Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Automobile Engineering.**	Enrollment No. ☐☐☐☐☐☐
Course:	**Mechanics of Thermal System.**	Course Code: **6A201**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1 A] Solve any FIVE of the following   **15**

   a. Define following terms with suitable example. (i) System (ii) Boundary (iii) Surrounding.

   b. Give any three assumption of air standard cycle.

   c. Suggest any three automotive uses of compressed air.

   d. Compare close cycle and open cycle gas turbine on the basis of any three points.

   e. Define following terms and give its suitable example. (i) Conduction (ii) Convection (iii) Radiation.

   f. Define following terms of Psychometric properties (i) Dry bulb temperature (ii) Wet bulb temperature. (iii) Dew point temperature.

   g. Derive the equation of steady state flow energy in case of nozzle with reversible adiabatic process.

B] Solve any ONE of the following   **05**

   a. A single stage reciprocating compressor takes $1m^3$ of air per minute at 1.013 bar and 15^0C and delivers it at 7bar. Assuming that the law of compression is $PV^{1.35}$=constant and the clearance is negligible, calculate the indicated power.

   b. Describe the construction and working of Automotive air conditioning with neat sketch.

Q.No.2 Solve any THREE of the following   **12**

   a. Describe the Otto cycle with the help of P-V diagram.

   b. Describe the need of regeneration with the help of P-V and T-S diagram (in case of open cycle gas turbine)

   c. A heat exchanger is to be selected for pasteurization of milk what material and which type of heat exchanger should be selected and justify your answer.

   d. Describe the working of vapour compression cycle with neat sketch.

P.T.O.

Q.No.3   **Solve any THREE of the following**   **12**

    a. Differentiate between open system and closed system on the basis of any four points.

    b. Describe the phase changes phenomena of ice to steam in detail. (with T-H Graph)

    c. Justify the need of multistaging in reciprocating air compressor with the help of P-V diagram.

    d. Justify the need of supercharging in case of automotive I.C. engine and draw a neat labeled sketch of turbo charger.

Q.No.4   **Solve any THREE of the following**   **12**

    a. Describe the following terms and write its equation (i) Isothermal efficiency (ii) Volumetric efficiency.

    b. Explain method of inter cooling in case of open cycle gas turbine with the help of T-S diagram.

    c. Explain working of shell and tube type heat exchanger with their application.

    d. Describe the working of modified vapour absorption cycle with neat sketch.

Q.No.5   **Solve any THREE of the following**   **12**

    a. Draw the P-V and T-S diagram for following thermodynamic process.
       (i) Iso baric (ii) Iso thermal.

    b. Calculate the ideal air standard cycle efficiency of Otto cycle for a gas engine with a cylinder bore of 50mm, a stroke 75mm and clearance volume is 21.3 cm^3.

    c. Justify the need of intercooling in case of multistage reciprocating air compressor with the help of P-V diagram.

    d. Describe the following forms related to psychometric properties of air (i) Humidification (ii) De-humidification.

Q.No.6   **Solve any TWO of the following**   **12**

    a. A cylinder contains $0.40m^3$ of gas at 1.20 bar and 110^0C. The gas is compressed according to the law $PV^n=C$ to a volume of $0.07m^3$ the final pressure being 7 bar determine (i) The value of index 'n' for compression. (ii) Final temperature of gas.

    b. Describe the working principle of open and closed cycle gas turbine with neat sketch.

    c. Determine the rate of heat flow through the boiler wall made of 3cm thick steel and covered with an insulating material of 0.5 cm thick. The temperature of wall inside boiler is 300^0C and temperature on the outer surface is 50^0C. Assume 'K' for steel is 60 w/m^{0}k and 'K' for insulation is 60 w/m^{0}k.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Automobile Engineering.**

Enrollment No.

Course: **Mechanics of Fluid System.**   Course Code: **6A202**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1 A] Solve any FIVE of the following   **15**

   a. State and explain Newton's law of viscosity

   b. What is mean by rate of flow? Give its unit.

   c. Define Kinematics & Dynamics of fluid flow.

   d. What is mean by Reynold number?

   e. Define HGL & TGL in case of flow through pipes.

   f. Classify control valve.

   g. Draw any 3 symbols used in hydraulic circuits.

B] Solve any ONE of the following   **05**

   a. Discuss different cases of surfaces to measure total pressure.

   b. Explain screw pump with neat sketch.

Q.No.2   Solve any TWO of the following   **12**

   a. What are the different pressure measurement device? Explain any one in detail with neat sketch.

   b. State & explain conditions of equilibrium of floating bodies.

   c. State Bernoulli's equation & explain each term involve in it with units.

Q.No.3   Solve any TWO of the following   **12**

   a. Explain concept of water hammer & power transmission through pipes.

   b. Explain working of pressure regulator with neat sketch.

   c. Explain temperature compensated valve with neat sketch.

Q.No.4   **Solve any TWO of the following**   **12**

    a. Define metacenter & metracenter height with its significance for submerged bodies.

    b. i) What are the law of fluid friction?

       ii) Give & explain terms involve in Chezy's formula.

    c. Explain time delay circuit with its application in vaccum handling.

Q.No.5   **Solve any TWO of the following**   **12**

    a. i) State & explain Pascal's Law

       ii) Define absolute, gauge & vaccum pressure.

    b. What is continuity equation? Explain any one application of Bernoulli's equation.

    c. Explain Regenerative circuit with neat sketch.

Q.No.6   **Solve any TWO of the following**   **12**

    a. Explain piston pump & its types with neat sketch.

    b. Write a note on Directional control valve with its symbolic representation.

    c. Explain meter IN & meter OUT circuit with its industrial application in detail.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Automobile Engineering.**

Enrollment No.

Course: **Automobile Materials**

Course Code: **6A203**

Max Marks: **80** Time: **03 Hours** Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	State the requirement of ideal auto material.	
CO1	b.	Classify the materials used in automobile.	
CO1	c.	Define resilience.	
CO1	d.	Define Toughness.	
CO1	e.	What do you mean by red hardness?	
CO4	f.	Enlist the common ceramics material used as auto material.	
CO4	g.	State the applications of ceramic materials.	
CO2	h.	Mention the effect of alloying material 'W' on steel properties.	
CO2	i.	List uses of stainless steel for automobile components. (any four)	
CO2	j.	Draw Iron-carbon equilibrium diagram.	
CO2	k.	Compare between white & gray cast iron (any four points)	
CO2	l.	State the importance of Nitrating process for automobile components.	
CO1	m.	Define the term creep.	
CO2	n.	Compare ferrous & non ferrous materials. (any four points)	

Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	Give detail classification of ferrous metal.	
CO2	b.	Write effect of alloying element like Ni, Cr, Si, Mo on the properties of steel.	**P.T.O.**

CO3   c.   What is babbit? Give its chemical composition and application.

CO3   d.   Enlist the composition and two application of muntz metal.

Q.No.3   **Solve any THREE of the following**   **12**

CO2   a.   Define Tools steel. Explain what is meant by H.S.S.?

CO2   b.   State the properties of stainless steel.

CO3   c.   State the advantages of non ferrous auto material. (any four)

CO3   d.   State any four applications of copper alloy.

Q.No.4   **Solve any THREE of the following**   **12**

CO4   a.   State any four desirables properties of ceramic material.

CO4   b.   State the importance of ceramics TSG & LSG in automotive industry.

CO5   c.   Compare thermoplastic material with thermosetting material.

CO5   d.   Define rubber. List its types and applications.

Q.No.5   **Solve any THREE of the following**   **12**

CO5   a.   State the general properties of plastics.

CO5   b.   Define polymer. How they are classified?

CO5   c.   Explain Acrylics with their properties and uses.

CO6   d.   Compare between Bio-Diesel and Diesel. (Any Eight point)

Q.No.6   **Solve any THREE of the following**   **12**

CO6   a.   State the requirements of ideal fuel for automobile.

CO6   b.   Compare multi-grade and mono-grade liquid lubricant.

CO6   c.   State the significance of solid lubricant in automobile lubrication with its applications.

CO6   d.   Enlist the required properties of lubricant in automobile. State its need in automobile.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Automobile Engineering.**

Enrollment No.

Course: **Automobile Mechanisms**   Course Code: **6A204**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Define the following terms related to mechanism.	
		(i) Statics (ii) Dynamics (iii) Kinematics.	
CO2	b.	Describe with neat sketch the velocities of various point by instantaneous centre method.	
CO3	c.	Classify the types of cam and follower pair and draw a neat sketch anyone of them.	
CO4	d.	Compare chain drive transmission with Belt drive transmission on the basis of three points.	
CO5	e.	Classify the types of dynamometer.	
CO6	f.	Justify the need of dynamometer and explain why two stroke engine having lighter flywheel than four stroke engine.	
CO1	g.	State motion and types of motion with suitable example.	

	B]	**Solve any ONE of the following**	**05**
CO4	a.	A shaft which rotates at a constant speed of 160 rpm is connected by belting to a parallel shaft 720 mm apart which has to run at 60,80 and 100 rpm. The smallest pulley on the driving shaft is 40mm in radius. Determine the remaining radius of the two stepped pulleys for a crossed belt. Neglect belt thickness and slip.	
CO5	b.	Describe the construction, working principle of hydraulic dynamometer with neat sketch.	

P.T.O.

Q.No.2　　**Solve any THREE of the following**　　　　　　　　　**12**

CO1　a.　Describe the types of Kinematic link and Kinematic pair on the basis of nature of contact closure and relative motion.

CO2　b.　Draw displacement, velocity and acceleration diagrams for a follower when it moves with simple harmonic motion.

CO4　c.　Describe the construction and working of centrifugal clutch with a neat sketch.

CO5　d.　Explain the concept of self locking and self energizing brakes.

Q.No.3　　**Solve any THREE of the following**　　　　　　　　　**12**

CO2　a.　Draw Klein's construction for determining the velocity of piston in a single slider crank mechanism.

CO4　b.　Explain with neat sketch working principle of epicyclic gear train.

CO5　c.　A single block brake having the diameter of drum is 300mm and the angle of contact is 90^0. If the operating forces of 600N is applied at the end of lever and the coefficient of friction between drum and lining is 0.3 determine the torque that may be transmitted by the block brake.

CO6　d.　Discuss how a single rotating mass is balanced by a single mass rotating in the same plane.

Q.No.4　　**Solve any THREE of the following**　　　　　　　　　**12**

CO1　a.　Draw a neat sketch of any two types of inversion of four bar chain.

CO3　b.　Describe motions of cam and follower with their displacement and velocity diagrams with respect to S.H.M.

CO5　c.　Justify the need of following suspension linkages (i) Panhard arm. (ii) Trump bar.

CO6　d.　State the causes of vibration in machine and their harmful effects with remedies.

Q.No.5　　**Solve any TWO of the following**　　　　　　　　　**12**

CO1　a.　Sketch Oldham's coupling and label it and mention its any two applications.

CO3　b.　Define following term of cam and follower

(i) Pitch curve (ii) Pitch circle (iii) Trace point (iv) Pitch point.

CO4　c.　Find the speed ratio and train value of simple gear train were the speed of drive gear is 450 RPM, intermediate gear 100 RPM and of driven gear 75 RPM.

CO6　d.　Describe with neat sketch the construction and working of centrifugal governor.

Q.No.6   **Solve any TWO of the following**   **12**

CO1   a.   In the four chain ABCD, AD is fixed and is 160 mm long. The crank AB is 40mm
            long and rotates at 120 rpm clockwise, while link CD=80mm Oscillates about D.
            BC and AD are of equal length. Find the angular velocity of link CD when angle
            BAD=60^0.

CO2   b.   In a pin jointed four bar mechanism as shown in fig. AB=300 mm,
            BC=CD=360mm and AD=600mm. The angle BAD=60^0. The crank AB rotates
            uniformly at 100 rpm. Locate all the instantaneous centers and find the angular
            velocity of the link BC.

CO3   c.   A cam with a minimum radius of 25mm rotating clockwise at a uniform speed is
            to be designed to give a roller follower at the end of a valve rod motion designed
            below.

            (i) To raise the valve through 50mm during 120^0 rotation of the cam. (ii) To keep
            the valve fully raised through next 30^0. (iii) To lower the valve next 60^0 and (iv)
            To keep the valve closed during rest of the revolution i.e. 150^0. The diameter of
            the roller is 20mm. Draw the profile of the cam when the line of stroke of the
            valve rod passes through the axis of the cam shaft.

OR

CO5   c.   Explain the procedure to determine velocity of slider crank mechanism by relative
            velocity method.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Automobile Engineering.**

Enrollment No.

Course: **Basic Manufacturing Process**   Course Code: **6A206**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Classify the various hot working process.	
CO3	b.	Classify the various welding process.	
CO3	c.	Enlist the filter material used in welding process (any three)	
CO3	d.	Enlist the application of welding process in automobile (any three)	
CO4	e.	Enlist the design considerations in pattern layout (any three)	
CO4	f.	Enlist multi point cutting tool operations (any three)	
CO4	g.	Enlist the types of welding joints (any three)	
	B]	**Solve any ONE of the following**	**05**
CO1	a.	Explain the hot spinning process with suitable sketch	
CO1	b.	Explain the cold rolling process with suitable sketch.	
Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	Draw a neat labeled diagram of a power press indicating the various parts.	
CO2	b.	Explain any one method of supporting the punch used in press and press work.	
CO3	c.	Explain the gas welding process with suitable sketch.	
CO3	d.	Explain the metal inert gas welding process (MIG) with suitable sketch.	
Q.No.3		**Solve any THREE of the following**	**12**
CO2	a.	Explain the Blanking process with suitable figure used in press work.	
CO3	b.	Enlist the defects observed in the welding process (any four)	
CO4	c.	Enlist the characteristic of moulding sand (any four)	
CO4	d.	Explain the hand tools used in pattern making. (any four).	**P.T.O.**

Q.No.4 **Solve any THREE of the following** **12**

CO4 a. Explain the gravity die casting method by suitable figure.

CO5 b. Draw a neat labelled figure of single point cutting tool indicating the various nomenclatures.

CO5 c. Explain the gear hobbing process with suitable figure.

CO6 d. Enlist the advantages obtained in super finishing process (any four)

Q.No.5 **Solve any THREE of the following** **12**

CO5 a. Write advantages obtained in rough cutting operations. (any four)

CO6 b. Enlist the properties for the abrasives used in grinding wheel.

CO6 c. Explain the honing process with suitable figure.

CO5 d. Differential between dry and wet grinding.

Q.No.6 **Solve any THREE of the following** **12**

CO4 a. Explain the construction of any one moulding machine.

CO4 b. Explain the procedure for preparation of sand in mould making.

CO4 c. Explain any one sand testing equipment used in mould making techniques.

CO6 d. Enlist the process need to be performed for manufacturing of piston of petrol engine.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Automobile Engineering.**   Enrollment No.

Course: **Auto Engine Technology.**   Course Code: **6A403**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
	a.	State the function of scavenging system in I.C. engine.	
	b.	State any two effects of engine variable on Ignition lag.	
	c.	State any two functions of carburetor.	
	d.	State the requirement of fuel injection system used in C.I. Engine.	
	e.	List out types of blowers used for I.C. Engine. Explain any one.	
	f.	Explain the term detonation also state its effect on engine.	
	g.	Explain injection timing & its effects on engine performance.	
	B]	**Solve any ONE of the following**	**05**
	a.	Describe various properties of lubricants on the basis of grades.	
	b.	Describe the performance parameters of I.C. engine. Explain it.	
Q.No.2		**Solve any THREE of the following**	**12**
	a.	Classify I.C. engine with suitable example.	
	b.	State common features used for controlling the detonation in diesel engine.	
	c.	State the limitations of a simple carburetor.	
	d.	Explain construction and working of pintle nozzle with a neat sketch.	
Q.No.3		**Solve any THREE of the following**	**12**
	a.	Explain construction and working of piston used in modern automotive engines.	
	b.	Describe the construction and working of SU type carburetor with a neat sketch.	
	c.	Describe the system used in CI engines about heat release pattern.	
	d.	Explain construction and working of splash lubrication system.	

P.T.O.

Q.No.4   **Solve any THREE of the following**   **12**

    a.   What is ignition timing? Explain its role in I.C. engine.

    b.   Describe construction and working of liquid cooling system with a neat sketch.

    c.   Explain the mechanism of cooling fan with a sketch.

    d.   Describe the significance of heat balance sheet in detail.

Q.No.5   **Solve any TWO of the following**   **12**

    a.   State the function and material of the following engine items (i) Cylinder block (ii) Gaskets (iii) Crank shaft.

    b.   Explain the importance of combustion chamber is SI Engine. List various CC and explain any one used for modern vehicle.

    c.   Describe construction and working of spark advance & retard mechanism with a neat sketch.

Q.No.6   **Solve any TWO of the following**   **12**

    a.   Explain fuel spray formation and spray distribution system of CI engine.

    b.   Classify types of radiators used in cooling system. Describe construction & working of regular radiator used in vehicles.

    c.   Describe – rope brake dynamometer method for calculation of the following. (i) Brake power (ii) Friction power (iii) Indicated power with neat sketch.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Automobile Engineering.**

Enrollment No.

Course: **Automobile System Technology**   Course Code: **6A406**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	List the advantages and disadvantages of hydraulic brake system.	
CO1	b.	Mention the required properties of brake fluid.	
CO2	c.	Define the following terms- i) Caster ii) Camber iii) King pin inclination	
CO2	d.	Draw a neat sketch of recirculating ball nut type steering gear box.	
CO3	e.	State the function of suspension system of a vehicle.	
CO3	f.	State the classification of suspension system used in Automobile.	
CO4	g.	Enlist the required physical properties of refrigerant (Any six)	
	B]	**Solve any ONE of the following**	**05**
CO1	a.	Differentiate between disc brake and drum brake (Any five points)	
CO2	b.	Describe the working of Macpherson strut type suspension with sketch.	
Q.No.2		**Solve any THREE of the following**	**12**
CO3	a.	Explain the working of suspension system used in case of MSRTC- bus.	
CO4	b.	Why use of R-12 Freon replace by R-134a in Air conditioning?	
CO5	c.	Explain working of power window mechanism used in a car.	
CO6	d.	Define i) Tractive effort ii) Draw bar pull.	

Q.No.3 **Solve any THREE of the following** **12**

CO1   a.   Describe working of pneumatic brake system.

CO2   b.   Draw a neat sketch of Lamoine and Reverse Elliot type stub axle.

CO3   c.   Explain the function of anti roll bar and its application.

CO4   d.   Describe controls used in Air conditioning system, Thermostat and humidistat.

Q.No.4 **Solve any THREE of the following** **12**

CO1   a.   Explain the working of master cylinder used in brake system.

CO2   b.   With neat sketch explain caster and camber angle used in steering geometry of vehicle.

CO5   c.   Enlist signaling and theft deterrent devices with is application.

CO6   d.   How air conditioning works to maintain human comfort condition.

Q.No.5 **Solve any TWO of the following** **12**

CO2   a.   Why power steering is used in most of vehicle? State its advantages.

CO4   b.   Describe with sketch air conditioning system of an automobile.

CO5   c.   Explain how the navigation system of a vehicle works?

Q.No.6 **Solve any TWO of the following** **12**

CO1   a.   Compare between hydraulic and pneumatic brake system (Any six point)

CO3   b.   Describe with neat sketch working of Telescopic shock absorber.

CO6   c.   Define i) Pitching ii) Bouncing and iii) yawing & its effect on vehicle.

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Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Automobile Engineering .**	Enrollment No.	
Course:	**Auto Electrical and Electronics Technology**	Course Code:	**6A407**
Max Marks: **80**	Time: **03 Hours**	Date:	**7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1   A]   Solve any FIVE of the following.   **15**

    a.   Explain any three sub systems of Auto electrical systems.

    b.   State any six auto electrical instruments.

    c.   State and explain battery specifications.

    d.   Explain wiring color codes based on any selected standards.

    e.   Explain head lamp relay for circuit and working.

    f.   Explain types of sensors used in motor vehicles (Any three).

    g.   Explain LIN as a communication system.

B]   Solve any ONE of the following.   **05**

    a.   List electrical consumer systems and explain in general any one electrical consumer system.

    b.   Explain electronic control system. List types. Explain anyone using block diagram.

Q.No.2   Solve any THREE of the following   **12**

    a.   Explain battery testing for equipment, procedure and fault diagnosis.

    b.   Explain fault diagnosis in Electrical distribution system for equipment, tools, gauges and process.

    c.   Explain testing of any two engine sensor.

    d.   Differentiate between MOST and FlexRay networks based on any four parameters.

Q.No.3   Solve any THREE of the following   **12**

    a.   State and explain specification of alternator.

    b.   List vehicle body actuators. Explain testing of any three of them.

c. Explain signal for requirement, types and their processing.

d. Explain blue tooth as a network used in automotive application.

Q.No.4   **Solve any THREE of the following.**   **12**

a. Explain circuit protectors for purpose and types.

b. Explain lighting systems for legal requirements, types.

c. Explain ATD and DTA circuit for communication with ECU.

d. Explain electronic control unit for requirement and types.

Q.No.5   **Solve any TWO of the following**   **12**

a. Explain charging system based on its requirement and its subsystems.

b. Explain a selected wiring diagram for symbols, schematic diagram and section designation (Any two).

c. Explain starting system with its circuit diagram and working.

Q.No.6   **Solve any TWO of the following**   **12**

a. Define battery as a electrical storage. Describe construction and working of maintenance free battery.

b. Explain DIN, SAE and its standards used for electrical distribution system for layout and wiring code.

c. Explain DIS ignition systems for their need, types and working based on circuit diagram.

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Examination [191] : Nov.-Dec. 2019

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	List the requirements of comfort Air conditioning (Any three)	
CO1	b.	Draw a neat sketch of a duct system used in Air conditioning of a Bus.	
CO2	c.	Mention the safe properties of refrigerant (Any six)	
CO5	d.	Mention the possible causes and remedy if the compressor of A/C system, does not start.	
CO3	e.	State the function of ambient temperature sensor and where it is located in the car.	
CO1	f.	Draw a block diagram of climate control system.	
CO1	g.	Enlist the functions of comfort heating system.	
	B]	**Solve any ONE of the following**	**05**
CO3	a.	Explain purpose and function of case and duct system in HVAC system of a vehicle.	
CO3	b.	Enlist the general faults in comfort heating system and its remedy.	
Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Define the human comfort and mention the factors which affect human comfort.	
CO2	b.	Explain independent case / duct system with upstream blower.	
CO2	c.	Explain the refrigerant leak detection method by halide torch.	
CO3	d.	What is the function of thermostat in vehicle comfort heating system.	
Q.No.3		**Solve any THREE of the following**	**12**
CO1	a.	Draw a neat sketch of split case system with upstream blower.	
CO2	b.	Compare between Receiver-drier and accumulator (Any four)	

P.T.O.

CO3   c.   Explain the function and working of vacuum check valve.

CO5   d.   Describe the charging procedure of refrigerant in A/C system of a car.

Q.No.4   **Solve any THREE of the following**   **12**

CO5   a.   Explain air distribution of case / Duct system with a sketch.

CO3   b.   With a neat sketch. Explain the superheat switch.

CO3   c.   List electromagnetic clutch faults and its remedy.

CO5   d.   Explain procedure for maintenance of comfort heating system.

Q.No.5   **Solve any TWO of the following**   **12**

CO1   a.   Define the following terms with suitable example
             i) Conduction   ii) Convection   iii) Evaporation.

CO3   b.   With neat sketch explain downstream case and duct system.

CO2   c.   Compare between thermostatic expansion valve and capillary tube.

Q.No.6   **Solve any TWO of the following**   **12**

CO1   a.   Draw a general layout of Air conditioning system and explain its working.

CO6   b.   Describe construction and working of sun load sensor with sketch.

CO6   c.   Explain Heat pump refrigerant circuit change over with neat sketch.

OR

CO3   c.   Explain rotary vane type compressor with neat sketch.

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GOVERNMENT POLYTECHNIC, AURANGABAD.
(An Autonomous Institute of Govt. of Maharashtra)

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering**   Enrollment No.

Course: **Building Construction**   Course Code: **6C203**
Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	State any two functions of foundation.	
CO1	b.	Write any two factors affecting bearing capacity.	
CO1	c.	Draw a labeled sketch of a column footing.	
CO2	d.	Enlist four tools required for construction of brick masonry.	
CO2	e.	Draw a neat sketch to show Ashlar Masonry	
CO3	f.	Write two points to be considered for deciding location of doors.	
CO1	g.	List any two fixtures & two fastenings used in Door.	
CO2	h.	State the purpose of i) Ventilators & ii) Revolving door.	
CO2	i.	State where do you prefer i) Bifurcated stair ii) Spiral stair.	
CO2	j.	Define the terms used in stair i) Rise ii) Head Room	
CO1	k.	Give the location & use of Mezzanine floor.	
CO3	l.	Define Neeru finishing.	
CO3	m.	Enlist any four types of pointing.	
CO3	n.	State two necessity of plinth protection.	
CO2	o.	Give the name of two material used for formwork.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Explain well foundation with sketch.	
CO1	b.	Mention the situation where do you prefer	

      i) Raft foundation   ii) Wall footing

      iii) Stepped foundation   iv) Combined column footing

P.T.O.

| CO1 | c. | Explain step by step procedure of mark out of foundation by centre line method. |
| CO4 | d. | Compare English Bond with Flemish Bond. (Four points) |

Q.No.3 **Solve any THREE of the following** **12**

CO3	a.	Explain two types of Rubble Masonry & Draw a neat sketch of any one type of Rubble Masonry.
CO4	b.	Give four requirement of good stone masonry.
CO1	c.	Illustrate two problems in foundation due to low B.C. and give its remedies.
CO2	d.	Draw a labeled sketch of ledged and braced framed door.

Q.No.4 **Solve any THREE of the following** **12**

CO3	a.	Explain the procedure of fixing Door frame and Door shutter.
CO3	b.	Give any four thumb rules taken into consideration for stair design.
CO2	c.	Draw a neat labeled sketch of stair & show following
		i) Nosing ii) Baluster iii) Waist iv) Tread
CO2	d.	Draw a neat sketch showing plan and elevation of spiral staircase.

Q.No.5 **Solve any THREE of the following** **12**

CO4	a.	State any four requirements of good stair.
CO4	b.	Differentiate between pitched roof and flat roof (Four points)
CO4	c.	State four precautions to be taken while plastering.
CO3	d.	State necessity of i) Form work ii) Water proofing.

Q.No.6 **Solve any THREE of the following** **12**

CO3	a.	State the suitable situation for use of following types of flooring
		i) Wood floor ii) Shahabad floor iii) Marble floor iv) Marbonite
CO3	b.	Explain the procedure for carrying out the plaster in cement mortar in two coats.
CO5	c.	Enlist four defects generally observed in plastering work along with their measures.
CO5	d.	State two causes of cracks & give its method of repair.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

(An Autonomous Institute of Govt. of Maharashtra)

\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**

Enrollment No. ☐☐☐☐☐☐

Course: **Basic Surveying (BAS)**   Course Code: **6C204**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Define i) Surveying ii) Levelling iii) Scale	
CO2	b.	State the methods of Linear measurement.	
CO2	c.	State the duties of Leader.	
CO2	d.	Define i) Base line ii) Check line iii) Surveying station	
CO3	e.	Define i) True meridian ii) Magnetic meridian iii) Magnetic declination	
CO4	f.	List the accessories used for plane table surveying.	
CO5	g.	Define i) Focussing ii) Parallax iii) Bench mark	
	B]	**Solve any ONE of the following**	**05**
CO1	a.	Classify surveying.	
CO4	b.	Describe the general principle of surveying.	
Q.No.2		**Solve any THREE of the following**	**12**
CO3	a.	Draw the figure when chain line may be interrupted in the following situations.	

   i) When chaining is free, but vision is obstructed.

   ii) When chaining is obstructed, but vision is free.

   iii) When chaining and vision are both obstructed.

CO2   b.   The distance between two stations was 1200m when measured with a 20 m chain. The same distance when measured with 30 m chain was found to be 1195. If the 20 m chain was 0.04 m too long, what was the error in the 30 m chain?

CO3   c.   Draw the conventional symbols for the following
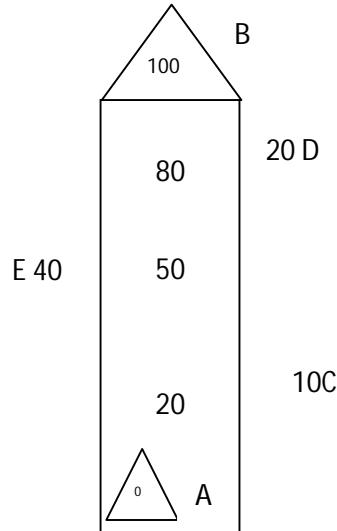
Canal, Level crossing, Cutting Boundary line.

CO3   d.   Explain the procedure of setting up the perpendicular by optical square.

Q.No.3   Solve any THREE of the following   12

CO2   a.   Determine the area of the field for the observations recorded in field book as given below.

CO6   b.   Describe the temporary adjustment of dumpy level.

CO5   c.   The bearing of the lines OA, OB, OC, OD are 30° 30′, 140° 15′, 220° 45′ and 310° 30′ respectively. Find the angles ∠AOB, ∠BOC and ∠COD.

CO3   d.   Define traversing and describe the method of compass traversing.

Q.No.4   Solve any THREE of the following   12

CO4   a.   Describe the intersection method of plane table.

CO4   b.   Enlist the steps for setting up plane table over a station. Explain orientation in details.

CO4   c.   State four advantages and disadvantages of plane table surveying.

CO6   d.   Compare between collimation system and Rise-and-fall system of calculation of RL.

Q.No.5   Solve any THREE of the following   12

CO6   a.   Describe temporary adjustments of dumpy level.

CO6   b.   Explain the process of fly levelling operation.

CO6   c.   Describe the process of profile leveling.

CO2   d.   Write the procedure of chaining on slopping ground by method of stepping.

Q.No.6   **Solve any TWO of the following**   **12**

CO6   a. The following consecutive reading were taken with a leveling instrument at interval of 10 m

2.375, 1.73, 0.615, 3.450, 2.85, 2.07, 1.5, 1.0, 0.435, 1.63, 2.55 and 3.630 m.

The instrument was shifted after fourth and Eighth reading. The last reading was taken on a BM of RL 110.200 m. Find the RLs of all the points.

CO6   b. The following table was obtained from a level book in which some of the readings were found to be missing. Calculate the missing data. Apply checks.

Station	BS	IS	FS	Rise	Fall	Rl	Remark
A	2.5					100	BM
B		X		1.5			
C		1.5			X		
D	2.3		X		0.3		CP
E		2.9			X		
F			1.3	1.6			CP

CO3   c. The following bearings were taken in traverse surveying conducted by compass at a place where local attraction was suspected.

Line	Fore bearing	Book bearing
AB	45° 00′	226° 15′
BC	130° 30′	310° 00′
CD	184° 30′	4° 30′
DA	290° 00′	109° 15′

Find the corrected bearing of a line.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**

Enrollment No. ☐☐☐☐☐☐

Course: **Hydraulics**

Max Marks: **80**   Time: **03 Hours**

Course Code: **6C205**

Date: **7 May 2022**

Instructions:

1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	State the unit of following : i) Mass density ii) Specific weight	
CO1	b.	List any two devices used for measurement of pressure.	
CO1	c.	Define i) Total Pressure ii) Centre of pressure.	
CO1	d.	Define discharge and give its unit.	
CO2	e.	State law of continuity.	
CO3	f.	Define Reynold's number.	
CO3	g.	State any two laws of pipe friction for laminar flow.	
CO2	h.	A rectangular channel is 3m deep and 5m wide. Find discharge through channel when it runs full. Take S=1/1000 and C=50.	
CO2	i.	Enlist two uses of hydraulic jump.	
CO2	j.	Define vena contract and show its location by drawing a sketch of jet from orifice.	
CO2	k.	State principle of venturimeter.	
CO2	l.	State two advantages of triangular notch over rectangular notch.	
CO2	m.	Enlist any two velocity measuring devices.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Explain the concept of ideal and real fluid.	
CO1	b.	Define atmospheric pressure, gauge pressure and absolute pressure and give relationship between them.	
CO1	c.	An U-tube differential manometer containing mercury, is used to measure the difference in pressure for two pipes 'C' and 'D' as shown in figure 2C. Pipe 'C' contains carbon tetrachloride of specific gravity 0.8, Pipe D contain oil of specific gravity 0.9. Find the difference of pressure in two pipes C and D.	
CO1	d.	A rectangular plate 2m x 4m is vertically immersed in water in such a way that 2m side is parallel to water surface and is 2.5m below it. Find total pressure and its position on plate.	

Q.No.3		**Solve any THREE of the following**	**12**
CO1	a.	Define pressure diagram with neat sketch. State it's any two application.	
CO2	b.	State Bernoulli's theorem with equation and state its two practical applications.	
CO2	c.	A vertical pipe 2m long has 200mm diameter at the lower end, 400 mm diameters at upper end. It carries water at 200 lits/sec. If loss in pipe is 1m of water. Find pressure difference in between two ends of pipe. **P.T.O.**	

CO3   d.   State minor losses of head in flow through pipes and give formula for any two minor losses.

Q.No.4   **Solve any THREE of the following**   **12**

CO3   a.   Two reservoirs are connected by three pipes in parallel. Their diameters are d, 2d and 3d having same length and same frictional factor for pipes. Determine discharge through larger pipes, if discharge through smaller pipes is $2m^3/s$.

CO3   b.   Define water hammer phenomenon. Enlist remedial measures for avoiding water hammering action.

CO2   c.   i) Define a) Wetted perimeter and   b) Hydraulic radius.
           ii) Give most economical conditions for rectangular channel.

CO2   d.   Determine most economical section of trapezoidal channel for carrying discharge $12m^3/s$ with a bed slope of 1:5000. The side slopes are 3H:2V. Take manning's constant as 0.012.

Q.No.5   **Solve any THREE of the following**   **12**

CO4   a.   Classify orifice according to
           i) Size   ii) Shape   iii) Shape of upstream edge of orifice   iv) Nature of discharge.

CO2   b.   Water discharges at the rate of 0.09 m^3/s through 10 cm diameter vertical sharp edge orifice placed under a constant head of 8 m. Find coefficient of discharge C_d of orifice. Also if a point on the jet measured from venacontracta of jet has coordinates 4.5 m horizontal and 0.54 m vertical then find C_V and C_C also (C_d, C_V. C_C)

CO2   c.   Draw a neat lebelled sketch of venturimeter and show all component parts.

CO2   d.   Make differentiation between notches and weirs (any four points)

Q.No.6   **Solve any THREE of the following**   **12**

CO2   a.   Determine discharge through 750 triangular notch, when head over notch is 0.8m. Take C_d as 0.60

CO2   b.   Explain working of any one type of current meter.

CO4   c.   Compare centrifugal pump with reciprocating pump. (any four points)

CO4   d.   Find the power required for a pump under the following condition. (i) Water to be pumped = 50 lit/sec, (ii) Pump total lift = 20m, (iii) Frictional losses=5m (iv) Efficiency of pump=80%.

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**

Enrollment No.

Course: **Building Drawing**   Course Code: **6C206**

Max Marks: **80**   Time: **04 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	Draw graphical symbol for following as per IS 962-1989 a) Glass b) Brick masonry.	
CO1	b.	Draw graphical symbol for following as per IS 962-1989 a) Hidden line b) construction line.	
CO1	c.	Enlist and explain any four types of lines used in drawing.	
CO2	d.	Define a) FSI b) Saleable Area.	
CO2	e.	Define a) Side margin b) Super built-up area.	
CO2	f.	Specify minimum dimensions of following units of residential building a) Living Room b) Kitchen	
CO2	g.	Specify minimum dimensions of following units of residential building a) Bath b) W.C.	
CO2	h.	Specify minimum height requirements of following buildings. a) Public building b) Residential building	
CO2	i.	Specify minimum height requirements of following building unit. a) Plinth b) W.C. and Bath ceiling.	
CO3	j.	Specify different sizes of opening for a) Door of W.C. and bath b) Window in bedroom.	
CO3	k.	Specify size of opening for a) Ventilator for Bath b) Door for living room.	
CO3	l.	Define a) Prospect b) Privacy	
CO3	m.	Define a) Grouping b) Circulation	
CO2	n.	State minimum arc area for ventilation in residential and public buildings.	

P.T.O.

Q.No.2		**Solve the following**	**12**
CO4	a.	Prepare developed double line plan for figure no.1 using given details. (Assume suitable scale and required data)	

Q.No.3		**Solve the following**	
CO4	a.	Prepare front elevation for figure No. 1 (Take scale used in Q.2 and Assume required suitable data)	**04**
CO4	b.	Prepare section along line A-A for figure no.1	**08**

Q.No.4		**Solve any THREE of the following**	**12**
CO4	a.	Prepare schedule of openings in the standard format for figure No.1	
CO3	b.	Enlist different units of residential building to be considered for planning.	
CO3	c.	Write any eight construction notes for a load bearing structure.	
CO5	d.	Compare between one point perspective and two point perspective. (four points)	

Q.No.5		**Solve any TWO of the following**	**12**
CO5	a.	Enlist different term used in perspective drawing and use of it (Any four)	
CO2	b.	Explain importance of development control rules and bye-laws.	
CO1	c.	Enlist different types of building drawings.	
CO4	d.	Draw to a suitable scale site plan for the building mentioned in question no. 2 (Figure No. 1) consider plot size is 12m X 15m.	

Q.No.6		**Solve any TWO of the following**	**12**
CO4	a.	Prepare line plan for primary school building with suitable scale and show names to different unit.	
CO2	b.	Explain necessity and provisions made for proper ventilation in residential and public building.	
CO5	c.	Draw the two point perspective view of small object shown in figure No. 02, retain all construction lines. Take eye level at 1.50m above G.L. All dimensions are shown in mm.	

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Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Civil Engineering.**	Enrollment No. ☐☐☐☐☐☐
Course:	**Concrete Technology.**	Course Code: **6C207**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1   A]   Solve any TEN of the following   **20**

CO1	a.	Define hydration of cement and enlist four compounds of cement.	
CO1	b.	What is meant by Adulteration of cement?	
CO2	c.	State four properties of fine aggregates.	
CO2	d.	Classify the coarse aggregates with reference to its shape and size.	
CO3	e.	Define duff Abraham's w/c ratio law.	
CO3	f.	Define compressive strength of concrete.	
CO3	g.	State the factors affecting shrinkage.	
CO4	h.	Define concrete mix design.	
CO4	i.	State different methods of NDT.	
CO4	j.	List two methods of mix design of concrete.	
CO5	k.	Distinguish between weigh batching and volume batching.	
CO5	l.	Write the precautions to be taken while transporting the concrete.	
CO5	m.	Enlist types of joint provided in concrete.	
CO6	n.	Name any four admixtures used in concrete.	

Q.No.2   Solve any THREE of the following   **12**

CO1   a.   Suggest the type of cement used for the following situations.

(a) Road construction. (b) Construction in winter season (c) Construction of dam

(d) Construction in summer season.

CO2   b.   Explain need and importance of impact value and abrasion value for coarse

aggregate

CO3   c.   Define impermeability of concrete. Enlist factors affecting it.   **P.T.O.**

CO4   d.   Explain in detail IS method of mix design with steps.

Q.No.3   **Solve any THREE of the following**   **12**

CO1   a.   Give step by step procedure of any one lab test for OPC.

CO2   b.   Explain procedure for determination of water absorption of coarse aggregate with IS specifications.

CO2   c.   Define impact value, abrasion value, crushing value and flakiness index of coarse aggregate.

CO3   d.   Explain different methods of curing of concrete.

Q.No.4   **Solve any THREE of the following**   **12**

CO3   a.   Define workability of concrete. Explain workability of concrete with slump test.

CO4   b.   State four limitations of rebound hammer test.

CO5   c.   Explain the necessity of thorough mixing of ingredients of concrete. While preparing fresh concretes. State types of mixing. Write the precautions to be taken while mixing when plasticizers are used.

CO6   d.   Explain in brief 'Super Plasticizers.'

Q.No.5   **Solve any THREE of the following**   **12**

CO3   a.   Explain the procedure to determine the compressive strength of concrete.

CO4   b.   Suggest maximum water cement ratio for four different grades of concrete as per IS : 10262-1982.

CO5   c.   State requirements of formwork.

CO6   d.   Define RMC and state advantages and limitations of RMC.

Q.No.6   **Solve any TWO of the following**   **12**

CO3   a.   State the different stages in concreting operations and precautions to be taken to avoid the wastage of material.

CO4   b.   Explain with sketch the pulse velocity method used in testing the concrete.

CO5   c.   State the necessity of water proofing. Enlist methods of water proofing.

CO6   d.   What are the problems faced in hot weather concrete? Write any four.

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Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Civil Engineering.**	Enrollment No.
Course:	**Mechanics of Structures**	Course Code: **6C208**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1   **Solve any TEN of the following.**   **20**

a. Define temperature stress. State the formula to find free expansion.

b. A hole of size 20 mm X 15 mm is to be punched through 10 mm thick plate. Find the force required to punch the hole if the strength of the plate is 100Mpa.

c. A steel bar 80 mm wide and 20 mm thick is 1m long, rod is subjected to axial pull of 30kN. Calculate elongation of the bar if E = 200GPa.

d. Calculate M.I. of a hollow rectangular lamina of outer dimensions 120mm X 200mm and inner dimensions 80mm X 160mm, about centroidal y axis.

e. For a quadrant of a circle of diameter 120mm, calculate M.I. @ the centroidal axes.

f. State formula of M.I. @ centroidal xx axis of a triangle of base b and height h.

g. A simply supported beam of span 6m, carries two point loads 20 kN at 2 m and 4 m respectively from left hand support. Calculate maximum bending moment.

h. Sate the relationship between shear force and loading function of a beam and relationship between bending moment and shear force.

i. State the formula for maximum BM for a cantilever of l length and point load W at free end of cantilever.

j. Define section modules and state bending stress formula.

k. Draw distribution of shear stress across solid circular section and state relation between maximum and average shear stress for solid circular section.

l. Define moment of resistance.

m. State maximum eccentricity for core of a solid circular section and draw core of a solid circular section.

n. State conditions of stability of dam section.

o. By drawing neat sketch show eccentric load on a cross section of a column. Which types of stresses are developed due to eccentric load?

Q.No.2   **Solve any TWO of the following**   **12**

a.   a reinforced concrete column of cross section 450 mm x 450 mm has 4 bars of 22 mm diameter. Determine the safe load it can carry if the permissible stresses in concrete and steel are 6 Mpa and 140 Mpa respectively take Es/Ec = 18.

b.   A bar of stepped cross section is loaded as shown in the Figure 1. Find the maximum and minimum intensities of stress included. Also calculate the net elongation of the bar if E = 200 Gpa.

c.   A cube of 100 mm side is acted upon by stresses along three directions such as $6x = 120$ Mp$_a$(tensile) $6_y = 75$ Mpa and $6z = 50$ Mpa (compressive). Find the strains in three directions if $\mu = 0.25$ & E = 200 Gpa.

Q.No.3   **Solve any TWO of the following**   **12**

a.   For the tee section of flange 60mm X 10mm and web 70mm X 10mm, values of $\bar{X} = 30$ mm and $\bar{Y}$ from bottom = 53.46 mm. Calculate I_{xx} and I_{yy} for the section.

b.   Find the moment of inertia of the shaded area as shown on Figure 2 about the axis AB.

c.   A steel rod 50mm X 50mm in section and 3m long is subjected to an axial pull of 20 kN. Taking E = 2×10^5 N/mm^2 and $\mu = 0.3$. Calculate the change in length side and change in volume of the rod.

Q.No.4   **Solve any TWO of the following.**   **12**

a.   A 10 m long simply supported beam carries two point loads of 10 kN and 6kN at 2m and 8m respectively from the left end. It also carries u.d.l. of 4 kN/m for length between 4m and 7m from the left end. Draw shear force and bending moment diagram for the beam.

b.   An overhanging beam of span 10m is loaded as shown in Figure No.3. Draw shear force and bending moment diagram for the beam..

c.   A simply supported beam of span 6m carries a point load of 12kN and clockwise couple of 24kNm at 2m from the left end, draw shear force and bending moment diagram for the beam.

Q.No.5   **Solve any TWO of the following**   **12**

a.   A hollow circular bar used as a beam having its outside diameter thrice the inside diameter. It is subjected to maximum bending moment of 60kNm. Determine inside diameter of the beam if the permissible bending stress is limited to 120Mpa.

b.   A symmetrical I beam of moment of Inertia @ xx axis as 50×10^6 mm^4. Over all depth of section 200 mm, is to be used as a simply supported beam of 6.75m span. Determine what concentrated load can be applied at a distance 2.25 m from right support if the maximum permissible stress is 80 Mpa.

c. Write shear stress equation stating meaning of each term. Draw shear stress distribution for solid circular, hollow rectangular, channel section and angle section showing location of maximum shear stress.

Q.No.6   **Solve any TWO of the following**   **12**

a. A masonry dam 10 m high. Its width at top and bottom 2m & 6m respectively. Its water face is vertical and retains water to a depth of 9m. Determine the maximum and minimum stress values at the base. The unit weight of masonry is 22kN/m^3 and specific weight of water 10kN/m^3.

b. A square column of side 400mm carries a load PkN lying on one of the centroidal axis and eccentric about the other by 'e'. If the resultant stress distribution diagram is as shown in Figure NO 4. Determine values of 'P'(load applied) and 'e' (eccentricity of the load).

c. i. Draw distribution of resultant stress at the base when

      1. σo (direct stress) > σb(bending stress)

      2. σo=σb

      3. σo<σb

ii. Calculate MI of a square lamina 50mm X 50mm about its diagonal.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

(An Autonomous Institute of Govt. of Maharashtra)

\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**

Enrollment No.

Course: **Theory of Structures.**   Course Code: **6C401**
Max Marks: **80**   Time: **04 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO3	a.	A continuous beam is loaded as shown in fig. No. 1. Without calculations draw nature of bending moment diagram for the beam.	
CO3	b.	Define stiffness factor, distribution factor and carry over factor.	
CO3	c.	Explain principle of superposition w.r.t. fixed beam.	
CO2	d.	Define perfect frame, deficient frame and redundant frame with sketches.	
CO2	e.	A simply supported beam of span 4m carries a central point load of 19 kN. Calculate maximum deflection at mid span. Take $I_{XX}=2 \times 10^8$ mm^4 & E=200 GPa.	
CO2	f.	For a cantilever of span 3m carrying a point load 'W' at the free end, the maximum slope was 0.2^0. Calculate the maximum deflection in mm.	
CO3	g.	State moment distribution theorem.	

	B]	**Solve any ONE of the following**	**05**
CO3	a.	Calculate the distribution factors for members for the joint 'O' as shown in fig. No. 2.	
CO3	b.	A fixed beam AB of span 3m carries a point load of 80 kN at its center. Calculate fixed end moments by using first principle and draw B.M. diagram.	

Q.No.2		**Solve any TWO of the following**	**12**
CO1	a.	A point in a strained material is stressed as shown in fig. No. 3. Calculate the principal stresses, position of principal planes and value of maximum shear stress.	
CO1	b.	An element is subjected to principal stresses of 100 Mpa (Tensile) and 60 MPa (compressive). Calculate normal stress, tangential stress, resultant stress on an inclined plane making an angle of 35^0 with the principal plane carrying 100 MPa stress. Also calculate angle of obliquity.	

P.T.O.

| CO1 | c. | For a stressed element shown in fig. No. 3, calculate normal, shear and resultant stresses on an inclined plane making an angle of 40^0 with vertical plane AB. | |

Q.No.3   **Solve any TWO of the following**   **12**

CO3	a.	A fixed beam of 4m span carries a point load of 20 kN at 1m from left hand support. Calculate fixed end moments. Draw S.F. and B.M. diagrams.
CO3	b.	A fixed beam of 8m span is subjected to UDL of 3 kN/m over entire length along with a point load of 12 kN acting 3m from left hand support. Calculate fixed end moments and draw B.M.D. Also calculate support reactions and net bending moment under the point load.
CO3	c.	A continuous beam is loaded as show in fig. No. 4. Using theorem of three moments, calculate support moments and draw B.M. diagram. M.I. constant throughout.

Q.No.4   **Solve any TWO of the following**   **12**

CO3	a.	A continuous beam ABCD is loaded as shown in Fig. No. 5. Using Clapeyron's theorem of three moments calculate support moments and draw B.M. diagram.
CO3	b.	A continuous beam ABC is loaded as shown in Fig. NO.6. Using theorem of three moments calculate support moments. Draw S.F. and B.M. diagrams.
CO3	c.	For a continuous beam loaded as shown in Fig. No. 5, calculate support moments using moment distribution method. Also calculate support reactions.

Q.No.5   **Solve any TWO of the following**   **12**

CO2	a.	A simply supported beam is loaded as shown in fig. No. 7. Determine slope at A and deflection at 'C'. Assume EI=4000 kN-m^2
CO2	b.	A cantilever of 2m long carries an UDL of 10 kN/m over 1m portion from fixed end and a point load of 20 kN at free end. Calculate the maximum slope and maximum deflection of the cantilever. Assume EI=2800 kN-m^2.
CO2	c.	Calculate safe load on hollow circular steel column of external diameter 150mm and internal diameter 100mm. Length of column is 6m with both ends hinged. (Use Rankine's formula). Take σc=550MPa, $\alpha=\dfrac{1}{1600}$, factor of safety=1.5.

Q.No.6　　　　**Solve any TWO of the following**　　　　　　　　　　**12**

CO2　a.　A 4m length of tube has a buckling load of 2kN when used as a column hinged at both ends. Calculate the buckling load for a 4.5 m length of same tube when used as a column if one end is fixed and other hinged use Euler's formula.

CO2　b.　A truss is loaded as shown in fig. No. 8, Using method of sections, calculate magnitude and nature of forces developed in the members. BC, CE and EF. Tabulate the results.

CO2　c.　Using method of joints analyze the truss shown in fig. No. 8. Tabulate the results for the members – AB, AE, CD, DF, CF and EF.

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**

Enrollment No.

Course: **Geotechnical Engineering.**   Course Code: **6C402**
Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Define soil and enlist importance of geotechnical engineering.	
CO2	b.	Define (a) Void ratio (b) bulk unit weight (c) liquid limit.	
CO3	c.	Define (a) Permeability (b) Phreatic line.	
CO4	d.	Define (a) Optimum moisture content (b) Maximum dry density.	
CO6	e.	Define (a) safe bearing capacity (b) allowable bearing pressure.	
CO5	f.	Which two components constitute shear resistance of soil?	
CO7	g.	Enlist four method of soil stabilization.	
	B]	**Solve any ONE of the following**	**05**
CO2	a.	A saturated clayeg soil weighing 1600 grams weighs 1300 grams after oven drying. If its dry density is 1350 kg/m^3, determine its water content, Void ratio, Porosity and Degree of saturation. Assume G=2.50 and V_w=9.8 kN/m^3.	
CO3	b.	In a falling head permeability test on a sample 12.2 cm length and 44.41 cm^2 in cross sectional area. The water level in stand pipe of 6.25 mm internal diameter dropped from a height of 75cm through 24.7 cm in 15 min. Find the coefficient to permeability.	
Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	State any four field applications of geotechnical engineering.	
CO2	b.	Draw three phase diagram for soil of dry condition with neat labelled diagram and explain all the notations used there in.	
CO3	c.	Write procedure to determine coefficient of permeability by constant head method	
CO4	d.	Differentiate between compaction and consolidation.	

P.T.O.

Q.No.3   **Solve any THREE of the following**   **12**

CO4   a.   Describe stepwise procedure of CBR test.

CO6   b.   State effect of water table on bearing capacity of soil & how it is incorporated in the bearing capacity equation for strip footing.

CO7   c.   Explain in detail method of mechanical stabilization.

CO2   d.   Describe stepwise procedure for finding out dry density of soil by core cutter method.

Q.No.4   **Solve any THREE of the following**   **12**

CO2   a.   Calculate the coefficient of uniformity (C_u) and coefficient of curvature (C_C) for a soil sample for which (i) $D_{10} = 0.0019$ mm (ii) $D_{30} = 0.030$ mm (iii) $D_{60} = 0.49$ mm.

CO3   b.   Write step by step procedure for determination of permeability of soil by falling head method permeability test. Explain with neat sketch.

CO4   c.   List different methods of field compaction of soil & state field situation when smooth wheel roller & sheep foot roller is adopted.

CO5   d.   Draw shear strength envelope for purely cohesive and cohesion less soil with sketch.

Q.No.5   **Solve any THREE of the following**   **12**

CO2   a.   Calculate shrinkage limit for a given soil sample from the following data.
(i) mass of empty container $W_1 = 13$ grams. (ii) Mass container with wet soil $W_2 = 43$ grams, (iii) Mass of container with dry soil $W_3 = 32.3$ grams,
(iv) Volume of wet soil $V_1 = 20.7$ cm^3, (v) Volume of dry soil pat $V_2 = 10.3$ cm^3.

CO3   b.   State any four factors affecting the permeability of soil.

CO6   c.   Explain methods of improving bearing capacity of soil and state typical values for SBC for black cotton soil and hard murum.

CO5   d.   State the advantages of direct shear test and it's any two limitations.

Q.No.6   **Solve any THREE of the following**   **12**

CO6   a.   Write any three important assumptions made by Terzaghi and also state the objective of conducting plate load test.

CO2   b.   Describe stepwise procedure for finding out specific gravity by pycnometer.

CO4   c.   Explain briefly purpose of compaction and enlist filed situations where compaction is required.

CO7   d.   Describe briefly step wise procedure for fly ash and lime stabilization.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**

Enrollment No.

Course: **Advanced Surveying**

Course Code: **6C403**

Max Marks: **80** Time: **03 Hours**

Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Define transiting & swinging of Theodolite .	
CO2	b.	Define (i) Contour (ii) Contour Interval.	
CO3	c.	Enlist any four name of instruments used in Tachometry	
CO4	d.	Enlist different types of curves.	
CO6	e.	Enlist any three applications of GPS.	
CO1	f.	State any four uses of transit theodolite.	
CO2	g.	Draw contours for (a) Valley (b) Pond (c) Vertical cliff.	
	B]	**Solve any ONE of the following**	**05**
CO1	a.	Explain temporary adjustment of transit theodolite.	
CO3	b.	Enlist advantage & disadvantage of tangential method of Tacheometry.	
Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Write down stepwise procedure of measuring bearing of line by using theodolite.	
CO2	b.	State any four characteristics of contour.	
CO3	c.	Describe advantages and disadvantages of Anallatic lens.	
CO4	d.	Draw figure of simple circular curve & show elements of it.	
Q.No.3		**Solve any THREE of the following**	**12**
CO5	a.	Explain procedure for setup of total station.	
CO6	b.	Describe Global Positioning system.	
CO5	c.	State the advantage of total station.	
CO4	d.	Enlist method of settling out simple circular curve and explain any one.	**P.T.O.**

Q.No.4   **Solve any THREE of the following**   **12**

CO1   a.   Explain the procedure for measurement of deflection angle by using transit theodolite.

CO2   b.   Describe stepwise procedure for calculating volume of earthwork by using contour map and digital planimeter.

CO6   c.   Explain fundamentals of GPS.

CO5   d.   State the applications of Total Station.

Q.No.5   **Solve any THREE of the following**   **12**

CO2   a.   State the methods contouring & explain any one.

CO5   b.   Write any four precautions to be taken while using total station.

CO1   c.   Mention different sources of error in theodolite surveying.

CO3   d.   Differentiate between theodolite and tachometer.

Q.No.6   **Solve any TWO of the following**   **12**

CO4   a.   Tabulate the data required for settling out a circular curve by deflection angle method using following information (i) Chainage of Intersection Point = 1064m (ii) Angle of Inter section – 145^0 (iii) Degree of curve 5^0 (iv) Peg Interval = 20m

CO3   b.   A tachometer fitted with Anallatic lens was setup at station P and the following readings were taken on vertically held staff.

Station	Staff Station	Vertical Angle	Studio reading in (m)		
P	B.M.	$+7^0$	0.850	1.160	1.450
P	Q	$-2^030'$	9.200	1.235	1.400

The constant of Tachometer was 100 find horizontal distance PQ and RL of Q if B.M. RL is 150m.

CO1   c.   Following are the observation taken while running closed traverse by theodolite. Find coordinate points using Bowditch rule.

Line	Length (m)	Bearing.
AB	335	$180^0\ 20'$
BC	850	$90^0\ 20'$
CD	408	357^0
DA	828	265^0

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Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Civil Engineering.**	Enrollment No. ☐☐☐☐☐☐
Course:	**Railway & Bridge Engineering**	Course Code: **6C405**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1	**A]**		**Solve any FIVE of the following**	**15**
CO1	a.		State the types of rail gauge with the gauge distance.	
CO1	b.		What are the function of sleepers in railway track.	
CO1	c.		What are the objects of providing super elevation?	
CO1	d.		Enlist types of Railway stations.	
CO4	e.		Classify the bridges according to material used for construction.	
CO4	f.		State the types of bridges according to function.	
CO1	g.		Enlist types of wing walls.	
	B]		**Solve any ONE of the following**	**05**
CO2	a.		Explain in brief factors governing the selection of rail alignment.	
CO2	b.		What are various requirements of good rail joints and enlist its types.	
Q.No.2			**Solve any THREE of the following**	**12**
CO3	a.		State ideal requirements of permanent way.	
CO5	b.		Draw neat sketch of simple split switch turnout.	
CO3	c.		What is the necessity for track maintenance?	
CO1	d.		What are the functions of bearings in bridge.	
Q.No.3			**Solve any THREE of the following**	**12**
CO3	a.		What are the causes of creep?	
CO5	b.		Explain cross over with a neat and labeled sketch.	

CO2	c.	Mention the main requirements of locomotive yard.
CO4	d.	Differentiate between temporary bridge and permanent bridge.

Q.No.4   **Solve any THREE of the following**   **12**

CO3   a.   Mention where the following types of ballast are suitable on rail track.
A) Broken stone   b) Brick   c) Kankar   d) Gravel

CO2   b.   State the factors considered for investigation of bridge site at preliminary stage.

CO2   c.   Explain bridge alignment.

CO1   d.   Define i) Afflux   ii) Scour depth   iii) Curtain wall   iv) Economic span.

Q.No.5   **Solve any THREE of the following**   **12**

CO2   a.   What are the requirements of railway station.

CO3   b.   Explain the data required for design of bridges.

CO5   c.   Draw a neat and labeled sketch of bridge showing all component parts.

CO3   d.   Write a short note on inspection of bridges.

Q.No.6   **Solve any TWO of the following**   **12**

CO3   a.   What is coning of wheels? Explain with neat sketch the behaviour of coned wheel on curved path.

CO3   b.   Explain with neat line sketch of terminal station.

CO2   c.   Explain in details factors affecting site selection for bridge (Any three)

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Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Civil Engineering.**	Enrollment No.
Course:	**Road Engineering**	Course Code: **6C406**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following.**	**15**
CO1	a.	State two importance of Roads, Railways and Airways.	
CO2	b.	Define i) Camber ii) Gradient iii) Shoulder	
CO3	c.	Enlist three types of road materials used in construction.	
CO3	d.	Draw structure of road Pavement with different Layers.	
CO5	e.	Show by free sketch for i) Speed limit 80km/hr ii) No-Parking iii) Hair pin bend right.	
CO5	f.	Give three necessity of maintenance of roads.	
CO3	g.	What is Soil Stabilized roads?	
	B]	**Solve any ONE of the following.**	**05**
CO2	a.	Draw freehand neat cross –section of road in embankment. Show all geometrical components and Values as per IRC suggestions and assumptions.	
CO3	b.	Enlist and explain in brief the different construction steps to be followed for Cement Concrete roads.	

Q.No.2		**Solve any THREE of the following**	**12**
	a.	State the classification of roads according to IRC.	
CO2	b.	Give necessity of Providing, i) Horizontal Curve for roads ii) Vertical curve for roads	
CO3	c.	Suggest the grade of bitumen for NH, SH, MDR and VR, adopted in construction.	
CO3	d.	What is Lead and Lift? Suggest its value for road Construction for estimation.	

Q.No.3		**Solve any THREE of the following**	**12**
CO1	a.	Enlist eight factors affecting the alignment of roads.	
CO2	b.	State the terms i) Sight distance ii) Super elevation	P.T.O.

CO3	c.	What type of Soil is Suitable for preparation of Sub-grade of roadwork?	
CO5	d.	Give the necessity of providing the following	
		i) Borrow pits ii) Spoil bank iii) Berms iv) Side Slope.	

Q.No.4   **Solve any THREE of the following.**   **12**

CO1	a.	Differentiate between roadways and waterways.
CO2	b.	Show on freehand neat sketch i) Right of way ii) C amber iii) Carriage way iv) Control lines
CO3	c.	Suggest the grades of Cement Concrete for i) City Concrete road ii) Lane of Colony/area iii) Market Yard Concrete road iv) Parking roads of concrete.
CO3	d.	Enlist the different steps of construction of WBM roads.

Q.No.5   **Solve any THREE of the following**   **12**

CO2	a.	Give the situation of providing i) Extra Widening of roads ii) Transition Curve iii) Floating gradient iv) Exceptional gradient.
CO3	b.	Define the terms i) Prime coat ii) Tack coat iii) Seal Coat iv) Premixed bitumen
CO4	c.	What is traffic volume study? State two uses of it.
CO5	d.	Draw free hand sketches of the following in Plan / elevation / sections for roads i) L-Drain ii) Cross Drain iii) Catch Water drain iv) Surface drain

Q.No.6   **Solve any THREE of the following**   **12**

CO4	a.	Draw a neat free hand sketch of traffic control signal and show its components with meanings.
CO4	b.	What are different shapes of rotary islands? Show by sketches.
CO5	c.	Enlist different defects generally observed in concrete roads.
CO5	d.	Explain the steps for repair of Pot.hole for bituminous road with a neat sketch.

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Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Civil Engineering.**	Enrollment No.	☐☐☐☐☐
Course:	**Irrigation Engineering.**	Course Code:	**6C407**
Max Marks:	**80** Time: **03 Hours**	Date:	**7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1		**Solve any FIVE of the following**	**15**
CO1	a.	Define the term, irrigation and state the necessity of irrigation in India.	
CO2	b.	State any six factors affecting runoff.	
CO2	c.	Define the terms (i) Time factor (ii) Capacity factor and (iii) Command area.	
CO3	d.	Differentiate between theoretical and practical profile of a gravity dam.	
CO3	e.	State any six factors affecting selection of site for a reservoir.	
CO4	f.	State any three advantages of barrage over a diversion weir.	
CO5	g.	Enlist any sin types of canal lining.	
	B]	**Solve any ONE of the following**	**05**
CO2	a.	Define average annual rainfall and explain Thiessen's polygon method of calculating average rainfall.	
CO1	b.	Classify irrigation projects according to culturable command area (CCA) and state purposes of irrigation projects.	

Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	The rainfall data over a catchment is as given below	

Year	1971	1972	1973	1974	1975	1976	1972	1977	1978	1979	1980
Rainfall in mm	1100	950	1400	1250	1175	1325	950	1410	1275	1390	1305

Size of catchment area = 50 sq.km coefficient of runoff – 0.60 calculate the yield of the catchment at 60% dependability.

CO2   b.   Find the design discharge of a canal for irrigating the crops using data given below : (i) Transit losses = 15% (ii) Time factor = 0.7 (iii) Capacity factor = 0.8

Sr.No.	Name of crop	Area under trrigation in Ha	Duty at field in Ha/cumec
1	Sugar cane	350	700
2	Rice (Kharif)	150	600
3	Bajri (Kharif)	600	1500
4	Wheat (Rabi)	1200	1800
5	Vegetables (H.W)	400	800

CO3   c.   State any four purposes of providing drainage gallery in a gravity dam.

CO3   d.   Explain low dam & high dam with sketch.

Q.No.3   **Solve any TWO of the following**   **12**

CO2   a.   Enlist methods of assessment of irrigation water and explain any two methods.

CO5   b.   Draw labelled diagram of canal cross section (i) In cutting (ii) In filling (iii) In partial cutting & filling.

CO5   c.   Define water logging. State any four causes of water logging, four effects of water logging and two remedial measures.

Q.No.4   **Solve any THREE of the following**   **12**

CO3   a.   Draw the area capacity curve and state its significance.

CO3   b.   Draw the cross section of gravity dam and show different forces acting on it. Enlist the name of forces also.

CO3   c.   State any four causes of failure of earthen dam.

CO3   d.   State any four factors affecting silting of reservoir.

Q.No.5   **Solve any THREE of the following**   **12**

CO3   a.   List the methods of reducing evaporation from reservoir and explain any one method.

CO3   b.   Draw neat sketch of earthen dam and show its component parts.

CO2   c.   State various cropping seasons and crops in Maharashtra with their base period.

CO2   d.   Explain any four methods of improving duty of a crop.

Q.No.6   **Solve any THREE of the following**   **12**

CO3   a.   Fix control levels of a medium size reservoir from the data given below.
Effective storage required – 3000 ha.m., Tank losses=20% of effective storage, Dead storage=10% of gross storage. Flood lift and free board=2m.

Contour RL in M	250	253	256	-	278	281	284
Storage in MM3	3.2	4.1	5.2	-	42.65	47.3	55.2

CO4   b.   Write any four advantages of Bandhara Irrigation.

CO4   c.   State the necessity of percolation tank in Maharashtra.

CO4   d.   Define pick-up weir and state any three situations under which it is constructed.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**

Enrollment No. ☐☐☐☐☐☐

Course: **Water Supply and Sanitary Engg.**
Max Marks: **80**   Time: **03 Hours**

Course Code: **6C408**
Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Classify the sources of water.	
CO3	b.	Define : (i) Chlorination (ii) Break Point Chlorination (iii) Residual chlorine.	
CO3	c.	State the term 'disinfection' of water? Enlist the methods of disinfection.	
CO2	d.	What is service reservoir? Write nay four functions of service reservoir.	
CO4	e.	Define : (i) Soil pipe (ii) Sullage pipe (iii) Vent pipe.	
CO4	f.	Draw sketches of P, Q and S traps showing water seal.	
CO4	g.	State essential qualities of good trap.	

	B]	**Solve any ONE**	**05**
CO2	a.	(i) Estimate the probable population for the data provided for the year 2031 & 2041 using.	

Year	Population
1991	9876
2001	10865
2011	11509
2021	13852

CO4	b.	What is the testing of sewers? Write the methods of testing of sewers and explain any one in detail.	

Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	State the factors affecting the rate of demand.	
CO1	b.	Explain reservoir intake with neat sketch.	
CO3	c.	State the methods of aeration. Explain any one method with sketch.	**P.T.O.**

CO4   d.   Describe inspection chamber with net sketch.

Q.No.3   **Solve any THREE of the following**   **12**

CO2   a.   State various methods of forecasting of population. Explain any one method in detail.

CO3   b.   Describe principle of coagulation with its process.

CO3   c.   Explain reflux valve with neat sketch & write the location where it is used.

CO4   d.   Define : (i) Self cleansing velocity (ii) Non scouring velocity.

Q.No.4   **Solve any THREE of the following**   **12**

CO2   a.   State the desirable limits as per I.S. for the following parameters.

Characteristics	
A	Colour
B	Turbidity
C	Total dissolved solids
D	Total Hardness
E	Chlorides
F	Iran (Fe)
G	pH
H	Fluorides.

CO3   b.   Explain with neat sketch : Gravity system of distribution of water.

CO4   c.   Differentiate between one pipe system and two pipe system.

CO4   d.   State B.O.D. and significance of B.O.D. with limits.

Q.No.5   **Solve any THREE of the following**   **12**

CO1   a.   Explain nay two surface sources and any two subsurface sources of water.

CO1   b.   Write four objects of analysis of water.

CO3   c.   Differentiate between slow sand filter & rapid sand filter.

CO4   d.   Differentiate between Aerobic process and Anaerobic process.

Q.No.6   **Solve any THREE of the following**   **12**

CO1   a.   Define : (i) Domestic demand of water (ii) Public demand (iii) Industrial demand (iv) Fire demand.

CO3   b.   Differentiate between dead end system and Grid iron system of distribution of water.

CO4   c.   Explain drop manhole with neat sketch.

CO4   d.   Explain working of trickling filter.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

(An Autonomous Institute of Govt. of Maharashtra)

\\PURSUIT FOR EXCELLENCE\\

Examination [191]:Nov.-Dec. 2019

Programme: **Diploma in CE/CS/PC**

Enrollment No.

Course: **Building Services**

Course Code: **6C409**

Max Marks: **80**   Time: **03 Hours** Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Define i) Service Pipe ii) Consumer Pipe iii) Residual Head.	
CO1	b.	Define Trap and Draw a neat labeled sketch of Gully trap.	
CO1	c.	State importance of i) Fire separation ii) Wet riser iii) Escape route.	
CO3	d.	State three principles of Acoustics of building.	
CO1	e.	Draw a neat sketch showing Water proof UGW tank & label it.	
CO3	f.	Compare Wind effect & Stack effect	
CO3	g.	Distinguish between single phase supply & three phase supply.	
	B]	**Attempt any one of the following**	**05**
CO2	a.	State the meaning of fixure unit value. How to calculate load on Vertical Pipe by assigning load factor to fixure unit?	
CO3	b.	Describe the importance of seating arrangement in acoustical design. How to avoid an echo in Auditorium?	
Q.No.2		**Solve any TWO of the following**	**12**
CO2	a.	State meaning of Break Pressure tank & its importance. How they work in water supply distribution system.	
CO2	b.	Assume 4+3 Storied Apartment and carryout its design calculation for Rain water harvesting by showing sketch of anyone method of recharging roof rain water.	
CO2	c.	Explain with line sketches (any two points) single stack system, one pipe system and two pipe system.	

P.T.O.

Q.No.3 **Solve any TWO of the following** **12**

CO3   a.   Define fire zone and explain classification of building based on occupancy.

CO3   b.   Suggest any six provisions for hospital building to provide protection from fire.

CO3   c.   Explain step by step procedure of designing the auditorium for acoustic treatment.

Q.No.4 **Solve any TWO of the following** **12**

CO1   a.   Explain i) Characteristics of audible sound ii) Three essentials of Termite Proofing.

CO2   b.   Explain with sketch Termite Proofing methods.

CO2   c.   State three causes of dampness & remedial measures on it.

Q.No.5 **Solve any TWOof the following** **12**

CO3   a.   State suitability ventilation system for Cinema theater. Give any four points to be consider during its design.

CO3   b.   State two factors on which natural ventilation depends. Design Ventilation System for drawing Hall. Draw a neat sketch. Assume data required.

CO1
CO2   c.   Explain functional requirement of ventilation system. List any four documents required for obtaining Water Supply Connection.

Q.No.6 **Solve any TWO of the following** **12**

CO3   a.   State necessity of earthing. Explain in brief procedure of earthing. Draw labeled sketch.

CO1   b.   Give importance & necessity of i) Gauges of Wire ii) MCB iii) Colour code of wires

CO3   c.   Draw the flow chart for Electric Supply from Electricity board to consumer for an apartment.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**	Enrollment No. ☐☐☐☐☐☐
Course: **Estimating and Costing.**	Course Code: **6C411**
Max Marks: **80** Time: **04 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any FIVE of the following**	**15**
CO1	a.	State deduction rules as per I.S. 1200 for masonry work (Brick & Stone)	
CO2	b.	State service units for following civil engineering structures : (i) School building (ii) Culvert (iii) Reservoir.	
CO2	c.	Elaborate significance of administrative approval and Technical sanction in the process of estimation.	
CO3	d.	Enlist and explain brief data required for detailed estimate.	
CO4	e.	Draw standard format used for preparing Bar Bending schedule.	
CO5	f.	Define 'Task Work'. State labours required for 10cum of cement concrete work in foundation.	
CO6	g.	Prove that quantity of earthwork if road in embankment is $Q=[Bd + sd^2] \times L$ where 'B' is top width, 'd' is depth and 's' is side slope and 'L' is length of embankment.	
	B]	**Attempt any ONE of the following :**	**05**
CO1	a.	Differentiate between revised estimate and supplementary estimate.	
CO2	b.	In cubic content method of preparing approximate estimate what are criterias for measuring height of structure normally followed in India.	
Q.No.2		**Solve any THREE of the following**	**12**
CO3	a.	Explain unit quantity method of detailed estimate.	
CO3	b.	Specify meaning and provisions of contingencies and work charged establishment with reference to detailed estimate.	
CO4	c.	(i) Enlist any four uses of bar bending schedule. (ii) Prove that extra length for 45^0 bent is 0.42d where d is effective depth of beam.	
CO5	d.	Enlist and explain factors affecting rate analysis.	
Q.No.3		**Solve any TWO of the following**	**12**
CO2	a.	Prepare approximate estimate for small residential building using following data.	

Sr. No.	Room	Size	Numbers
1	Drawing hall	4m x 5m	01
2	Bed room	2.7m x 5.5m	02
3	Kitchen	2.7m x 5.5m	01
4	Toilet block	2.8m x 3.0m	01

P.T.O.

PAR is Rs. 6500/sqm.

CO3   b.   Explain long wall short wall method of taking out quantities.

CO4   c.   (i) A RCC beam 300 m x 150 mm and length 3000 mm is reinforced with 3 No. of 12 mm ϕ main bar placed in one row. Out of 3, 2 bars are straight and one bar is bent up at 45^0. In addition to this 2 anchor bars of 10 mm ϕ are provided at top. 6 mm ϕ stirrups are provided at 150 mm c/c. The overall cover provided to the beam is 20 mm. Calculate total quantity of steel & prepare Bar bending schedule (BBS).

Q.No.4   **Solve any TWO of the following**   12

CO3   a.   Prepare checklist of items of works for
(i) Framed structure building (ii) Septic tank

CO4   b.   A R.C. roof slab 12cm thick rests fully on 30cm wall at all four sides of a room measuring 4.5m x 4.5m. The slab is reinforced bothways with 10mm diameter bars, with 100 mm c/c. Main steel bars are alternately bent at 30^0 at both ends. Distribution bars are straight bars. Find out quantity of concrete and steel.

CO5   c.   Workout the quantity of materials required for 12mm thick plaster & 100 sqm area in CM 1:6.

Q.No.5   **Solve any TWO of the following**   12

CO3   a.   Explain centre line method of taking out quantities. Illustrate your answer with example.

CO6   b.   Calculate quantity of earthwork required for the earthen dam by Trapezoidal formula using following data (i) Top width of embankment=3m (ii) RL of top of embankment=105.00m (iii) Side slopes on both sides 2 H:1V.

| Chainage (m)	200	230	260	290	320	350
GL (m)	100	98	97.5	95.20	96	97

CO6   c.   Calculate the quantity of earthwork for road from the following data using Mean Area Method. Formation width=10m, slope of banking 2:1 slope in cutting 1.5:1

Chainage	0	50	100	150
GL	498.00	497.90	497.10	496.40
FL	496.50	496.00	495.50	495.00

Q.No.6   **Solve any TWO of the following**   12

CO3   a.   Estimate the quantities of the following items of a two roomed building from the given plan and section see fig. 2.6
(i) Earthwork in excavation in foundation (ii) 1st class brickwork in LM in superstructure. (iii) 2.5cm CC damp proof course.

CO4   b.   Calculate length of bar for following
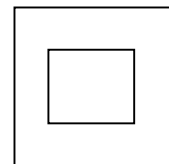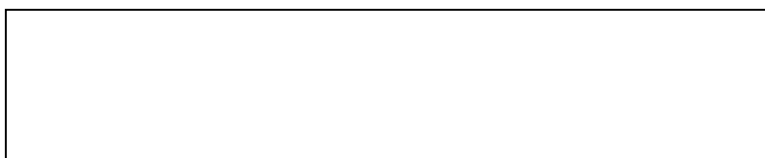
←----------------------6m------------------------------------→   ←---300----→

(i) Bottom straight bar 16 mmϕ (ii) Bottom bent-up bar 16 mm ϕ Bend at 300
(iii) 6 mm ϕ stirrup.
Clear cover to reinforcement is 25mm.

CO5   c.   Carryout rate analysis for PCC 1:4:8 used for foundation work.

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil Engineering.**	Enrollment No. ☐☐☐☐☐☐
Course: **Design of Reinforced Concrete Structure**	Course Code: **6C412**
Max Marks: **80**　　　　Time: **04 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. IS 456-2000 is permitted in the examination.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Differentiate between RCC and steel structures.	
CO4	b.	List assumption made in limit state of collapse in compression.	
CO4	c.	Define i)Short column　　ii) Long column	
CO2	d.	Write I-S specifications for minimum and maximum spacing of vertical stirrups	
CO2	e.	Define bond and write down types of bond.	
CO2	f.	Explain necessity of shear Reinforcement.	
CO2	g.	State IS code provision for minimum shear reinforcement.	
	B]	**Solve any ONE of the following**	**05**
CO4	a.	A square column of size 450mm is reinforced with 10bars of 16mm φ dia. of grade Fe415. If the grade of concrete is M25, calculate the safe load the column can carry.	
CO2	b.	A doubly reinforced beams of size 230mm x 450mm is reinforced with 3 No. 20mm φ dia bars in tension and 2 No of 16mm φ dia. bars in compression each at an effective cover of 40mm. Calculate the ultimate moment of resistance if fck= 20MPa, fy = 415 MPa & fsc = 353 MPa.	
Q.No.2		**Solve any THREE of the following**	**12**
CO4	a.	Draw sketch showing the cross section of an isolated square footing of uniform depth and show reinforcement details.	
CO1	b.	Write formula for strength of shear reinforcement – i) Vertical stirrups ii) Bent up bars bent up at same cross section with meaning of each term.	
CO1	c.	List various exposure conditions and cover required as per IS 456:2000.	
CO3	d.	Slab panel 3m x 5m is oppositely supported along longer side, classify slab & draw main reinforcement on the panel.	
Q.No.3		**Solve any THREE of the following**	**12**
CO4	a.	Draw neat sketches showing critical sections for one way & two way shear adopted in the design of footing.	
CO1	b.	Define – i) Characteristic strength ii) Characteristic load also draw related normal distribution curves.	

CO2   c.   A RCC beam 230 x 400 mm deep effective is reinforced with 03 No. of 16 mm dia. bars. Determine the ultimate moment of resistance & safe load, beam can carry if M20 Grade concrete and Fe415 steel is used.

CO2   d.   Calculate the development length for following data – In compression
    – steel provided is 20 mm ϕ deformed bar.
- Design bond stress – 1.2 MPa (for plain bars in tension)
- Use M20 Grade concrete & Fe415 Steel.

Q.No.4   **Solve any TWO of the following**   **12**

CO2   a.   A beam 230mm x 450 mm Overall is reinforced with 4 Nos. – 16 mm ϕ (dia.) bars of Fe415 Grade steel, The beam is subjected to a factored shear force of 147KN. Design the shear Reinforcement by using 2 legged 8mm ϕ dia. stirrups Take $\tau_{uc} = 0.57$ N/mm^2.

CO2   b.   Calculate the ultimate moment of resistance of a T beam having flange width of 1200 mm thickness of slab is 115mm, effective depth of beam is 600 mm and width of beam is 300 mm provided with Tension reinforcement consisting of 4 bars of 25mm dia. of grade Fe415 use M20 Grade concrete.

CO3   c.   Differentiate between one way slab and two way slab and draw cross section along short span showing reinforcement details for both.

Q.No.5   **Solve any TWO of the following**   **12**

CO3   a.   Design a roof slab for a room having clear dimension as 3.0 x 4.20m.. The slab is simply supported on all four sides of walls of 300mm thick and corners are not held down. The live load is 2 KN/m^2. Use M20 Grade concrete and Fe415 steel take M.F. as 1.4. Sketch the cross section of slab along shorter span showing all details (No check required)

CO3   b.   Design a roof slab for a hall having size of 2.73m x 6.23m effective, carries L.L = 2.5 KN/m^2, F.F. = 1 KN/m^2. Use M20 grade concrete and Fe415 steel use M.F. as 1.40 sketch the cross section of slab along shorter span showing all details (No check required)

CO3   c.   Design a Cantilever chajja with following data – clear span – 1.50m, live load – 1.5 KN/m^2. Floor finish = 0.5 KN/m^2 support lintel = 230mm. Use M20 Grade concrete & Fe415 steel, sketch the cross section of chajja showing steel details & apply check for development length. Adopt M.F. = 1.6

Q.No.6   **Solve any TWO of the following**   **12**

CO4   a.   Design a square column to carry an axial load of 1500 KN. The unsupported length of the column as 3.5m Use M20 Grade concrete and Fe415 steel for longitudinal reinforcement. Use Ms bar for lateral ties. Apply the check for minimum eccentricity.

CO4   b.   Design an RCC column footing for following data – Size of column – 430 mm x 430 mm, safe bearing capacity of soil = 250 KN/m^2, load on column 1350 KN. Use M20 grade concrete & Fe415 steel. Calculate depth of footing from B.M. criteria & criteria of one way shear.

CO3   c.   Design a dog legged stair case for a residential building, size of stair case room is 2.0m x 4.3m . The width of the landing is 0.90m. floor to floor height is 3.30m. take riser = 0.150m, Tread 0.25m consider L.L. = 2 KN/m^2 $^\&$ F.F. = 1 kN/m^2. Take M20 grade concrete and Fe415 steel. Consider waist slab & landing slab spanning in the same direction. Draw cross section showing steel details.

Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Civil Engineering**		Enrollment No.		

Course: **Town Planning And Municipal Engineering**   Course Code: **6C505**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	A]	**Solve any FIVE of the following**	**15**
CO1	a.	State any three objectives of town planning.	
CO4	b.	Draw a typical neighborhood plan and show various features on it.	
CO4	c.	Write the situation where following types of housing layout are preferred i) Reilly Plan ii) Radburn plan.	
CO5	d.	Write any three points for selection of site for paves.	
CO5	e.	State any three objectives of Traffic Management.	
CO6	f.	List various maps to be collected for the preparation of master plan.(any six).	
CO6	g.	State 3 main features of smart city.	
	B]	**Attempt any ONE of the following**	**05**
CO3	a.	Give the meaning of term 'Density Zoning'. Explain height zoning with specific reference to 45^0 rule and $63\frac{1}{2}^0$ rule.	
CO5	b.	State four design factors of street lighting. Explain any one. Draw a neat sketch of radial street system.	

Q.No.2		**Solve any TWO of the following**	**12**
CO1	a.	Draw and explain Pie diagram showing distribution of land in a city plan for various purposes.	
CO1	b.	State two features of satellite town; write two advantages and two disadvantages of vertical growth of city.	
CO2	c.	Prepare a detail proforma for socio-economic survey with regard to town planning.	

P.T.O.

Q.No.3   **Solve any TWO of the following**   **12**

CO2   a.   State and explain the methods employed to collect city survey data and describe analysis of data.

CO4   b.   Describe slum improvement method of slum development.

CO4   c.   Draw the general layout for i) Cul – De - Sac ii) Grid – iron pattern iii) Organic Street System

Q.No.4   **Solve any TWO of the following**   **12**

CO4   a.   State three causes of slum formation and write three precautions against formation of slum.

CO4   b.   Write two factors to be considered while selecting site for following types of public building i) Hospitals ii) Monumental buildings iii) Universities.

CO5   c.   State different forms of shopping facilities.   Draw layout of any two types of it.

Q.No.5   **Solve any TWO of the following**   **12**

CO5   a.   Design a park layout for a neighborhood of 8000 population showing following details i) children playing area ii) Pathways iii) Gymkhana.

CO5   b.   State and explain six requirement of effective communication network.

CO5   c.   State and explain three factors of traffic congestion and give remedies on it.

Q.No.6   **Solve any TWO of the following**   **12**

CO1   a.   i) Prepare a sketch to show garden city Principle and write two main features of garden city principle.

CO6   ii) State three objectives of Master Plan.

CO6   b.   i) State three point on model town planning act and its necessity.

           ii) Write three essential points that should be followed by land acquisition authorities.

CO6   c.   i) Sate three objectives of Re- Planning the Existing town.

           ii) State three features of Bombay town planning act.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in civil Engineering**

Enrollment No.

Course: **Environmental Pollution And Control.**   Course Code: **6C506**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1 A] Solve any FIVE of the following   **15**

   a   Define communicable diseases. Enlist the type of communicable diseases.

   a1 Define the following term

      i. Ecology   ii. Global Warming iii. Climate change

   b. State any three ways to control soil erosion.

   c. Define air pollution. Enlist the types of air pollution.

   d. Explain the phenomenon of acid rain.

   e. Discuss the noise pollution standards given by CPCB for silence zone, residential zone and Industrial zone.

   f. Classify Municipal solid waste (MSW).

   f1 State any three ecological benefits of biodiversity.

   g. Describe any one conventional and innovative waste utilization and recycling technologies.

   g1 Define EIA and state any four process of EIA.

B] Attempt any ONE of the following   **05**

   a. State any five effect of lead on human beings.

   b. Enlist different methods of sanitary land fill and Explain any one.

Q.No.2   Solve any THREE of the following   **12**

   a. State the major sources of non communicable diseases.

   b. What action to be taken to reduce sea pollution.

   c. Describe the measures that can be taken for air pollution control.

   d. What are the main causes of green house effect.

Q.No.3   **Solve any THREE of the following**   **12**

    a. State any four effect of air pollution on materials.

    b. Explain control of noise pollution.

    c. State the sources of noise pollution.   **P.T.O.**

    d. Describe the effects of noise pollution on human being.

Q.No.4   **Solve any THREE of the following**   **12**

    a. State the effects of air pollution on human health.

    b. Explain the impact of global warming.

    c. Describe the Indian constitutional provision for environmental protection.

    d. Describe the concept of sustainable development.

Q.No.5   **Solve any TWO of the following**   **12**

    a. Describe the role of individual in pollution control.

    b. Explain the environmental protection act 1986.

    c. Describe the sustainable building construction.

Q.No.6   **Solve any TWO of the following**   **12**

    a. Define the environment management describe the ways of environment pollution control.

    b. Explain the various factors affecting on selection of treatment methods.

    c. Write the general standards for discharge of following effluents for discharge as per CPCB.

       i. Suspended solids.

       ii. PH

       iii. Oil and grease.

       iv. BOD

       v. COD

       vi. Ammonia

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GOVERNMENT POLYTECHNIC, AURANGABAD.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191]:Nov.-Dec. 2019

Programme: **Diploma in Dress Design & Garment Manufacturing**	Enrollment No.

Course: **Fundamentals of Fashion Drawing** Course Code: **6D101**

Max Marks: **40**   Time: **02 Hours**Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	**A]**	**Solve any FOURof the following**		**08**
CO1	a.	Identify the application of fixative and marker pen in drawing process.		
CO2	b.	List out the five design elements and principles.		
CO3	c.	Suggest the do's and don'ts of clothing for Tall and Thin figure.		
CO4	d.	Differentiate between cool and Warm colors.		
CO5	e.	State achromatic and monochromatic color scheme.		
CO1	f.	Name the three types of papers with surface quality and suggest the suitable color media.		
Q.No.2		**Solve any FOUR of the following**		**12**
CO1	a.	Compare geometric textile print with floral textile print.		
CO2	b.	Suggest the methods of creating emphasis and rhythm in garments.		
CO3	c.	Compare human figure with fashion figure.		
CO4	d.	Draw and explain Newton's color wheel.		
CO5	e.	Name the factors influencing the choice of color in clothes.		
CO2	f.	Illustrate formal and informal balance in a garment & explain it.		
Q.No.3		**Solve any FOURof the following**		**12**
CO3	a.	Select the design elements for following figure types. i) Top heavy ii) Bottom heavy		
CO4	b.	Mention the three properties of color. Give example.		
CO5	c.	Explain complementary and split complementary color scheme with the help of color wheel.		

P.T.O.

CO1   d.   Illustrate a conversational textile print for night dress of a 5 year girl in 8 x 8cm square block. Apply suitable color scheme.

CO2   e.   Differentiate between structural and decorative design.

CO4   f.   Identify the names of color for following i) Color which have highest and lowest value. ii) Colors added to develop light, dark and dull colors. iii)Symbolizing nature and associated with sun.

Q.No.4   **Solve any TWO of the following**   **08**

CO2   a.   Explain how does lines convey different optical illusion. Give examples.

CO4   b.   Identify the application of additive and subtractive color theory & name the color of each theory.

CO5   c.   Identify the color scheme from following & explain it.

         i)   Color without colors.

         ii)   Various Values & intensities of single color.

         iii)   Adjacent color scheme.

         iv)   Equidistant placed colors.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

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\\PURSUIT FOR EXCELLENCE\\

Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Dress Designing and Garment Manufacturing**	Enrollment No.	☐☐☐☐☐☐
Course:	**Tools for Apparel Construction/Tools & M/C For Apperal Construction.**	Course Code:	**6D104/5D104/4D104/DD151**
Max Marks:	**40**	Time: **02 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1		**Solve any FOUR of the following.**	**08**
CO 1	a.	List out two types of Pinning and measuring tools.	
CO 2	b.	Suggest appropriate needle for jeans and muslin fabric..	
CO 3	c.	List the use of Zipper and shirring foot.	
CO 4	d.	Define "Ticket Number".	
CO 3	e.	Compare Roller foot with cording foot with respect to use and application.	
CO 4	f.	Write 'Sewing thread packages'. (Any two).	

Q.No.2		**Solve any FOUR of the following**	**12**
CO 1	a.	State the function of pressure foot and needle bar.	
CO 2	b.	Suggest remedies for (Any three)-	

        i. Needle thread breakage.
        ii. Skipped stitched
        iii. Upper thread breaking.
        iv. Fabric puckering.

CO 3	c.	Make use of gathering foot and zipper foot in any article.	
CO 4	d.	Define strength and elasticity of thread.	
CO 5	e.	Name three types of buttons with respective diagram.	
CO 2	f.	Outline the upper threading procedure of sewing machine.	

Q.No.3		**Solve any FOUR of the following**	**12**
CO 1	a.	Differentiate between sewing scissors with shears with respect to size, use and diagram.	
CO 2	b.	Write the history of sewing machine.	
CO 3	c.	State the function of "Compensating foot".	
CO 4	d.	i. Identify the thread package for industry and domestic purpose.	
		ii. Identify the needle point for knitwear.	
CO 5	e.	Draw three types of zippers and explain any two.	
CO 3	f.	Illustrate any three types of foots used in clothing construction.	

Q.No.4		**Solve any TWO of the following.**	**08**
CO 1	a.	Identify the pressing tool for sleeve and velvet fabric and explain with relevant diagram.	
CO 2	b.	Illustrate basic sewing machine and label its parts.	
CO 4	c.	Explain needle shapes with respect to size , shape and eye use.	
CO 5	d.	Suggest one name of garment for application of given fasteners-	

       i.   Basic snap.

      ii.   Hook and eyes.

    iii.   Sew through button.

    iv.   Invisible zipper.

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Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Dress Designing & Garment Mfg.**	Enrollment No.	☐☐☐☐☐☐

Course: **Elements of Garment Construction**   Course Code: **6D201**

Max Marks: **40**   Time: **02 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1   **Solve any FOUR of the following**   **08**
   a. Define the term selvage.
   b. Write any two difference between off grain & on grain.
   c. Draw four gored skirt & color it.
   d. Draw a top with raglan sleeves.
   e. Enlist the types of collar (any four)
   f. Define the term draft.

Q.No.2   **Solve any THREE of the following**   **12**
   a. Explain the basic pattern set with diagram.
   b. Explain : (i) Apex of dart (ii) Break point line.
   c. Develop a Bell sleeve draft pattern for 5 year children.
   d. Write drafting instruction of peter pan collar & develop a draft pattern using 1:4 scale (cm)
   e. Design & draft a baby skirt using 1:4 scale with instruction.

Q.No.3   **Solve any THREE of the following**   **12**
   a. Differentiate between fashion pattern & master pattern.
   b. Write the drafting instruction of circular skirt & develop a draft pattern using 1:4 scale (cm)
   c. Differentiate the set in sleeve with raglon sleeve.
   d. Draft sailor collar for 5 years children using 1:4 size with its drafting instruction.

Q.No.4   **Solve any TWO of the following**   **08**
   a. Explain : (i) True bias (ii) Tailor tack
   b. Enlist the types of belt using in skirt & draft any two with instruction.
   c. Write drafting instruction for lantern sleeve & draft the pattern.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Dress Designing & Garment Manufacturing.**	Enrollment No.
Course:	**Drafting And Pattern Construction.**	Course Code: **6D202**
Max Marks: **40**	Time: **02 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1		**Solve any FOUR of the following**	**08**
CO5	a.	Draft 1:4 cm scale pattern of peter-pan-collar.	
CO5	b.	Draw peter pan & Eatein collar.	
CO1	c.	Define the term 'Fabric grain'.	
CO4	d.	Draw technical sketch of baby frock (Front & back)	
CO	e.	Draft 1: 4 cm scale pattern roll circular skirt. (Size 5 years girl)	
CO6	f.	Draw the design of two types of cut pocket used in Culotte.	

Q.No.2		**Solve any FOUR of the following**	**12**
CO3	a.	Explain drafting instructions of Dhoti salwar of women.	
CO	b.	Mentions the folds of fabrics & explain any one of it.	
CO5	c.	Prepare a flow chart for stitching of baby frock.	
CO1	d.	Estimate required fabric for Panjabi kurta of women when full length -84 cm & sleeve length -20 cm.	
CO3	e.	State the step wise stitching process of basic salwar.	
CO6	f.	Design & illustrate any three patterns of Culottes for 5 years girl (Front & Back)	

Q.No.3		**Solve any FOUR of the following**	**12**
CO4	a.	Illustrate the A line Punjabi top for women with technical sketch.	
CO3	b.	Design & illustrate any three pattern of salwar with front & back view.	

CO4	c.	Explain the stitching process of A-line Punjabi kurta with sketch.
CO6	d.	Draw & mention drafting instruction for Culotte (Front pleted & back plain)
CO5	e.	Draft & illustrate puff sleeve of baby frock for 5 years girl.
CO1	f.	Calculate the required fabric for baby frock if fabric having one directional print (Size 5 years girl)

Q.No.4   **Solve any TWO of the following**   **08**

CO6	a.	Classify types of waist belts & explain stitching process of any one of it.
CO3	b.	Design a pattern of chudidar salwar & mention drafting instructions of chudidar salwar for women & write the drafting instruction for the same.
CO5	c.	Illustrate any four innovation pattern of baby frock with different sleeves & collars.
CO4	d.	Suggest the trimming & material required for A-line Punjabi kurta.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Dress Design & Garment Manufacturing**	Enrollment No.
Course: **Indian Costumes**	Course Code: **6D302**
Max Marks: **4**0 Time: **02 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any FOUR of the following**	**16**
CO1	a.	Explain the influence of Rajput on Akbars Costume.	
CO2	b.	Describe Sakachcha – nesana sari draping in Maharashtra.	
CO3	c.	Explain men's costume in Kashmir.	
CO4	d.	Explain women costume in Rajasthan.	
CO5	e.	Compare costume of Christian & Jewish women.	
CO5	f.	Explain women's costume of Kerala.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Draw the history of costume during Aurangzeb era.	
CO2	b.	Describe men's costume of Maharashtra.	
CO3	c.	Describe the ornaments used by Kashmiri Women.	
CO4	d.	Enlist & explain types of headgear worn in Gujrat & Rajasthan.	

Q.No.3		**Solve any THREE of the following**	**12**
CO1	a.	Describe the history of Akbar & Jahangir era.	
CO2	b.	Enlist and explain ornaments of Maharashtra.	
CO5	c.	Describe the steps of wearing Bangali Saree.	
CO3	d.	Illustrate rural & urban women Costume of Punjab.	
CO4	e.	Explain men's costume of Gujrat.	

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Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Dress Designing & Garment Manufacturing**	Enrollment No.	

Course:	**History Of World Costume**	Course Code:	**6D303**
Max Marks:	**80** Time: **03 Hours**	Date:	**7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

		Q.No.1	**Solve any TEN of the following.**	**20**
CO 1	a.	Name and illustrate two motifs of ancient Egypt.		
CO 1	b.	State the term 'Palla'.		
CO 5	c.	Identify the term 'Biretta'.		
CO 5	d.	Define the terms 'Haute Couture' and 'Pret Collection'.		
CO 2	e.	State the difference between emperor's and peasant dress of China.		
CO 5	f.	Identify the term 'Hakama' and 'Haori'.		
CO 5	g.	Identify the terms – i. Shenti. ii. Haik.		
CO 2	h.	State the term OBI or Sash.		
CO 2	i.	Explain the importance of dragon motif in china.		
CO 5	j.	Identify the term – i. Retro fashion. ii. Avant garde.		
CO 1	k.	Differentiate between Lacerna and Chalmys.		
CO 4	l.	State the purpose of wearing corset.		

		Q.No.2	**Solve any FOUR of the following**	**12**
CO 1	a.	State the shoulder collers worn in Egypt with sketch.		
CO 2	b.	Identify the names of Toga according to colors.		
CO 4	c.	Describe Spanish women's fashion in Rennaisance period.		
CO 4	d.	Explain the main features of men's and women's clothing of 1930's.		
CO 3	e.	Illustrate the female Chinese costume.		
CO 5	f	Identify the terms – i. kosode ii. Hadajuban iii. Susoyoke.		

Q.No.3   **Solve any FOUR of the following**   12

CO 3   a.   Illustrate and state any three head dresses of ancient Egypt.

CO 3   b.   Describe the wearing style of Toga.

CO 5   c.   Identify the following terms and mention when it was used.
              i. Houppelande   ii. Partlet   iii. Chopines.

CO 4   d.   Describe the accessories of 1980's.

CO 2   e.   Compare the chief garments of China with chief garments of Japan.

CO 1   f.   Identify the three types of Kimono worn in Samurai era.

Q.No.4   **Solve any FOUR of the following.**   12

CO 4   a.   Describe the characteristics of women's clothing of Rococo era.

CO 4   b.   Differentiate the men's clothing in 1970's and 1990's.

CO 4   c.   Illustrate and state women's formal dress of 1940's.

CO 1   d.   Describe the features of Cheongsam.

CO 3   e.   Explain the charecteristics of Japanese bridal attire.

CO 4   f.   Describe the women's fashion of 1950's.

Q.No.5   **Solve any THREE of the following**   12

CO 3   a.   Compare the men's and women's costume of old kingdom and middle kingdom
              of Egypt.

CO 3   b.   Differentiate between Doric and Ionic Chition.

CO 4   c.   Compare the characteristics of the age during 1920's and 1940's.

CO 5   d.   State the terms – i. Crinoline   ii. Farthingale.

CO 4   e.   Design a evening wear for women using inspiration of 1980's era.

Q.No.6   **Solve any THREE of the following**   12

CO 5   a.   Differentiate between Dragon robe and Mandarin robe of china.

CO 4   b.   Differentiate between

              i.   Formal and semi formal.

              ii.   Resort and sports wear.

CO 1   c.   Differentiate the court wear 'Junihitoe' of Japan.

CO 4   d.   Differentiate the women's clothing on 1960's and 1990's.

CO 4   e.   Compare the women's accessories of Gothic and Rococo era's.

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Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Dress Designing and Garment Manufacturing.**	Enrollment No.
Course:	**Apparel Merchandising**	Course Code: **6D304**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1 A] Solve any TEN of the following.   **20**

CO 1   a.   Define 'Fad' fashion with one example.

CO 1   b.   Differentiate between fashion and style.

CO 1   c.   List out the variables of demographics and psychographics.

CO 1   d.   Define discretionary and disposable income.

CO 2   e.   Give two examples of long run and short run fashions in woman's clothing.

CO 2   f.   List out the factors which accelerate and retard the fashion cycle.

CO 3   g.   State the major sources of inspiration for many fashion designers.

CO 3   h.   State the term fashion victims.

CO 5   i.   Define fashion merchandising.

CO 5   j.   State the publication level of fashion business.

CO 4   k.   Enlist the methods of payment.

CO 4   l.   State the term 'Letter of credit'.

Q.No.2 Solve any FOUR of the following   **12**

CO 1   a.   Name and define three components of fashion.

CO 1   b.   Explain any three basic psychological factors that influence fashion demand.

CO 2   c.   Identify the rational and emotional buying motives of consumer.

CO 3   d.   Outline the features of High fashion and stylist designer.

CO 5   e.   Explain the role of merchandiser in retail sector.

CO 4   f.   Compare between direct and indirect exporting.

Q.No.3   **Solve any FOUR of the following**   **12**

CO 1   a.   Justify with example how fashion acceptance affects the timing and design.

CO 1   b.   State the effect of Wars and disasters in recent years on fashion Give example.

CO 2   c.   State the practical considerations which affect a purchase.

CO 3   d.   Describe the three types of retailers.

CO 5   e.   State the qualities required to become successful buyer.

CO 4   f.   Explain the retail and auxiliary level of fashion business.

Q.No.4   **Solve any FOUR of the following.**   **12**

CO 1   a.   Explain three misconceptions about fashion.

CO 2   b.   Explain the relationship between consumer use cycle with consumer buying cycle.

CO 3   c.   Identify the factors which made Paris the center of world fashion.

CO 5   d.   Identify the actions a merchandiser takes for slow sale style and obsolete items.

CO 4   e.   Outline the impact of demographics and psychographics on fashion marketing.

CO 2   f.   Give example knock off.

Q.No.5   **Solve any THREE of the following**   **12**

CO 1   a.   List out the principles of fashion and explain any two with example.

CO 1   b.   Identify the effect of technological advances on today's fashion.

CO 2   c.   Compare between interrupted and recurring fashion cycles.

CO 3   d.   State the four reasons due to which consumers become fashion followers.

Q.No.6   **Solve any THREE of the following**   **12**

CO 1   a.   Compare the technological advances in agriculture and transportation and their effect on fashion.

CO 2   b.   Identify the phases and lengths of fashion cycles and how they relate to consumer acceptance.

CO 3   c.   Distinguish between fashion leaders and fashion innovators.

CO 5   d.   Compare the wholesale and retail level merchandising.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

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Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Dress Designing & Garment Manufacturing**

Enrollment No.

Course:	**Advanced Pattern Construction**
Max Marks:	**40** Time: **02 Hours**

Course Code: **6D405**

Date: **7 May 2022**

Instructions:

1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1		**Solve any FOUR of the following**	**08**
CO4	a.	Chart the different types of dart location on bodice front and name the darts.	
CO4	b.	Illustrate two darts of intersecting darts and two designs of graduated darts.	
CO4	c.	Apply slash & spread technique of dart manipulation for bust dart to center front dart.	
CO3	d.	The katori piece of katori blouse in always cut in bias justify.	
CO2	e.	Illustrate four designs of Trumpet skirt pattern in front & back view.	
CO1	f.	Calculate the amount of width of four different darts stitched for plain blouse.	

Q.No.2		**Solve any FOUR of the following**	**12**
CO2	a.	Design a trumpet skirt in front & back view. Describe the stepwise process to develop the pattern.	
CO4	b.	Draw two different patterns for parallel dart pattern and describe the process to develop the pattern.	
CO1	c.	Draw high neck pattern bodice and explain the pattern development for the same..	
CO1	d.	Illustrate high relaxed cowl pattern & explain the stepwise adaptations done in bodice to achieve the pattern.	
CO3	e.	Explain the stepwise stitching process for strapless pattern & princess line pattern with high neck.	

Q.No.3   **Solve any TWO of the following**   **8**

CO1   a.   Draft the front part of the katori blouse in 1:4 scale & write the drafting instructions.

CO1   b.   Describe the process to develop princess line sleeveless pattern from dress block.

CO1   c.   Describe the stepwise process to develop the strapless pattern from close fitting bodice block.

CO4   d.   Define dart manipulation. Write its importance & describe the two technique of dart manipulation.

Q.No.4   **Solve any FOUR of the following**   **12**

CO1   a.   Illustrate any six pattern of cowl & name them.

CO1   b.   Draft the sleeve block for saree blouse pattern and mention the drafting instructions.

CO1   c.   Write the changes done to develop Halter neck pattern from close fitting bodice block.

CO1   d.   Compare deep neck cowl with high released cowl and suggest the changes done in bodice for the same.

CO   e.   Design an one draft cluster pattern & radiating dart pattern & explain its development.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Dress Designing and Garment Mfg.**	Enrollment No.

Course: **Garment Construction Process**   Course Code: **6D406**
Max Marks: **40**   Time: **02 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any FOUR of the following**	**08**
CO2	a.	Draw the standard waist belt for mens trouser small size & illustrate it.	
CO1	b.	Mention drafting instruction for stand collar with illustration.	
CO4	c.	Draw technical sketch for sherwani with specification (front & back view)	
CO3	d.	Draw & mention the names of any two types of pockets for jacket.	
CO2	e.	Compare with any two points mens & womens trouser.	
CO5	f.	State the features of night suit for men.	
Q.No.2		**Solve any FOUR of the following**	**12**
CO5	a.	Design any three patterns of night suit for teenage boy with front & back view.	
CO3	b.	Describe flow chart for stitching process of vest coat.	
CO1	c.	Describe the drafting of front & back of men for small size.	
CO2	d.	Illustrate two designs for Jeans of men with front & back view.	
CO4	e.	Describe the draft of two piece sleeve for sherwani.	
Q.No.3		**Solve any THREE of the following**	**12**
CO2	a.	Describe the drafting of womens trouser for small size.	
CO3	b.	Design & illustrate the four innovative patterns of waist coat.	
CO4	c.	Design & illustrate non symmetric pattern for sherwani & explain the stepwise adaptation in the basic block of the sherwani for the same.	
CO2	d.	Mention types of welt pocket & explain stitching process for any one of it.	
Q.No.4		**Solve any TWO of the following**	**08**
CO3	a.	Draw & mention the drafting instruction of vest coat for men for size-38 [only front view]	
CO1	b.	Estimate the fabric required for mens shirt of size 38 when the width of cloth is 100cm. Explain with drawing of lay plan.	
CO5	c.	Describe the draft of front & back of pyijama for men.	
CO1	d.	Design & illustrate any four stitch pattern for womens in flat sketch with front & back view.	

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Examination [191]:Nov.-Dec. 2019

Programme:	**Diploma in Dress Design & Garment Manufacturing**	Enrollment No.						

Course: **Indian Textile & World Embroidery.**   Course Code: **6D407**
Max Marks: **80**   Time: **03 Hours** Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVEof the following**	**15**
CO1	a.	List six types of white work and categories the embroidery which belong to open work.	
CO1	b.	State the designs of Mount mellick embroidery. (Any three).	
CO1	c.	List the material and stiches used in Zardozi.	
CO1	d.	Name the fabric used in Chamba and explain the 'Tantric' theme of das mahavidyos.	
CO4	e.	Name the states of Western region of India and two popular sarees of each state.	
CO4	f.	Differentiate between Gharchola&Panetar.	
CO4	g.	Name the state to which kornad and kalamkari belong to.	
	B]	**Attempt any one of the following**	**05**
CO1	a.	Name the embroidery of China as per province and explain 'Su-Xio' embroidery.	
CO2	b.	Differentiate between 'Zardozi and Kamdani' and give design details of each panel of Rukmini Haran.	
Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	Illustrate step design and Greek scroll design of Blackwork and write the stiches used for it.	
CO2	b.	Explain the theme Samundramanthan and Battle of Kurukshetra.	
CO4	c.	Name two type of tassarsarees and explain saree worn by BihariBrahim Hindu Women while cooking.	
CO4	d.	Name the end piece weaving techniques of Kanchipuram and explain it.	**P.T.O.**

Q.No.3   **Solve any THREE of the following**   **12**

CO2   a.   Apply any one type of white work on cushion cover and state the fabric and needles used for white work.

CO1&   b.   Compare fabric, stiches of Uttar Pradesh and Himachal Pradesh and apply any
CO2   one embroidery on a Ladies casual dress.

CO4   c.   State two characteristics of Dacca muslin and Jamdani muslin.

CO4   d.   Explain features of Kasarapudava and state the sarees of Andhra Pradesh

Q.No.4   **Solve any THREE of the following**   **12**

CO1   a.   Explain the 3D embroidery of China with respect of fabric, threads and motifs & features.

CO1   b.   Compare the features of cutwork, candlewick, Mountmellick with respect to fabric, needle, design and stiches.

CO2   c.   Illustrate Rasmandala theme on the back of a shirt of any style.

CO4   d.   Name the sarees of Tamilnadu and explain any one of it.

Q.No.5   **Solve any TWOof the following**   **12**

CO4   a.   Explain Deccan Saree with respect to Area, Yarn, Color, field, endpiece and border.

CO4   b.   Explain – Pochampally, Ikat and Mysore silk saree.

CO1&   c.   Name the following   i) Two dynasties of China ii) Two types of White
CO4   embroidery iii) Two sarees of Gujrat iv) Two themes of Chamba v) Two styles of Kalamkari of AP. vi) Two Sarees of Tamilnadu.

Q.No.6   **Solve any TWO of the following**   **12**

CO5   a.   Name the weavers, looms area and border types of Paithani and state the origin and features of Himaroo.

CO4&   b.   i) Illustrate temple motif of East Region and its importance in textiles.
CO5   ii) Explain poetic reference of Dacca Muslin.

CO4   c.   Explain tant, Khadi, buttidar and GoradSaree. (Any Three).

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Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Dress Designing and Garment Manufacturing.**

Enrollment No. ☐☐☐☐☐☐

Course:	**Textile Processes**	Course Code:	**6D408**
Max Marks:	4**0**	Time: **02 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

			Q.No.1	**Solve any FOUR of the following.**	**08**
CO 1	a.			Indentify the four fundamental operations of weaving.	
CO 2	b.			Differentiate between thread count and yam count.	
CO 3	c.			State the purpose of finishing processes used for fabrics.	
CO 4	d.			Differentiate between dyeing and printing.	
CO 5	e.			State the basic difference between dry and laundry cleaning.	
CO 2	f.			State the term selvedge and its types.	

			Q.No.2	**Solve any FOUR of the following**	**12**
CO 1	a.			Outline the features of shuttle loom.	
CO 2	b.			Differentiate between weaving and knitting.	
CO 3	c.			Describe one important preparatory finishing process for smooth surfaced fabrics.	
CO 4	d.			Explain both the limitations and the advantages of direct dyes.	
CO 5	e.			State the points to be considered while storing woolens and velvet.	
CO 2	f.			Identify the number of harnesses needed for simple, advanced and figured weaves.	

			Q.No.3	**Solve any FOUR of the following**	**12**
CO 1	a.			List out the points of loom with its function and illustrate any two.	
CO2	b.			List out three features of Dobby weave.	
	c.			State the advantages of Ammoniating process for cotton fabrics over mercerizing.	
CO 4	d.			Distinguish between direct printing and resist printing.	

CO 5   e.   i. State the basic rules of stain removal.

                ii. Suggest the method of removing following stains for cotton and silk –
                   i.   chocolate ii. blood.

CO 4   f.   State the advantages of screen printing.

Q.No.4   **Solve any TWO of the following.**   **08**

CO 2   a.   Compare plain weave with twill weave with respect to

                 i.   Structure.

                 ii.   Appearance.

                 iii.   Properties.

                 iv.   Fabrics.

CO 2   b.   Differentiate between satin and sateen weave.

CO 4   c.   Identify the two problems faced while performing tie and dye and hand block printing.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering**

Enrollment No.

Course: **Basics of Electrical Engineering**   Course Code: **6E201**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	Define work and energy. State unit for it.	
CO1	b.	Draw graph of resistance and temp for copper.	
CO1	c.	List types of resistance.	
CO1	d.	Define node, branch, loop & mesh w.r.t. circuit.	
CO2	e.	State the factors on which capacitances of capacitor depends.	
CO2	f.	Draw the VI graph showing charging & discharging of capacitor.	
CO2	g.	List any four types of capacitor.	
CO2	h.	List any four applications of capacitor.	
CO3	i.	Give any four dissimilarities of electric and magnetic circuits.	
CO3	j.	Define MMF, Flux, flux density and reluctance.	
CO3	k.	Draw B-H curve for sheet steel and caste steel.	
CO4	l.	Define self and mutual Inductance.	
CO4	m.	State faradays law of electromagnetic Induction.	
CO5	n.	Define phase & phase difference.	
Q.No.2		**Solve any TWO of the following**	**12**
CO1	a.	10 C.C. of copper are i) drawn in to wire 100 meters long. ii) rolled into a squre sheet of 10 cm side. Find the resistance of wire and the resistance between opposite faces of the sheet if specific resistance of copper is $1.7 \times 10^{-6} \Omega$ -cm	
CO1	b.	Four resistor are in parallel. The current in the first three resistor are 4mA, 5mA & 6mA respectively. The voltage drop across the fourth resistor is 200 volts. The total power dissipated is 5 W. Determine the values of the resistances of the branches & the total resistance.	
CO1	c.	The following are the details of load on a circuit connected through a supply	

meter.

     i) Six lamp of 40 watts each working for 4hrs/day

     ii) Two fluorescent tubes 125 watt each working for 2hrs/day.

     iii) One 1000 watt heater working for 3hrs/day. If each unit of energy cost 70 P, what will be the electricity bill for the month of June?

Q.No.3		**Solve any TWO of the following**	**12**

CO2   a. Two capacitors of capacitances 4µF and 6µF respectively are connected in series across a p.d. of 250 V. The Capacitors are disconnected form the supply & are reconnected in parallel with each other. Calculate the new p.d. & charge on each capacitor.

CO2   b. Derive the expression for Energy stored in capacitor.

CO3   c. Define magnetic hysteresis Explain phenomenon of magnetic hysteresis with neat circuit diagram & loop.

Q.No.4		**Solve any TWO of the following**	**12**

CO3   a. Draw the circuit for parallel magnetic circuit & Derive expression for ϕ and NI.

CO3   b. A magnetic ring bas a mean circumference of 1.5 meter & is of $0.01 m^2$ in cross section with 175 turns. A saw cut of 4mm wide is made in ring. Calculate magnetizing current to produce a flux of 0.8 mwb in air gap. Assume $\mu=400$ & leakage factor 1.25.

CO4   c. Explain the Fleming right hand and left hand rule with schematic diagram.

Q.No.5		**Solve any TWO of the following**	**12**

CO4   a. Define the following terms. State the equations for it.

     i) Statically induced for *emf* ii) Dynamically induced *emf* iii) Lenz Law

CO4   b. Derive the expression for energy stored in inductance.

CO4   c. Explain with neat diagram generation alternating voltage.

Q.No.6		**Solve any TWO of the following**	**12**

CO1   a. Distinguish between AC and DC circuit w.r.t. following

     i) Circuit diagram ii) O/P voltage equation iii) power equation

     iv) Frequency v) Advantages vi) Disadvantages.

CO5   b. Calculate the r.m.s. value form factor and peak factor of a periodic voltage having the following values for equal time intervals, changing suddenly from one value to the next 0,5,10,20,50,60,50,20,10,5,0,-5,-10,-----etc.

CO5   c. An alternating current of frequency 60 c/s has a max. value of 120A

     i) Write down the equation for instantaneous value. ii) Instantaneous value after 1/360 sec. iii) Time taken to reach 96 A for first time.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering.**

Enrollment No. ☐☐☐☐☐☐

Course: **Fundamentals Of Electronics**

Course Code: **6E202**

Max Marks: **80**   Time: **03 Hours**

Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	Give any two examples of conductor and insulator.	
CO1	b.	Define extrinsic and intrinsic semiconductor.	
CO1	c.	Draw a symbol of FET and SCR.	
CO1	d.	List the applications of photo diode & varactor diode (any two)	
CO1	e.	Define varactor diode and draw its symbol.	
CO1	f.	List applications of zener diode.	
CO1	g.	List any four properties of semiconducting material.	
CO2	h.	Define ripple factor and transformer utilization factor.	
CO2	i.	If maximum reverse voltage is 20V then calculate peak inverse voltage for half wave and full wave rectifier.	
CO2	j.	Compare half wave rectifier and full wave rectifier with given parameter with given parameters such as ripple factor, TUF, efficiency of rectifier and no. of diode.	
CO2	k.	Classify the filters used in electronic circuit.	
CO2	l.	Write any one merit and demerit of half wave rectifier.	
CO3	m.	List biasing method of transistor (any two)	
CO4	n.	Define oscillator and enlist its type.	
CO5	o.	Write a series of 78XX and 79XX.	

P.T.O.

Q.No.2　　**Solve any THREE of the following**　　　　　　　　　　**12**

CO1　a.　Explain construction of PN junction diode with the help of neat diagram.

CO2　b.　Describe working of half waver rectifier with diagram and waveform.

CO3　c.　Explain how transistor can be acts as switch with help of neat diagram.

CO4　d.　Explain with diagram operation of R-C coupled amplifier.

Q.No.3　　**Solve any THREE of the following**　　　　　　　　　　**12**

CO2　a.　Explain LC type of filter with neat diagram and output waveform.

CO3　b.　Draw and explain input and output characteristics of common base configuration of transistor with neat diagram.

CO4　c.　Explain how transistor can be used as an amplifier with neat diagram.

CO5　d.　Describe shunt voltage regulator with the help of neat diagram.

Q.No.4　　**Solve any THREE of the following**　　　　　　　　　　**12**

CO1　a.　Explain with neat diagram zener diode acts as a load voltage regulator.

CO3　b.　Draw and explain voltage divider bias of transistor with its expressions.

CO3　c.　Prove that $\alpha = \frac{\beta}{1+\beta}$

CO4　d.　Draw and explain frequency response curve of RC coupled amplifier.

Q.No.5　　**Solve any TWO of the following**　　　　　　　　　　**12**

CO1　a.　Explain forward and reverse biasing of P-N junction diode with neat diagram and also draw V-I characteristics of P-N junction diode.

CO2　b.　Draw a circuit diagram of full wave bridge rectifier and explain its operation with waveforms.

CO3　c.　Explain base bias (fixed bias) circuit of transistor with neat diagram. Write stability factor of it.

Q.No.6　　**Solve any TWO of the following**　　　　　　　　　　**12**

CO1　a.　Describe the operation of (LED) light emitting diode with neat diagram. List any four applications of it.

CO3　b.　Explain working of PNP and NPN transistor with the help of neat diagram.

CO5　c.　Describe the construction and operation of cathode ray oscilloscope with the help of neat diagram.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering.**

Enrollment No.

Course: Electrical Measurements   Course Code: **6E203**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any TEN of the following**	**20**
CO1	a.	List any two effects used in measuring instruments.	
CO1	b.	Distinguish between absolute and secondary instruments.	
CO1	c.	Give the equation of T_d and T_c in case of PMMC meter.	
CO2	d.	List any two classification of resistance and their ranges.	
CO2	e.	Draw a neat labeled diagram of Kelvin's double bridge.	
CO3	f.	Give reason why C.T. secondary should not kept open.	
CO3	g.	List any two advantages instrument transformer over shunt and multiplier.	
CO5	h.	Define active and reactive power with formulas.	
CO3	i.	Define multiplying factor of wattmeter.	
CO3	j.	List any two advantages of two wattmeter method.	
CO5	k.	Give the purpose of shading band? Where it is located.	
CO5	l.	List any two drawbacks of one wattmeter method.	
CO5	m.	State the function of brake magnet in energy meter.	
CO5	n.	List any two advantages of PMMC instruments.	
CO5	o.	List two examples of each recording type instrument and integrating type instrument.	

Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	Define 'standardization' and explain how unknown emf is measured using potentiometer.	
CO3	b.	Explain with neat diagram working of moving iron attraction type instrument.	

CO3   c.   A moving coil instrument gives full scale detection of 24 mA. when P.D. across it is 72 mv. Calculate

       i)   Shunt resistance for full scale deflection of 120 Amps.

       ii)   The series resistance for full scale detection of 600v.

CO5   d.   List any two error occur in energy meter and how these errors are eliminated.

Q.No.3   **Solve any TWO of the following**   **12**

CO1   a.   State and explain any six qualities of measuring instruments.

CO2   b.   Explain the working of wheatstone bridge with neat sketch.

CO4   c.   Explain with the help of diagram, process of calibration of ammeter by using potentiometer.

Q.No.4   **Solve any TWO of the following**   **12**

CO1   a.   List the different methods of producing controlling torque and explain any two methods with neat diagram.

CO3   b.   List any three errors occurs in wattmeter? How these errors are eliminated.

CO3   c.   Explain with neat sketch the construction and working of dynamometer type *P.F.*meter.

Q.No.5   **Solve any TWO of the following**   **12**

CO3   a.   Explain with neat sketch working of resonance type frequency meter.

CO2   b.   Explain with neat sketch construction and working of megger.

CO5   c.   Draw ckt dia and phasor diagram for measurement of reactive power in three phase star connected load by one wattmeter.

Q.No.6   **Solve any TWO of the following**   **12**

CO5   a.   Explain with neat diagram construction and working of single phase induction type energy meter.

CO5   b.   Explain with diagram for measurement of power in three phase balanced load by two wattmeter method and state its advantages.

CO4   c.   Explain with the help of diagram, process of calibration of voltmeter by using potentiometer.

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Examination: (191) NOV DEC – 2019

Programme: **Diploma in Electrical Engineering.**   Enrollment No.

Course: **Network Analysis**   Course Code: **6E204**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any TEN of the following.**	**20**
CO2	a.	Define i) Unilateral Network ii) Bilateral Network	
CO2	b.	Compare open circuit & short circuit Network on any two point	
CO1	c.	Define Ideal voltage source. Draw its symbol.	
CO2	d.	Give four steps to Solve Network by Mesh analysis.	
CO2	e.	State Norton's Theorem.	
CO3	f.	Define Power Factor. State the value of PF for Resistive Load.	
CO3	g.	Define Inductive Reactance. Give the relation between X_L & F.	
CO3	h.	Define Reactive Power. State unit of Measurement of Reactive Power.	
CO4	i.	Impedance $Z_1=(3+j4)\Omega$ and $Z_2=(4+j3)\Omega$ connected in parallel. Find equivalent Admittance of the circuit.	
CO4	j.	Define i) Admittance ii) Susceptance also give its unit.	
CO4	k.	Define Quality Factor of Parallel circuit.	
CO4	l.	Compare series and parallel resonance on any two point.	
CO5	m.	List any two advantages of three phase system over single phase system.	
CO5	n.	Compare 3- phase and 1- phase circuit on any two point.	
CO5	o.	Explain in brief the meaning of three phase balance & unbalance load. (two points each)	

Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	Fine the Resistance between terminal A and B as shown in Fig. 1.	
CO2	b.	State & explain superposition theorem.	

P.T.O.

CO3   c.   Derive the expression for voltage and current in purely resistive circuit with the help of phasor diagram and waveform comment on the phase relation between Voltage & Current.

CO4   d.   An impedance of $(8+j6)$ Ω is connected in parallel with an impedance of $(5-j6)\Omega$ and this combination is supplied with an AC voltage of $200 / 30^0$. Calculate total current form the source.

Q.No.3   **Solve any THREE of the following**   **12**

CO1   a.   Explain with suitable example to convert a practical current source into an equivalent voltage source.

CO2   b.   Find the current shown by Ammeter by using Mesh analysis as shown in fig.2.

CO3   c.   An a,c, circuit consist of pure resistance of 10Ω and is connected to an AC supply of 230V, 50Hz, Calculate   i) Current ii) Power Consumed iii) equations for voltage and current.

CO5   d.   Draw the circuit for balance load. State the relationship between line current & phase current, line voltage & phase voltage and power consumed, in case of Star connected load.

Q.No.4   **Solve any TWO of the following.**   **12**

CO2   a.   State Thevenings theorem and find the current through 'R_L' using Thevenins theorem as shown in fig.3

CO3   b.   For R-L Series circuit draw circuit diagram and obtain the expression for the power. Also draw waveform and phasor diagram of R- L series circuit & comment on power factor of the circuit.

CO4   c.   An Inductor of 0.5H inductance and 90Ω resistance is connected in parallel with $20\mu f$ capacitor. Find   i) Total RMS current ii) Total P.F. of the circuit iii) Total Power drawn from the source.

Q.No.5   **Solve any TWO of the following**   **12**

CO2   a.   State Maximum Power Transfer theorem for d.c. circuit. Find the value of 'R_L' to give Maximum Power transfer and also determine the power delivered to the load as shown in fig.4.

CO4   b.   Impedance $Z_1 = (10+j5)\Omega$ and $Z_2= (8+j6)\Omega$ are connected in parallel across $V = (200+j0)$, using the admittance Method Calculate the circuit current and the branch current. Also find the total power drawn from the source.

P.T.O.

CO5   c.   State the Principle of 3- phase emf generation and state the equations of all the three phases. Draw waveform & phasor diagram. Also show that the sum of the instantaneous values of the voltage in three phase system is always zero.

Q.No.6   **Solve any TWO of the following**   **12**

CO2   a.   Give the steps for solving the network by Node analysis and determine the current through branch 'AB' by Node Analysis as shown in fig.5

CO3   b.   Explain series RLC circuit. Draw phasor diagram and voltage triangle for
i) $X_L > X_C$ ii) $X_L < X_C$ iii) $X_L = X_C$

CO5   c.   Three identical coil each having resistance 10Ω and inductance of 0.03H are connected in delta across a three phase 400 volt 50Hz AC supply. Calculate

      i)   The phase current

      ii)   Line Current

      iii)   Power factor

      iv)   Total power consumed. Draw phasor diagram.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191]:Nov.-Dec. 2019

Programme: **Diploma in ElectricalEngineering**

Enrollment No.

Course: **Generation & Transmission Engineering**   Course Code: **6E205**

Max Marks: **80**   Time: **03 Hours**Date: **7 May 2022**

Instructions:

1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any TENof the following**	**20**
CO1	a.	Classify the energy sources.	
CO1	b.	List the major equipments in thermal power station.	
CO1	c.	Write any two disadvantages of Thermal Power Station.	
CO2	d.	Classify the hydro power stations.	
CO2	e.	List any two hydro power stations in Maharashtra with their installed capacity.	
CO2	f.	Write the two advantages of Hydro electric power plant.	
CO3	g.	Define i) Average demand; ii) Demand factor	
CO3	h.	Define i) Plant Capacity factor ii) Plant Use factor.	
CO3	i.	List the two advantages of Nuclear Power Station.	
CO3	j.	List out nuclear fuel used in nuclear power station.	
CO4	k.	Draw single line diagram of A.C. supply system.	
CO4	l.	List the two advantages of bundled conductors.	
CO4	m.	Enlist various types of supports used for installing a transmission line,	
CO4	n.	List the advantages of A.C.S.R. conductor.	
CO5	o.	List the factors affecting the corona.	

Q.No.2		**Solve any TWO of the following**	**12**
CO1	a.	Write the function of following related to Thermal Power Station – i) Air preheater ii) Super heater iii) Economiser.	
CO1	b.	Write the selection criteria for site of thermal power plant with explanation.	
CO2	c.	Explain the energy conversion process for Hydro Power Station with plant layout.	

P.T.O.

Q.No.3   **Solve any TWO of the following**   **12**

CO2   a.   Write the selection criteria for site of Hydro Power Plant with explanation.

CO3   b.   Explain the process of disposal of Nuclear Waste.

CO3   c.   Explain the meaning of nuclear fission and chain reaction related to Nuclear Power Station.

Q.No.4   **Solve any TWO of the following**   **12**

CO3   a.   Draw a neat lablled diagram of Nuclear reactor used in nuclear power station and write the function of moderator and control rod.

CO4   b.   Define: "String Efficiency", List the methods of improving string efficiency and explain any one.

CO4   c.   Compare solid standed and bundled conductors.

Q.No.5   **Solve any TWO of the following**   **12**

CO4   a.   List any six reasons for the failure of insulators.

CO5   b.   Explain the skin effect and proximity effect.

CO5   c.   Explain the effect of load power factor on voltage regulation.

Q.No.6   **Solve any TWO of the following**   **12**

CO5   a.   Define: 'corona', and write the advantages and disadvantages of corona.

CO5   b.   Draw the equivalent circuit of short transmission line with phasor diagram and obtain the expression for Voltage Regulation of it.

CO5   c.   Explain with equivalent circuit and phasor diagram the ferranti effect.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering.**

Enrollment No.

Course: **D C Machines and Transformer**   Course Code: **6E401**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO3	a.	Define all day efficiency of transformer.	
CO2	b.	Classify the different types of DC motor.	
CO4	c.	Justify the need of parallel operation of transformer.	
CO3	d.	Define voltage regulation of transformer.	
CO3	e.	List the classification of single phase transformer.	
CO2	f.	Give the three application of DC series motor and shunt motor.	
CO1	g.	Give the function of following components in DC generator	
		a) Commutator b) Brushes c) Armature winding	

	B]	**Solve any ONE of the following**	**05**
CO3	a.	A single phase transformer deliver 10A 220 to a resistive load while the primary draws 6A at 0.9 lagging pf from 450, 50 Hz supply. The turn ratio of the transformer is 2. Calculate efficiency and regulation under this condition.	
CO4	b.	Explain the essential and desirable condition of parallel operation of transformer.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Distinguish between the lap winding and wave winding.	
CO1	b.	Explain in brief about armature reaction? Also give its effects.	
CO3	c.	Explain the reason why the rating of transformer in KVA?	
CO4	d.	Explain the construction and working of single phase auto transformer?	

Q.No.3   **Solve any THREE of the following**   **12**

CO2   a.   Explain the flux control method of DC shunt motor for speed control?

CO3   b.   Explain the different losses takes place in transformer?

CO3   c.   Distinguish between the single phase auto transformer and single phase transformer.

CO5   d.   Draw and explain the construction of buchholz relay.

Q.No.4   **Solve any TWO of the following**   **12**

CO1   a.   Derive the emf equation of DC generator and state the meaning of each term.

CO5   b.   Describe the significance of vector grouping of three phase transformer.

CO3   c.   Draw and explain the equivalent circuit of transformer.

Q.No.5   **Solve any THREE of the following**   **12**

CO2   a.   Describe the necessity of starter for DC shunt motor.

CO3   b.   Explain the condition for maximum efficiency of transformer.

CO5   c.   Give the comparison of three phase transformer with bank of three single phase transformer?

CO4   d.   Draw the phasor diagram when transformer is on no load.

Q.No.6   **Solve any THREE of the following**   **12**

CO4   a.   Draw and explain the circuit diagram of carry out sumpners test on transformer.

CO5   b.   Draw the neat vector diagram for Star-Star connection in case of three phase transformer.

CO3   c.   Derive the Emf equation of transformer.

CO2   d.   Derive the torque equation of DC motor.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering**   Enrollment No.

Course: **A. C. Machines**   Course Code: **6E402**
Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	List any 3 advantages and disadvantages of polyphase Induction Motor.	
CO2	b.	Compare 1-phase I.M. & 3- Phase I.M. on the basis of self – starting size & cost.	
CO3	c.	List any 3 advantages of keeping armature stationary.	
CO4	d.	Give any three applications of synchronous motor.	
CO5	e.	Give any three applications of Stepper Motor.	
CO1	f.	A-3 phase, 4 pole, 50 Hz induction motor has a slip of 4% find a) Synchronous speed b) Rotor Speed & c) Frequency of rotor current.	
CO3	g.	Distinguish between salient pole alternator & Non salient pole alternator any three points.	
	B]	**Attempt any one of the following**	**05**
CO1	a.	Draw the power stages of 3 phase Induction motor neatly.	
CO3	b.	A 3-phase, 12 pole star connected alternator has 180 slots with 10 conductors per slot & the conductors of each phase are connected in series. The coil span is 144^0 (elect). Determine the phase & line emf if the machine runs at 600 rpm & the flux per pole is 0.06 wb distributed sinusoidally over the pole.	
Q.No.2		**Solve any THREE of the following**	**12**
CO4	a.	Distinguish between Induction Motor & Synchronous motor on the basis of speed, self starting power factor & costing.	
CO5	b.	With a neat figure, explain working of reluctance motor.	
CO2	c.	Draw circuit diagram of a single – phase IM & explain its working.	
CO1	d.	Derive condition for maximum torque under running condition.	**P.T.O.**

Q.No.3		**Solve any THREE of the following**	**12**
CO3	a.	Derive equation of Induced EMF of an alternator.	
CO4	b.	With the help of Vector diagram define load angle, Internal angle & power factor angle.	
CO5	c.	Explain working of Hysteresis motor with a neat sketch.	
CO1	d.	An 8 – pole, 50 – Hz, 3-phase slipring IM has effective rotor resistance of 0.08 Ω/phase. Stalling speed is 650 rpm. How much resistance must be inserted in the rotor / phase to obtain maximum Torque at starting?	

Q.No.4		**Solve any THREE of the following**	**12**
CO2	a.	With the help of neat figure, explain working of Universal Motor.	
CO3	b.	What is armature reaction? State its effects.	
CO4	c.	Explain working principle of synchronous motor.	
CO5	d.	With the help of a neat figure, explain working of stepper motor.	

Q.No.5		**Solve any TWO of the following**	**12**
CO1	a.	i) Draw Torque – slip characteristic of 3- phase IM, show in it the operating and What conclusion you can draw from the characteristic? ii) Explain Necessity of a starter for 3-phase I.M.?	
CO3	b.	Explain 1 Dark & 2 equally bright lamp method of synchronizing by drawing circuit diagram & lamp connections.	
CO4	c.	Explain V curve & Inverted V curve.	

Q.No.6		**Solve any TWO of the following**	**12**
CO2	a.	i) Classify 1- phase IM & give one application of each.	
CO1		ii) An 18.65 kW, 6-pole, 50-Hz, 3 – phase slipring IM runs at 960 rpm on full load with a rotor current per phase 35A. allowing 1kW for mechanical losses, find the resistance of 3-phase rotor winding.	
CO3	b.	Define voltage regulation from the following test results, determine the voltage regulation of a 200v, 1-phase alternator delivering a current of 100 A at i) Unity P.F. ii) 0.71 lagging Test results : - full load current of 100A is produced on short circuit by a field excitation of 2.5A. An emf of 500V is produced on open circuit by the same excitation. The armature Resistance is 0.8Ω.	
CO1	c.	i) Give the methods of speed control of 3-phase IM.	
CO4		ii) Give any three features of synchronous motor.	

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Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Electrical Engineering.**	Enrollment No. ☐☐☐☐☐☐
Course:	**DISTRIBUTION AND UTILIZATION ENGG.**	Course Code: **6E404**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO2	a.	List classification of underground cables.	
CO3	b.	Define individual and group drive.	
CO4	c.	Give three advantages of electric heating.	
CO4	d.	Give causes of failure of heating elements.	
CO5	e.	Give principle of resistance welding.	
CO5	f.	Give three advantages of electric are welding.	
CO6	g.	List different types of braking.	
	B]	**Solved any ONE of the following**	**05**
CO1	a.	Explain classification of distribution systems.	
CO1	b.	Draw & explain layout of 33/11 kv distribution substation.	
Q.No.2		**Solve any TWO of the following**	**12**
CO1	a.	Explain the method of solving A.C. distribution calculation for single phase connected balance system.	
CO2	b.	Explain any two methods of laying underground cables.	
CO3	c.	Give three advantages and disadvantages of electric drive.	
Q.No.3		**Solve any TWO of the following**	**12**
CO1	a.	Draw and explain pole mounted substation.	
CO4	b.	Explain construction and operation of resistance heating.	
CO6	c.	Compare resistance welding and arc welding (six points)	

P.T.O.

Q.No.4   **Solve any TWO of the following**   **12**

CO1   a.   Explain the requirements of distribution system.

CO4   b.   Give two advantages, disadvantages and applications of dielectric heating.

CO6   c.   Explain working of A.C. locomotive with a well labeled diagram.

Q.No.5   **Solve any TWO of the following**   **12**

CO4   a.   Explain working of indirect arc furnace with neat labeled diagram.

CO6   b.   List any two current collecting equipments. Also give their merits and demerits.

CO6   c.   Explain in brief two methods of electric braking.

Q.No.6   **Solve any TWO of the following**   **12**

CO4   a.   Explain working of direct core type induction furnace.

CO6   b.   Explain desirable characteristics of traction motors.

CO6   c.   List the systems of track electrification & explain any one in detail.

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Examination: (191) NOV DEC – 2019

Programme: **Diploma in Electrical Engineering.**	Enrollment No.
Course: **Domestic Installation & Wiring**	Course Code: **6E406**
Max Marks: **80** Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1 A] Solve any FIVE of the following.   **15**

CO 1   a.   According to IE rules, What is declared frequency of supply to consumer?

CO 1   b.   Define – Estimation, Rate analysis, Labour cost.

CO 3   c.   State 'Inverse square law' of illumination.

CO 4   d.   Define – Tender, Contract, Tender notice.

CO 2   e.   What is the purpose of earthing an installation?

CO 2   f.   Show with proper diagram, a service connection to single storey building with PVC or weather proof cable.

CO 3   g.   Define – Luminous flux, Reduction factor, Brightness.

B] Solve any ONE of the following.   **05**

CO 3   a.   List different lighting schemes for illumination. Explain any two of them.

CO 2   b.   Compare casing caping wiring and conduit wiring on following
points – Material required, cost, Durability, Appearance and safety.

Q.No.2   Solve any TWO of the following   **12**

CO 1   a.   List any six factors on which earth resistance depends. How does earth resistance change with each of these factors?

CO 1   b.   List the tests to be carried out on any installation after completion. Explain any two of them.

CO 3   c.   It is desired to illuminate a drawing hall with an average illumination of 200 Lux. The hall is 30m X 20m size. The lamps are to be fitted 4m from ground level. Find number of lamps and wattage per lamp for lighting scheme.
Given efficiency of lamps = 25 lumens/watt, depreciation factor = 0.8, coefficient of utilization = 0.75.

Q.No.3		**Solve any TWO of the following**	**12**
CO 4	a.	Explain the procedure to be followed by contractor to fill the tender.	
CO 2	b.	Give the uses of following tools in electrical installation – Fish tape, combination plier, electrician's knife, Hacksaw, Hand Drill, Reamer.	
CO 2	c.	List eight important rules for residential wiring. Write the specifications of Aluminum and copper conductor used for residential wiring in light sub circuit.	
Q.No.4		**Solve any TWO of the following.**	**12**
CO 1	a.	With the help of neat sketch explain underground service connection to a small scale industry. Prepare estimate of material required for the same.	
CO 4	b.	Explain the following terms – Earnest money deposit, security deposit, schedule of material.	
CO 1	c.	Explain Derrick pole method of pole erection in installation of overhead lines with neat diagram.	
Q.No.5		**Solve any TWO of the following**	**12**
CO 1	a.	Explain the procedure for conductor erection in installation of T & D lines with the help of neat diagram.	
CO 2	b.	In residential installation , following load is to be connected –	

Light Point   –   4 Nos. – 60 W each.
Light point   – 3 Nos   - 100 W each.
Fan   – 4 Nos   – 60 W each.
5 A Socket   – 6 Nos   – 60 W each.
15 A Socket – 4 Nos   – 1000 W each.

Find the rating of cable and MCB. Find number of sub circuits and draw single line diagram showing connection of each point.

CO 3	c.	Define – Space to height ratio, Utilization factor. List any four factors on which quality of lighting system depends.	
Q.No.6		**Solve any TWO of the following**	**12**
CO 1	a.	State following IE rules –	

    i.   Clearance above ground of lowest conductor.

    ii.   Cutout on consumers premises.

    iii.   Point of commencement of supply.

CO 4	b.	Explain permit system. State any three precautions to be taken by issuer of permit.	
CO 2	c.	Prepare estimate of material for wiring of single room of size 5m X 4m. Height of ceiling from ground = 3.5 m. The room is to be provided with 2 lamps, 1 Fan and one 5 A socket. Mark the location of points and draw wiring diagram. Supply is taken from adjacent room so main switch is not required. Assume any other data if necessary.	

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Examination [191]:Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering**   Enrollment No.

Course: **Power Electronics**   Course Code: **6E407**

Max Marks: **80**   Time: **03 Hours** Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	**A]**	**Solve any FIVEof the following**	**15**
CO1	a.	Draw a symbol for the following devices i) SCR ii) GTO iii) IGTB.	
CO2	b.	Draw snubber circuit and label all components.	
CO3	c.	Define chopper and give its function.	
CO4	d.	Give classification of Inverters.	
CO4	e.	Draw circuit diagram for three phase bridge inverter.	
CO5	f.	List different types of speed control method used for Induction Motor.	
CO5	g.	Draw a time delay circuit and label all component.	
	B]	**Attempt any ONE of the following**	**05**
CO	a.	List the triggering methods of SCR and explain any one method in detail.	
CO	b.	Explain External pulse commutation with neat circuit diagram.	
Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Compare DIAC with TRIAC (Any four points)	
CO3	b.	Draw the circuit diagram for type C chopper and explain working.	
CO4	c.	Explain the working of single phase half bridge Inverter.	
CO5	d.	Explain speed control of DC Motor Using SCR Chopper circuit.	
Q.No.3		**Solve any THREE of the following**	**12**
CO2	a.	Justify the need of SCR protection.	
CO3	b.	Draw circuit diagram for type D chopper and explain working.	
CO4	c.	Explain working of Mid point type single phase to single phase cycloconverter.	
CO5	d.	Explain the working of static circuit breaker with neat diagram.	**P.T.O.**

Q.No.4   **Solve any TWO of the following**   **12**

CO1   a.   Draw V.I. characteristics of SCR and explain in detail.

CO2   b.   Define commutation and explain Natural Commutation with neat circuit diagram and waveform.

CO4   c.   Explain the working of series inverter with neat circuit diagram and waveforms.

Q.No.5   **Solve any TWOof the following**   **12**

CO1   a.   Explain the working ofsingle phase half wave controlled rectifier with neat circuit diagram and waveforms.

CO2   b.   Explain the working of class C Commutation circuit voltage commutation with neat circuit diagram.

CO3   c.   Explain the working of step down chopper with neat circuit diagram and waveform.

Q.No.6   **Solve any TWO of the following**   **12**

CO1   a.   Explain the working of three phase half wave controlled rectifier with neat circuit diagram and waveforms.

CO2   b.   Draw the circuit diagram for class B Commutation circuit current commutation and explain the working.

CO3   c.   Explain the working ofstep up chopper with neat circuit diagram and waveform.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering.**	Enrollment No.
Course: **Industrial Installation & Wiring**	Course Code: **6E408**
Max Marks: **80** Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1   A]   Solve any FIVE of the following   15

CO1   a.   Recall Indian Electricity rule No. 32.

CO2   b.   List any three effects of misalignment of rotating machine.

CO3   c.   Define – Grounded electrical system, bonded electrical system, ground fault current.

CO4   d.   Select proper starter for following 3-phase motors in an industrial installation 10 HP squirrel cage induction motor, 1 HP sq. cage induction motor, 5HP slip ring induction motor.

CO4   e.   Compare overhead and underground service connection for industrial installation on any three points.

CO5   f.   Construct block diagram of automatic water level controller.

CO2   g.   Compare commercial and industrial installation on following points- type of supply, type of load, wiring.

B]   Solve any ONE of the following   05

CO2   a.   Explain the procedure for electrical installation of industrial unit.

CO3   b.   Explain high resistance grounding in an industrial installation.

Q.No.2   Solve any TWO of the following   12

CO1   a.   List any six tools required for industrial installation. Write the use of each tools.

CO2   b.   Develop and explain a power control circuit for automatic sequence starting of three motors.

CO3   c.   Summarize any six benefits of neutral grounding.

P.T.O.

Q.No.3   **Solve any TWO of the following**   **12**

CO2   a.   Explain the procedure for installation of induction motor in an industry.

CO3   b.   Explain resonant (Peterson Coil) grounding with the help of neat diagram. Write its two advantages.

CO4   c.   Summarize important considerations regarding motor installation wiring. (any six).

Q.No.4   **Solve any TWO of the following**   **12**

CO4   a.   An underground service connection is to be supplied to a small scale industry having 3 phase, 37 KW, 415V, 50 Hz motor. Distance between pole to installation is 15m. Draw neat diagram of service connection and Estimate quantity of material (Minimum 6 items). Take efficiency of motor = 85% and p.f. = 0.8.

CO2   b.   (i) List any three factors which decide static machine foundation.
(ii) Identify the requirement of different dimensions of foundation for rotating machinery.

CO4   c.   Following motors are to be installed in a workshop – (i) 0.75 KW, 415V, 3 phase induction motor, (ii) 3.7 KW, 415V, 3 phase induction motor, (iii) 5.5 KW, 415V, 3 phase induction motor. Assume efficiency of each motor. = 85% and p.f. = 0.8. Calculate full load current of each motor and decide current rating of each motor switch. Also calculate current rating of main switch controlling these motors.

Q.No.5   **Solve any TWO of the following**   **12**

CO1   a.   (i) Recall IE rule regarding use of energy at high and extra high voltage.

CO5   (ii) Explain the working principle of centrifugal pump.

CO2   b.   Develop schematic diagram for control circuit and complete wiring diagram for direct on line starting of 3 phase induction motor.

CO3   c.   Compare resistance grounding and solid grounding on the basis of method of connection, any two advantages, any two disadvantages and application.

Q.No.6   **Solve any TWO of the following**   **12**

CO4   a.   A small workshop is to be equipped with following machines – 5 HP, 415V, 3 phase sq. cage motor, 3 HP, 415V, 3 phase squirrel cage motor. Draw a floor plan for placing these machines. Prepare estimate of material required to carry out installation. (Min. 6 items) Take efficiency of both machines = 0.85 and p.f. = 0.8. Assume any other data if required.

CO4   b.   A 3 phase, 15 HP, 50 Hz, 400V, 1440 rpm induction motor is to be installed with star/delta starter in a workshop 15m x 25 m. Draw installation plan, single line wiring diagram and 3 phase, 3 wire, wiring diagram

CO5   c.   (i) Select proper type of elevator for (i) construction area, (ii) home (iii) High rise application.
(ii) Name any three safety devices used in traction elevator with their application.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering.**	Enrollment No.
Course: **Industrial Instrumentation**	Course Code: **6E409**
Max Marks: **80** Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	List any six static characteristics of instruments.	
CO2	b.	Define Transducer. Give two examples each of Electrical and Mechanical transducer.	
CO2	c.	Compare active and passive transducer on any three points.	
CO3	d.	Show pin configuration of IC 741 in a neat diagram.	
CO4	e.	List any three applications and three disadvantages of LCD.	
CO5	f.	List any three methods of converting analog signal to digital signal..	
CO5	g.	Draw a labelled diagram of digital to analog (DAC) converter using op-amp with binary weighted resistor.	
	B]	**Solve any ONE of the following**	**05**
CO2	a.	Name the transducer used for measurement of pressure (Any two). Explain with neat sketch, the construction of Bonded metal wire strain guage.	
CO3	b.	Explain the working of an op-amp as inverter, with the help of circuit diagram.	
Q.No.2		**Solve any TWO of the following**	**12**
CO1	a.	Draw block diagram of general instrumentation system. Explain the function of each block.	
CO2	b.	Explain the working of electromagnetic flow meter, with the help of neat diagram.	
CO3	c.	Explain the working of op – amp as adder for adding three signals. Prove its mathematical formula.	**P.T.O.**

Q.No.3   **Solve any TWO of the following**   **12**

CO4   a.   Explain the working of LED with the help of neat diagram.   Write its any two
           advantages over other display devices.

CO5   b.   Explain generalized Data Acquisition system with the help of block diagram.

CO2   c.   Explain Hall Effect with the help of neat diagram. List any two advantages &
           disadvantages of Hall effect trasducer.

Q.No.4   **Solve any TWO of the following**   **12**

CO2   a.   Explain with neat diagram, the construction of C type bourdon tube pressure
           guage.

CO3   b.   Draw and explain basic block diagram of typical op-amp.

CO4   c.   Speed – torque characteristics of motor are to be plotted on a recorder. Suggest a
           suitable recorder. Draw its block diagram and explain the working.

Q.No.5   **Solve any TWO of the following**   **12**

CO5   a.   Explain logarithmic conversion method of signal condition in Data Acquisition
           system.

CO2   b.   Plot the characteristics of LVDT. Explain its use for the measurement of linear
           displacement, with the help of neat diagram.

CO3   c.   Explain the working of op-amp as voltage to current converter with grounded
           load.

Q.No.6   **Solve any TWO of the following**   **12**

CO1   a.   Define the following terms – Drift, Tolerance, Range, Repeatability,
           Reproducibility, Linearity.

CO2   b.   Give the classification of thermister based on shape. Draw diagram for each type.
           State any three advantages.

CO2, c.   i) List the materials used in manufacturing thermister and thermocouple. (Any
           three).

CO3   ii) Draw pin diagram of LF 398. Write function of each pin.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering.**

Enrollment No.

Course: **DIGITAL TECHNIQUES**   Course Code: **6E410**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO2	a.	Draw the symbol and truth table of the following (i) OR Gate (ii) Ex-NOR Gate.	
CO1	b.	Convert decimal to binary $(27)_{10}$, and binary to decimal $(10100)_2$.	
CO3	c.	Define fan in, Figure of merit and power dissipation.	
CO2	d.	What is K map? State its advantages.	
CO5	e.	Write the necessity of multiplexer and demultiplexer.	
CO4	f.	Compare counter & shift register.	
CO2	g.	Which gate is called universal gate? Why?	
	B]	**Solve any ONE of the following**	**05**
CO4	a.	Explain the working of SR flip flop with net diagram and truth table.	
CO2	b.	State and prove Deomorgan's theorem.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	(i) Find the decimal equivalent of following binary number.	
		(i) 1 1 1 1 1 1 (ii) 1 1 0 0	
		(ii) Convert octal No. to binary No. $(723)_8$.	
CO2	b.	Simplify the following Boolean functions	
		(i) $A + \overline{A} B + AB$ (ii) $\overline{A} B + \overline{A} B + AB \overline{A} B$	
CO4	c.	Explain the working of D type flip flop with neat diagram.	
CO5	d.	Explain the operation of Demultiplexer with the help of block diagram.	

P.T.O.

Q.No.3   **Solve any THREE of the following**   12

CO3   a.   Compare TTL and MOS Technologies.

CO4   b.   Explain Edge and level method of triggering.

CO2   c.   Implement following function using K map and simplify it.

$F(A, B, C) = \Sigma m (0, 1, 3)$ and d $(4, 5, 7)$.

CO1   d.   Compare BCD and binary No. system of coding.

Q.No.4   **Solve any THREE of the following**   12

CO2   a.   Explain positive logic system and negative logic system.

CO5   b.   Explain full Subtractor with circuit diagram & its logical equation.

CO5   c.   Explain concept of Adder.

CO4   d.   Explain master slave JK flip flop with block diagram & truth table.

Q.No.5   **Solve any TWO of the following**   12

CO4   a.   Draw block diagram of synchronous up counter. Write its truth table.

CO5   b.   Draw pin diagram and explain it for IC 74138. Write its features.

CO4   c.   State the types of shift requester. Explain any one of it.

Q.No.6   **Solve any TWO of the following**   12

CO3   a.   Classify and explain logic families.

CO2   b.   Draw symbol, truth table and explain working of two input EX-OR gate.

CO1   c.   Convert following hexadecimal into equivalent binary, octal, decimal No. $(6AC)_{16}$.

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Examination [191] : Nov.-Dec. 2019

Instructions:

1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1   A]   Solve any FIVE of the following   **15**

a. Define – Non conventional sources of energy, Non renewable sources of energy and commercial sources of energy.

b. List any three application of solar energy.

c. Give an expression which relates power output of wind turbine with wind speed. Name each term in the expression.

d. Compare the features of power obtained from solar PV and CSP power plant.

e. List any three environmental effects of biomass.

f. Explain the economic size of wind turbine.

g. Define the following term as applied to solar energy -

i) Solar radiation   ii) Diffused radiation   iii) Beam radiation.

B]   Solve any ONE of the following   **05**

a. Explain the working of standalone PV solar generation system with the help of block diagram.

b. Explain wind electric system with the help of block diagram.

Q.No.2   Solve any TWO of the following   **12**

a. List any three nonconventional energy sources. Give two advantages and two disadvantages of each source.

b. Explain the working of solar power Tower with the help of neat diagram.

c. List any six points to be considered for selection of site for wind turbine generating station.

Q.No.3   **Solve any TWO of the following**   **12**

a.   Explain three causes of poor power quality in grid connected renewable wind energy system.

b.   Explain Anaerobic digestion system for biogas production.

c.   Explain vertical axis wind turbine with the help of neat labeled diagram.

Q.No.4   **Solve any TWO of the following**   **12**

a.   Explain future prospects of renewable energy in India.

b.   Compare flat plate solar energy collector and concentrating collector on four points. Also draw neat labeled diagram of both the collector.

c.   List the different modes of wind power generation. Explain any one with neat diagram.

Q.No.5   **Solve any TWO of the following**   **12**

a.   Explain any three key solutions to grid operational issues of solar power.

b.   Compare fixed dome type and floating drum type biogas plant on following points- i) Material used   ii) Cost   iii) Feed stock
            iv) Digestion period   v) Gas tightness   vi) Thermal insulation.

c.   List different ways of storing solar energy. Explain any one with the help of neat diagram.

Q.No.6   **Solve any TWO of the following**   **12**

a.   Explain the phenomenon of local impact of wind power on the grid.

b.   Draw the floating drum types biogas plant and name different parts of it. Give any two advantages and two disadvantages of this plant.

c.   i) Show a solar cell, solar module and solar array with the help of neat diagram.

ii) Compare the horizontal axis wind turbine (HAWT) and vertical axis wind turbine (VAWT) on the following points-

i) Power captured   ii) Complexity of yaw mechanism iii) Noise problem.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering**   Enrollment No.

Course: **High Voltage Engineering (HVE)**   Course Code: **6E509**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Explain in brief liquid breakdown.	
CO1	b.	Explain in brief vacuum as insulator.	
CO2	c.	Give the types of mechanism for breakdown in Commercial liquids.	
CO3	d.	Draw a neat labeled diagram of Half wave and full wave Rectifier Circuit.	
CO4	e.	Give the advantages of CVT.	
CO5	f.	Define: Disruptive discharge voltage.	
CO5	g.	Explain why high voltage testing of Electrical apparatus is necessary.	
	B]	**Attempt any ONE of the following**	**05**
CO1	a.	Explain how electric field stresses are controlled.	
CO1	b.	Explain the surge voltages and their distribution with control.	
Q.No.2		**Solve any TWO of the following**	**12**
CO2	a.	Define Ionization; and list the ionization processes and explain any one.	
CO2	b.	Explain stremer Theory of breakdown in gases with neat labeled diagram.	
CO2	c.	Explain the breakdown occurs due to Treeing and tracking in solid dielectric in practice.	
Q.No.3		**Solve any TWO of the following**	**12**
CO2	a.	Explain the chemical and Electrochemical Deterioration and breakdown in solid dielectric.	
CO3	b.	Explain the working of voltage multiplier circuit with neat labeled diagram.	
CO3	c.	Explain the working of Cascade Transformer with neat sketch for generation of A.C. voltages.	

Q.No.4   **Solve any TWO of the following**   **12**

CO3   a.   Explain the working of multistage impulse generator – Marx circuit with neat labeled diagram.

CO3   b.   Explain the Necessity of generation of high voltages.

CO4   c.   Explain the working of generating voltmeter with neat sketches.

Q.No.5   **Solve any TWO of the following**   **12**

CO4   a.   Explain the working principle and operation of resistance potential divider with neat labeled diagram.

CO4   b.   Explain the working of capacitive Voltage Transformer with diagrams.

CO5   c.   Explain the partial discharge tests on high voltage cables.

Q.No.6   **Solve any TWO of the following**   **12**

CO5   a.   Define
   i)   50 % flash over voltage
   ii)   100 % flash over voltage
   iii)   Creepage distance

CO5   b.   Explain the power frequency test carried out on insulators.

CO5   c.   Explain the significances of power factor tests and partial discharge tests carried out on bushings.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Electrical Engineering**   Enrollment No.

Course: **High Voltage Engineering (HVE)**   Course Code: **6E509**
Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Explain in brief liquid breakdown.	
CO1	b.	Explain in brief vacuum as insulator.	
CO2	c.	Give the types of mechanism for breakdown in Commercial liquids.	
CO3	d.	Draw a neat labeled diagram of Half wave and full wave Rectifier Circuit.	
CO4	e.	Give the advantages of CVT.	
CO5	f.	Define: Disruptive discharge voltage.	
CO5	g.	Explain why high voltage testing of Electrical apparatus is necessary.	
	B]	**Attempt any ONE of the following**	**05**
CO1	a.	Explain how electric field stresses are controlled.	
CO1	b.	Explain the surge voltages and their distribution with control.	
Q.No.2		**Solve any TWO of the following**	**12**
CO2	a.	Define Ionization; and list the ionization processes and explain any one.	
CO2	b.	Explain stremer Theory of breakdown in gases with neat labeled diagram.	
CO2	c.	Explain the breakdown occurs due to Treeing and tracking in solid dielectric in practice.	
Q.No.3		**Solve any TWO of the following**	**12**
CO2	a.	Explain the chemical and Electrochemical Deterioration and breakdown in solid dielectric.	
CO3	b.	Explain the working of voltage multiplier circuit with neat labeled diagram.	
CO3	c.	Explain the working of Cascade Transformer with neat sketch for generation of A.C. voltages.	

Q.No.4   **Solve any TWO of the following**   **12**

CO3 a. Explain the working of multistage impulse generator – Marx circuit with neat labeled diagram.

CO3 b. Explain the Necessity of generation of high voltages.

CO4 c. Explain the working of generating voltmeter with neat sketches.

Q.No.5   **Solve any TWO of the following**   **12**

CO4 a. Explain the working principle and operation of resistance potential divider with neat labeled diagram.

CO4 b. Explain the working of capacitive Voltage Transformer with diagrams.

CO5 c. Explain the partial discharge tests on high voltage cables.

Q.No.6   **Solve any TWO of the following**   **12**

CO5 a. Define

       i)   50 % flash over voltage

       ii)   100 % flash over voltage

       iii)   Creepage distance

CO5 b. Explain the power frequency test carried out on insulators.

CO5 c. Explain the significances of power factor tests and partial discharge tests carried out on bushings.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in CE/ME/EE/ET/IT/CO/AE.**   Enrollment No. ☐☐☐☐☐☐

Course: **Basic Mathematics**   Course Code: **6G101/5G101/4G101/ 1G103/GE103/GE152**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**Solve any TEN of the following**	**20**

a. If $A = \begin{bmatrix} 1 & -2 \\ 4 & 3 \end{bmatrix}$ Find the matrix X such that $A + 2X = \begin{bmatrix} 3 & 6 \\ 0 & 1 \end{bmatrix}$

b. If $A = \begin{bmatrix} 2 & 5 & 6 \\ 0 & 1 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 6 & 1 \\ 0 & 4 \\ 5 & 7 \end{bmatrix}$ find $(AB)^T$

c. If $A = \begin{bmatrix} 3 & -5 \\ 2 & 0 \end{bmatrix}$ $B = \begin{bmatrix} 1 & -2 \\ 3 & 2 \end{bmatrix}$ verify that AB # BA.

d. If $A = \begin{bmatrix} 2 & 4 \\ -1 & -2 \end{bmatrix}$ show that A^2 is a Null matrix.

e. Resolve into partial fraction $\frac{x+4}{x(x+1)}$

f. Resolve into partial fraction $\frac{1}{x^2+x}$

g. Find sin210-cos300+tan420

h. Prove that $\frac{cos7\theta+cos5\theta}{sin7\theta-sin5\theta} = cot\theta$

i. Evaluate $2\cos75^0 . \cos15^0$.

j. If $tan\left(\frac{\theta}{2}\right) = \frac{1}{\sqrt{3}}$ $find$ $sin\theta$

k. Find $\tan^{-1}(1/2) + \tan^{-1}(1/3)$

l. Find principal value of $cos\left(\frac{\pi}{2} - sin^{-1}\frac{1}{2}\right)$

m. If $f(x) = x^4 - 2x + 7$ find $f(0) + f(2)$

n. Evaluate-
$$\underset{x \to -4}{Lim} \frac{x^2 + 3x - 4}{x^2 + 7x + 12}$$

Q.No.2	**Solve any THREE of the following**	**12**

a. Solve by Cramer's rule, 3x + y + z = 4, 2x - 3y + z = 7, x + y + 3z = 6.

b. If $A = \begin{bmatrix} 3 & 1 & -1 \\ 3 & 1 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 1 \\ 2 & 0 \\ 3 & -1 \end{bmatrix}$ $C = \begin{bmatrix} 1 \\ 3 \end{bmatrix}$ verify that A (BC) = (AB) C

P.T.O.

c. If $A = \begin{bmatrix} 2 & 4 & 4 \\ 4 & 2 & 4 \\ 4 & 4 & 2 \end{bmatrix}$ show that $A^2 - 8A$ is a scalar Matrix.

d. Find x, y if $\left\{ 3 \begin{bmatrix} 4 & 1 & 3 \\ 0 & -1 & -3 \end{bmatrix} - 2 \begin{bmatrix} 3 & 2 & 4 \\ -6 & 1 & -3 \end{bmatrix} \right\} \begin{bmatrix} 1 \\ 3 \\ -2 \end{bmatrix} = \begin{bmatrix} x \\ y \end{bmatrix}$

Q.No.3 **Solve any THREE of the following** **12**

a. If $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ find A^{-1} by adjoint method.

b. Solve by matrix method $2x + 3y - z = -3$, $5x + y + 3z = 10$, $4x + 3y - 2z = -3$.

c. Resolve into partial fraction $\dfrac{x^2 - 2x + 3}{x^3 + x}$

d. Resolve into partial fraction $\dfrac{x+3}{(x^2-1)\ (x+5)}$

Q.No.4 **Solve any THREE of the following** **12**

a. Find value of $\dfrac{\sin(90+\theta)}{\cos(-\theta)} - \dfrac{\sin(180-\theta)}{\sin(-\theta)} + \dfrac{\tan(270+\theta)}{\cot(-\theta)}$

b. Prove that $\dfrac{\sin 5A + 2\sin 7A + \sin 9A}{\cos 3A + 2\cos 5A + \cos 7A} = \sin 2A + \cos 2A.\tan 5A$

c. Prove that $\dfrac{\cos 2A + 2\cos 4A + \cos 6A}{\cos A + 2\cos 3A + \cos 5A} = \cos A - \tan 3A.\sin A$

d. Prove that $\cos 20.\cos 40.\cos 60.\cos 80 = \dfrac{1}{16}$

Q.No.5 **Solve any THREE of the following** **12**

a. Prove that $\tan^{-1}\left(\frac{1}{2}\right) + \tan^{-1}\left(\frac{1}{3}\right) = \frac{\pi}{4}$

b. If $f(x) = \log\left\{\frac{1+x}{1-x}\right\}$ show that $f(a) + f(b) = f\left(\frac{a+b}{1+ab}\right)$

c. If $f(x) = \dfrac{2x+5}{3x-4}$, $t = \dfrac{5+4x}{3x-2}$ show that $f(t) = x$.

Evaluate-

d. $\underset{x \to 0}{\mathrm{Lim}} \left(\dfrac{\sqrt{1+x} - \sqrt{1-x}}{x} \right)$

Q.No.6 **Solve any THREE of the following** **12**

Evaluate-

a. $\underset{x \to 3}{\mathrm{Lim}} \left[\dfrac{1}{x-3} - \dfrac{1}{(x^2 - 5x + 6)} \right]$

Evaluate-

b. $\underset{x \to 0}{\mathrm{Lim}} \dfrac{\cos 3x - \cos 5x}{x^2}$

Evaluate-

c. $\underset{x \to 0}{\mathrm{Lim}} \dfrac{10^x - 2^x - 5^x + 1}{x^2}$

Evaluate-

d. $\underset{x \to 5}{\mathrm{Lim}} \left(\dfrac{\log x - \log 5}{x-5} \right)$

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in CE/ME/EE/ET/IT/CO/AE**	Enrollment No. ☐☐☐☐☐☐
Course: **Engineering Mathematics**	Course Code: **6G102/5G102/4G102/ 1G104/GE104/GE153**
Max Marks: **80** Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1   Solve any TEN of the following   20

CO1 a. Find $\frac{dy}{dx}$ if y = $\frac{sinx}{1-Cosx}$

CO1 b. Find $\frac{dy}{dx}$ if x = a sec θ and y = b tan θ

CO1 c. If y = sin (e^{5x}) Find $\frac{dy}{dx}$

CO2 d. Find the slope of the curve y^2 = 25 – x^2 at pt. (-3, 4)

CO3 e. Evaluate $\int sinx.\,sec^2x\;dx$

CO3 f. Integrate with respect to x, cos^{2}x.

CO3 g. Evaluate $\int \frac{sec^2x}{1-tan^2x}\,dx$

CO3 h. Evaluate $\int_{-1}^{1} \frac{dx}{1+x^2}$

CO4 i. Form the differential equation if y = A e^{5x} + B e^{-5x}.

CO4 j. State the order and degree of differential equation. $\sqrt{1 + \left(\frac{dy}{dx}\right)^2} = \left(c.\frac{d^3y}{dx^3}\right)^3$

CO5 k. Calculate the mean deviation about the mean of following data

3, 6, 5, 7, 10, 12, 15, 18.

CO5 l. Find the range and coefficient of range of the following distribution.

Class-I	11-20	21-30	31-40	41-50	51-60
Freq.	9	12	16	14	10

Q.No.2   Solve any THREE of the following   12

CO1 a. If y = tan^{-1} $\left[\frac{sinx}{1+cosx}\right]$ Find dy/dx.

CO1 b. If e^y = y^x, prove that $\frac{dy}{dx} = \frac{(logy)^2}{logy-1}$ **P.T.O.**

CO1   c.   Differentiate with respect x, $(\tan x)^x$.

CO1   d.   If $y = \tan^{-1}\left(\frac{2t}{1-t^2}\right)$ and $x = \sin^{-1}\left(\frac{2t}{1+t^2}\right)$. Find $\frac{dy}{dx}$

Q.No.3   **Solve any THREE of the following**   **12**

CO1   a.   If $y = a.\cos(\log x) + b.\sin(\log x)$ prove that $x^2\frac{d^2y}{dx^2} + x\frac{dy}{dx} + y = 0$

CO2   b.   Find the equation of tangent and normal to the parabola $y^2 = 4x$ at point (1,-2)

CO2   c.   Find the radius of curvature at any pt. of the cycloid $x=a\ (\theta+\sin\theta)$, $y=a(1-\cos\theta)$

CO2   d.   Find the maximum and minimum values of $x^4-6x^2+8x-30$.

Q.No.4   **Solve any THREE of the following**   **12**

CO3   a.   Evaluate $\int \frac{e^x(x-1)dx}{x^2.sin^2\left(\frac{e^x}{x}\right)}$

CO3   b.   Evaluate $\int \frac{dx}{25-61\ sin^2x}$

CO3   c.   Evaluate $\int e^{2^x}.sin3x\ dx$

CO3   d.   Evaluate $\int \frac{e^x.dx}{3.e^{2x}+4e^x+1}$

Q.No.5   **Solve any THREE of the following**   **12**

CO3   a.   Evaluate $\int_0^{\pi/2} \frac{dx}{5+3.cosx}$

CO3   b.   Evaluate $\int_0^1 \frac{tan^{-1}x}{1+x^2}dx$

CO3   c.   Solve $\frac{dy}{dx}=\cos(x+y)$

CO3   d.   Solve $(x^3 + y^3)\frac{dy}{dx} = x^2y$

Q.No.6   **Solve any THREE of the following**   **12**

CO4   a.   Solve $(x+1)\frac{dy}{dx} - y = e^x(1+x)^2$

CO4   b.   Solve $(2xy + y^2)dx + (x^2 + 2xy + \sin y)dy = 0$.

CO5   c.   Find the median of the following distribution graphically.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Freq.	02	05	11	15	10	06	01

CO5   d.   Find the standard deviation of the following data.

Class Interval	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Freq.	03	05	09	15	20	16	10	02

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in CE/ME/EE/ET/IT/CO/DD/AE**   Enrollment No.

| Course: | **ENGLISH** | | Course Code: | **6G301/5G301/4G301** |
| Max Marks: | **80** | Time: **03 Hours** | Date: | **7 May 2022** |

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**Solve any TEN of the following in two-three sentences each.**	**20**

    a. Was Gandhiji against machinery?

    b. How is plastic an environmental hazard?

    c. Which incident taught Dr. Kalam the value of planning, teamwork and time?

    d. Name the sports events in which Malathi Holla participated.

    e. How did the small sapling of Infosys grow into a majestic tree?

    f. What did Gandhiji object to?

    g. What are Malathi Holla's expectations from the disabled people?

    h. Compare the use of plastic by Indians, Europeans and Americans.

    i. Why did Narayan Murthy not join IIT?

    j. What is the advice of Dr. Kalam to the new generation?

    k. Name the awards won by Malathi Holla.

    l. What should the labourer assured of?

    m. Who is the founder of 'Infosys'?

    n. What is principle of Ruskin Bond's book - 'Unto This Last'?

Q.No.2	**Solve any THREE of the following in about 75-80 words.**	**12**

    a. If Gandhiji was against modernization, what were his views on electricity?

    b. How has plastic spoiled the city?

    c. Name the various awards honoured to N.R. Narayan Murthy.

    d. How does the success story of Dr. Kalam inspire the new generation?

    e. "Attitudinal handicap is much worse than physical handicap." Justify this statement with example.

P.T.O.

Q.No.3 A] **Choose correct preposition and complete the sentences. (Any FOUR)** **04**

(of, for, at, from, to, in)

a. Daulatabad is 20 km ____ Aurangabad.

b. Throw it ____ the dustbin.

c. This is a letter ____ you.

d. We will return ____ night.

e. I have been ____ Pune twice.

f. They are proud ____ their success.

B] **Change the narration of the following sentences. (Any Four)** **04**

a. The teacher advised, "Get rid of needless interests."

b. The police asked, "Do you know whose children those are?"

c. "Sandesh is coming today," I told her.

d. She aksed, "Where is the hotel 'Green Leaf'?"

e. "How amazing it is!" She said.

f. The lecturer said, "Chhatrapati shivaji won the respect of all races and classes by his justice."

C] **Rewrite the following sentences in active / passive voice. (Any FOUR)** **04**

a. We use this room only on special occasion.

b. Somebody had slashed the picture with a knife.

c. You should open the debate.

d. Someone will serve refreshments.

e. Students are doing a lot of work.

f. English is spoken all over the world.

Q.No.4 A] **Do as directed. (Any TEN)** **10**

a. I (live) here for ten years. (Use suitable form of the verb)

b. He was a funny looking man. (Make it Exclamatory)

c. It is raining heavily. I have to go for a meeting. (Rewrite as a compound sentence)

d. Finish the work within ____ hour. (Insert the appropriate article.)

e. Many animals live in water. (Rewrite the sentence using present perfect continuous tense)

f. He has been a faithful friend. (Identify the noun in the sentence)

g. The principal …… take action against him. (Rewrite the sentence by using Modal Auxiliary showing 'Certainity')

h. Do you have any money with you? (Identify the type of sentence). **P.T.O.**

i. All the proceedings should be legal, never….. .

(Fill in the blanks with antonym of the underlined word.)

j. Write two words having prefix 'Mis___'.

k. Everest is the tallest mountain. (Change into positive degree)

l. 'Save money'. (Make sentence using this collocation)

m. Make a sentence using subject +verb +object. (S V O type)

n. A place where one can read books.

(Write an appropriate word for the given group of words)

B] Punctuate and rewrite the following sentences. (Any Two)   02

a. the problem is this which came first the hen or egg

b. the old man asked what are you doing there my child

c. the biggest cities in india are kolkata mumbai chennai delhi and hyderabad

Q.No.5   Solve any THREE of the following.   12

a. Prepare a 'Resume' for the post of a junior engineer in Aurangabad Municipal Corporation.

b. Write an e-mail to your friend describing him/her your first day in the college.

c. Write a short paragraph on 'Importance of Books in life'

OR

'Bicycle is popular today in many countries'.

d. Write an e-mail to Registrar, G.P. Aurangabad inquiring about the scholarship process.

Q.No.6 A] Solve any TWO of the following.   06

a. What is the importance of good listening skills?

b. Explain active listening with two suitable examples.

c. Explain Psychological barriers to listening with suitable examples.

B] Read the following extract and answer the questions given below :

Whatever the origin of speech, we can be certain that man did not begin to feel the need to speak until he began to live in communities, for speech is essentially social in character. It is however, as difficult to explain the origins of speech as it is to explain why certain combinations of sound came to be associated with certain objects. Many primitive people believed, and some still believe, in the magical power of names. They believed, for example, that God's name was a part of him and therefore possessed some of the divine powers of the God himself.

P.T.O.

A reflection of the same attitude may be seen in a Child's unwillingness to tell a stranger his name, since he feels that with his name he is giving a part of himself. Similarly, parents give their children the names of Gods or saints or famous men in the hope that the name will carry with it some of the great qualities of its original possessor. Most of us, too feel annoyed or hurt if somebody mispronounces our name or calls us by the wrong name.

a. When did man begin to feel like speaking? **1**

b. Why did the primitive people believe in names? **1**

c. Why is a child unwilling to give his name? **1**

d. Is the writer certain about the origin of speech? **1**

e. How far do you believe that names have great power? Support your answer with examples. **2**

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**

Enrollment No.

Course: **Machining Processes**   Course Code: **6M202**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1   Solve any TEN of the following   20

a. State tool signature. Give one example.

b. State the properties of cutting fluid (any two)

c. A previously drilled role is to be enlarged to a non standard size suggest the operators and draw a free hand sketch for the suggested operation.

d. Find time required for one complete cut on a workpiece of 60mm diameter and 400mm long. The cutting speed is 50 m/min and feed 0.5 mm/rev.

e. Distinguish between rough and finish turning. (Any two points)

f. State any two reasons why carbide tools are provided with negative roll angle.

g. List different tools holding devices on drilling machine. (any two)

h. A hole of 10 mm dia is to be drilled through a mild steel plate of 16mm thick. If spindle is running at 400 rpm. Calculate cutting speed.

i. Classify Boring machines.

j. Specify Horizontal boring machine.

k. Name any four work holding devices used on a shaper.

l. Suggest the type of machine used for

(i) Production of splines. (ii) Keyways on Gear.

m. What is the function of throttle valve and relief valve in Hydraulic shaper?

n. Describe a surface broaching machine.

o. State the function of front and rear pilot in Broaching.

P.T.O.

Q.No.2   **Solve any THREE of the following**   **12**

    a.   Differentiate between orthogonal cutting and oblique cutting. (any four points)

    b.   Define cutting speed, feed and depth of cut in a lathe machine.

    c.   Draw a neat sketch of a single point cutting tool and show different angles on it.

    d.   List various types of chip breakers. Why they are used.

Q.No.3   **Solve any THREE of the following**   **12**

    a.   Specify the Lathe machine.

    b.   How do you machine / produce 'V' threads on lathe machine? Discuss the operation in steps.

    c.   Explain with neat sketch Tumbler feed reversing mechanism.

    d.   List the different taper turning methods. Explain taper turning attachment.

Q.No.4   **Solve any THREE of the following**   **12**

    a.   Explain bar feeding mechanism in capstan with free hand sketch.

    b.   List different chucks. Explain push-out type collect chuck.

    c.   Explain the working of taper turning attachment.

    d.   Why floating holders are used while reaming operation. Describe its working.

Q.No.5   **Solve any THREE of the following**   **12**

    a.   Why boring heads are used during boring operation. Explain about a simple boring head.

    b.   Draw a neat sketch of Jig boring machine. State any two advantages.

    c.   Explain with neat sketch how do you adjust stroke length of shaper.

    d.   Explain the working of slotted disk mechanism of slotting machine.

Q.No.6   **Solve any THREE of the following**   **12**

    a.   Differentiate between planer & shaper (any four points)

    b.   A vertical surface of a machine tool bed is to be machined on planer machine. Explain with neat sketch.

    c.   State the advantages and limitations of broaching (any two each)

    d.   Draw a block diagram of standard double housing planer.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**   Enrollment No. ☐☐☐☐☐☐

Course: **Mechanical Technology.**   Course Code: **6M204**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1   **Solve any TEN of the following**   **20**

a. Enlist any three factors which govern the selection of proper material for pattern.

b. How the layout of pattern is made.

c. Enlist any four characteristics of a good moulding sand.

d. What are the different types of moulding machines?

e. Draw sketch of gas fired furnace.

f. Enlist any two defects and their causes in casting.

g. Define cold spinning process.

h. Enlist any four hot working processes.

i. Suggest proper welding method for following material (i) Stainless steel (ii) Cast iron.

j. State any two applications of spot welding.

k. State principle of arc welding.

l. What are different types of press?

m. List any four press operations.

n. How the press size is designated?

Q.No.2   **Solve any THREE of the following**   **12**

a. What are the common allowances provided on pattern and why?

b. Explain general clour coding used in pattern making.

c. Describe moulding sand preparation and conditioning in brief.   **P.T.O.**

d. Why testing of moulding sand is necessary? Which equipments are used for moulding sand testing?

Q.No.3   **Solve any THREE of the following**   **12**

   a. Explain with neat sketch coke-fired furnace (pit furnace).

   b. Why cupola furnace sometimes gets jammed? How it can be prevented?

   c. Explain with neat sketch direct or forward extrusion.

   d. Explain with neat sketch embossing.

Q.No.4   **Solve any THREE of the following**   **12**

   a. Describe a fly press with the help of a neat sketch.

   b. Explain with neat sketch following press operations (i) Lancing (ii) Piercing.

   c. Explain with neat sketch TIG welding.

   d. Write the classification of welding.

Q.No.5   **Solve any THREE of the following**   **12**

   a. What considerations are necessary for while designing a pattern?

   b. List any four types of core boxes, draw and explain half core box.

   c. Write any four advantages and disadvantages of CO_2 moulding.

   d. Write requirements of an ideal gating system.

Q.No.6   **Solve any THREE of the following**   **12**

   a. Explain with neat sketch hot chamber die casting.

   b. What are advantages and disadvantages of die casting? (Any four)

   c. Describe with neat sketch wire drawing process.

   d. Draw neat sketch of arc welding, label all parts. State its two advantages and disadvantages.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**   Enrollment No. ☐☐☐☐☐☐

Course: **Thermal Engineering**   Course Code: **6M205**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	Define intensive property. Give two examples.	
CO2	b.	State Avogadro's law.	
CO3	c.	List the different boiler mounting and accessories (Each Two)	
CO4	d.	Give the applications of steam nozzles.	
CO5	e.	Write any two functions of the steam condenser.	
CO6	f.	Define transmissivity and emissivity.	
CO1	g.	State zeroth law of thermodynamics.	
CO2	h.	Write Charles's law as applied to an ideal gas.	
CO3	i.	Define sensible heat and latent heat.	
CO4	j.	List any four losses in steam turbine.	
CO5	k.	State the Dalton's law of partial pressure.	
CO4	l.	Define critical pressure.	
CO6	m.	State the Newton's law of cooling.	
CO3	n.	Define dryness fraction.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Write general steady flow energy equation (SFEE) per unit mass. Apply this equation to a [i] Nozzle [ii] steam condenser.	
CO2	b.	Two kg of gas at 50^0C is heated at constant volume until pressure is doubled. Determine [i] Final temperature [ii] Change in internal energy. Take Cv=0.70 kJ/kgK.	
CO4	c.	Suggest measure to improve thermal efficiency of steam turbine power plant.	
CO5	d.	State the sources of air leakages and its effect in steam condenser.	

Q.No.3		**Solve any THREE of the following**	**12**
CO1	a.	Explain : (i) Point function (ii) Path function (iii) State (iv) Process.	
CO2	b.	Draw P-V and T-S diagram of isentropic and isothermal process.	
CO3	c.	Three kg of steam at pressure of 3 MPa exists in dry and saturated condition. Calculate the following. (i) Enthalpy (ii) Entropy (iii) Volume (iv) Internal energy	
CO5	d.	What is boiler draught? State its necessity.	

P.T.O.

Q.No.4   **Solve any THREE of the following**   12

CO1   a.   Prove the equivalence of Kelvin-plank and Clausius statement.
CO2   b.   Write the equation for polytropic process. (i) Change in internal energy (ii) Work done.
CO3   c.   Explain construction and working of loeffler boiler with neat sketch.
CO4   d.   Classify steam turbine on the basis of (i) Principle of action (ii) Direction of steam flow (iii) Method of governing (iv) Steam pressure.

Q.No.5   **Solve any THREE of the following**   12

CO2   a.   Determine the enthalpy, entropy, specific volume and internal energy for one kg of steam at 7 bar if its conditions are (i) 85% dry and when (ii) Supersaturated upto 100^0C. Assume C_P=2.1 KJ/Kgk for superheated steam using steam table.
CO3   b.   Discuss important provisions made on IBR (Indian Boiler Regulation)
CO4   c.   Explain the necessity of compounding of steam turbine. Also, state various types of compounding.
CO6   d.   Explain the construction and working of pipe in pipe type heat exchanger.

Q.No.6   **Solve any THREE of the following**   12

CO2   a.   Explain throttling process with the help of P-V and T-S diagram.
CO3   b.   Draw T-S diagram of simple Rankine cycle for a thermal power plant. Show all the processes on it.
CO4   c.   Compare Impulse and reaction turbine.
CO6   d.   A reactor's wall, 320mm thick is made up of an inner layer of fire brick (K=0.84 W/m^{0}C) covered with a layer of insulation (k=0.16 W/m^{0}C). The reactor operates at a temperature of 1325^0C and ambient temperature is 25^0C find. (i) Thickness of brick and insulation which gives maximum heat loss. (ii) Calculate heat loss presuming that insulating material has maximum temperature of 1200^0C.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

(An Autonomous Institute of Govt. of Maharashtra)

\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**   Enrollment No. ⬚⬚⬚⬚⬚⬚

Course: **Theory Of Machines**   Course Code: **6M206**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any TEN of the following**	**20**
CO1	a.	Define kinematic link & give its two practical examples.	
CO1	b.	Define (i) Spherical pair (ii) Higher pair.	
CO1	c.	Name any four inversion of a slider crank chain.	
CO2	d.	Write the relation between the number of instantaneous centers and the number of links in a mechanism.	
CO3	e.	Why a roller follower is preferred to that of a knife edge follower?	
CO3	f.	Define the following terms as applied to cam (i) Base circle (ii) Pressure angle.	
CO4	g.	State precisely the reasons for V belt drive being preferred to flat belt drive.	
CO4	h.	Define initial tension in belt drive & state its effect.	
CO4	i.	State the law of gearing.	
CO5	j.	List various types of friction.	
CO6	k.	Define fluctuation of speed & fluctuation of energy in case of flywheel.	
CO6	l.	State the necessity of balancing for rotors of high speed engines.	
CO6	m.	Define the terms 'Coefficient of Friction' and 'Limiting angle of friction.'	

Q.No.2		**Solve any TWO of the following**	**12**
CO2	a.	In the toggle Mechanism shown in fig. No. 1, the crank OA rotates at 180 rpm counter clockwise. The dimensions of various links are as follows OA=180 mm, CB=240 mm, AB=360 mm, and BD=540 mm. For the given configurations, find (i) Velocity of slider D (ii) Angular velocity of link BD.	
CO2	b.	In a slider crank mechanism, the length of crank & the connecting rod are 200 mm and 800mm respectively. Locate all the instantaneous centres of the mechanism for the position of the crank when it has turned 30^0 from the inner **P.T.O.**	

dead centre. Also find the velocity of slider and the angular velocity of the connecting rod if the crank rotates at 40 rad/sec.

CO5   c.   In a thrust bearing the external and internal diameter of the contacting surfaces are 320 mm and 200mm respectively. The total axial load is 80 kN and the intensity of pressure is 350 kN/m^2. The shaft rotates of 400 rpm. Taking coefficient of friction as 0.06. Calculate the power lost in friction assuming uniform pressure. Also find the number of collars required for the bearing.

Q.No.3   **Solve any TWO of the following**   **12**

CO2   a.   The crank & connecting rod of a reciprocating engine are 200mm & 700 mm respectively. The crank is rotating in clockwise direction at 120 rad/s. Find with the help of Klein's construction : (i) Velocity & acceleration of the piston. (ii) Velocity & acceleration of the mid point of the connecting rod. The crank is at 30^0 to IDC (inner dead centre)

CO3   b.   A cam rotates a roller follower, axis passing through the axis of cam. The specification are as follows. Minimum radius of cam=30 mm, lift of follower=30mm, diameter of roller=20mm, angle of lift =120^0 with SHM; outer dwell angle=30^0, Angle of return=150^0 with uniform acceleration & retardation. Draw the cam profile.

CO4   c.   A belt drive transmits 8 kw power from a shaft rotating at 240 rpm to another shaft rotating at 160 rpm. The belt is 8mm thick. The diameter of the smaller pulley is 600mm & the two shafts are 5m apart. The coefficient of friction is 0.25. If the maximum stress in the belt is limited to 3 N/mm^2, find the width of the belt for (i) open belt drive, and (ii) a cross belt drive, and (iii) a cross belt drive.

Q.No.4   **Solve any THREE of the following**   **12**

CO3   a.   Differentiate between machine & structure.

CO4   b.   Write the classification of follower (i) As per shape (ii) As per motion. Also draw sketch of any one.

CO5   c.   Explain the phenomena of 'Slip' and 'Creep' in a belt drive.

CO1   d.   A vertical shaft 18cm diameter rotating at 120 rpm rests on a flat end footstep bearing. The shaft carries a vertical load of 22 kN. The coefficient of friction is 0.06. Determine the power lost in friction assuming uniform pressure distribution.

Q.No.5   **Solve any THREE of the following**   **12**

CO1   a.   Write the classification Kinematic pairs on the basis of (i) Type of contact (ii) Type of relative motion.

CO3   b.   Draw the displacement, velocity and acceleration diagram for a follower when it moves with SHM.

CO4   c.   Write the advantages & disadvantages of V belt drive over flat belt drive (four each)

CO6   d.   Draw and explain Turning moment diagram of 4 stroke IC engine.

Q.No.6   **Solve any THREE of the following**   **12**

CO6   a.   Distinguish between flywheel & governor (four points)

CO6   b.   Explain the working principle of centrifugal governor with neat sketch.

CO   c.   State the causes & harmful effects of vibrations in machines.

CO   d.   Four masses 200kg, 300kg, 240 kg and 160 kg are rotating at radii 0.2m, 0.15m, 0.25m and 0.3m, respectively, and the angles between successive masses are 45^0, 75^0 and 135^0. Find graphically the position & magnitude of the balance mass required, if its radius of rotation is 0.25m.

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**	Enrollment No.
Course: **Measurement & Controls**	Course Code: **6M207**
Max Marks: **80** Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1   Solve any TEN of the following   20

CO		
CO5	a.	Explain the term calibration.
CO3	b.	State functions of instrument.
CO6	c.	Write down following cases of measurement as contact or non contact type. (i) Measurement of temperature by using thermometer. (ii) Measurement of temperature of hot casting.
CO2	d.	Define (i) Accuracy (ii) Precision.
CO4	e.	State advantages of automatic control system.
CO6	f.	Suggest name of pressure gauge for measurement of extreme low pressure.
CO1	g.	Give classification of flow transducer.
CO5	h.	State different scales of temperature measurement with its conversion.
CO6	i.	Name temperature sensor for measuring temperature sensor for measuring temperature above 3000^0C.
CO4	j.	Draw neat sketch of servomotor mechanism.
CO3	k.	State advantages of electromagnetic balance.
CO3	l.	List different types of strain gauges.
CO3	m.	Draw neat sketch of carbon microphone.
CO5	n.	How speed measurement is done by stroboscope?

Q.No.2   Solve any THREE of the following   12

CO		
CO1	a.	Explain generalized measurement system with the help of block diagram.
CO3	b.	Explain thermal conductivity gauge in detail.
CO4	c.	Identify and explain the open or closed loop system for the following cases. (i) traffic signal on road (ii) Air conditioner.
CO2	d.	Explain four important dynamic characteristics of the measuring instrument.

Q.No.3   Solve any THREE of the following   12

CO		
CO1	a.	Classify instrument on the basis of following (i) Application (ii) Mode of operation (iii) Energy conversion (iv) Output.
CO3	b.	Explain electrical resistance pressure gauge.

P.T.O.

| CO2 | c. | Classify errors in the instrument and describe any two errors. |
| CO4 | d. | With the help of functional block, diagram. Explain feedback control system. |

Q.No.4 **Solve any TWO of the following**   **12**

CO4	a.	Explain three different modes of control actions used in control system.
CO3	b.	State classification of liquid level measurement methods and explain with neat sketch float and shaft gauge.
CO3	c.	Explain working principles of hot wire anemometer in constant current and constant temperature mode with neat sketch.

Q.No.5 **Solve any TWO of the following**   **12**

CO6	a.	Explain the working of ultrasonic flow meter and state situation in which this flow meter is preferred.
CO3	b.	Write construction and working of eddy current dynamometer with neat sketch.
CO5	c.	Explain working principle of optical pyrometer with neat sketch and state advantages.

Q.No.6 **Solve any THREE of the following**   **12**

CO3	a.	Draw and explain strain gauge transmission dynamometer.
CO3	b.	Explain Mcleod gauge with neat sketch.
CO6	c.	Write down any four practical applications of LVDT.
CO5	d.	Explain working principles of thermocouple.

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\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**

Enrollment No.

Course: **Fluid Mechanics & Machinery**   Course Code: **6M401**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Define following properties of fluid. (i) Mass density (ii) Weight density (iii) Specific volume.	
CO1	b.	Derive continuity equation based on the principle of conservation of mass.	
CO1	c.	Derive expression for Reynolds number.	
CO3	d.	Derive expression for loss of head in pipe for Darcy-Weisbach formula.	
CO5	e.	Sketch and lable vortex casing used in centrifugal pump.	
CO5	f.	Define slip in reciprocating pump? State negative slip.	
CO6	g.	Classify hydraulic turbines.	
	B]	**Solve any One of the following**	**05**
CO1	a.	Calculate the density, specific weight and weight of one litre of petrol of specific gravity 0.7.	
CO3	b.	The diameters of a pipe at a sections 1 and 2 are 10 cm and 15cm respectively. Find the discharge through the pipe if the velocity of water following through the pipe at a section1 is 5 m/s. Determine also the velocity at section 2.	
Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	State and prove the Pascals law.	
CO2	b.	Explain pitot-tube. Determine the velocity at any point with the help of pitot-tube.	
CO3	c.	Derive the equation for – (i) Loss of head at the entrance of a pipe (ii) Loss of head at the exit of pipe.	
CO3	d.	Define : (i) Hydraulic gradient line (ii) Total Energy line.	
Q.No.3		**Solve any THREE of the following**	**12**
CO2	a.	State types of manometer. Explain the construction of simple U-tube manometer with neat sketch.	
CO3	b.	Water is flowing through a pipe having diameter 300mm and 200mm at the bottom and upper end respectively. The intensity of a pressure at the bottom end is 24.525 N/cm^2 and the pressure at the upper end is 9.81 N/cm^2. Determine the difference in datum head if the gate of flow through pipe is 40 lit/s.	
CO3	c.	Derive an expression for the power transmission through pipes.	
CO4	d.	Explain the phenomenon of water hammer.	P.T.O.
Q.No.4		**Solve any THREE of the following**	**12**

CO3   a.   Three pipes of length 800m, 500m and 400m and of diameters 500mm, 400mm and 300mm respectively are connected in series. These pipes are to be replaced by a single pipe of length 1700m. Find the diameter of the equivalent pipe.

CO4   b.   Explain the construction and working of centrifugal pump.

CO4   c.   Explain the construction and working of reciprocating pump.

CO4   d.   Explain the construction and working of pelton wheel turbine.

Q.No.5   **Solve any THREE of the following**   **12**

CO4   a.   Explain the following important efficiencies of a centrifugal pump.
(i) Manometric efficiency (ii) Mechanical efficiency.

CO5   b.   Explain the construction and working of submersible pump.

CO5   c.   Sketch Ideal indicator diagram for reciprocating pump and show the effect of acceleration by sketching another indicator diagram.

CO4   d.   Define cavitation in centrifugal pump. State any two effects of cavitation on efficiency of pump.

Q.No.6   **Solve any THREE of the following**   **12**

CO5   a.   State any four selection criteria for centrifugal pumps.

CO5   b.   Explain air vessel, with neat sketch.

CO6   c.   Sketch conical draft tube and moody spreading tube.

CO6   d.   Explain the governing mechanism of pelton turbine.

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Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Mechanical Engineering**	Enrollment No.
Course:	**Industrial Fluid Power**	Course Code: **6M402**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1 A] Solve any FIVE of the following   **15**

     a. State three main limitations of oil hydraulics.

     b. Sketch and label Piston type actuator

     c. Sketch symbol of 3/2 DC Valve used in Pneumatic circuit.

     d. List advantages of Meter – in circuits.

     e. Sketch a Pneumatic circuit operating a single acting cylinder using 3/2 Direction Control Valve.

     f. Compare meter in circuit with meter out circuit on three important points.

     g. What is PLC ? List its advantages.

B] Attempt any one of the following   **05**

     a. Explain hydraulic circuit of the milling machine with a neat diagram.

     b. Explain with a neat sketch, working of a sequencing pneumatic circuit for two double acting cylinders.

Q.No.2 Solve any THREE of the following   **12**

     a. Differentiate between hydraulic system and Pneumatic system.

     b. Sketch label following (any four.)
     i)Ge-rotor pump ii) Screw pump iii) Variable displacement vane pump
     iv) External gear pump v) Lobe pump

     c. What is FRL unit? Explain it's working with a neat sketch.

     d. Sketch and Label a Regenerative hydraulic circuit to operate double acting cylinder with a 3/2 DCV.

Q.No.3 Solve any THREE of the following   **12**

     a. List types of hydraulic fluids. Give properties of hydraulic oil for it's selection.

     b. Give the causes and Remedy for following troubles in hydraulic system.
         i) Sluggish Response of valves.
         ii) Motor not developing proper speed.
         iii) Excessive pump noise
         iv) Pump not delivering pressure.

     c. Explain pneumatic circuit for controlling speed of a double acting cylinder by a circuit diagram.

     d. List major applications of PLC.   **P.T.O.**

Q.No.4 **Solve any THREE of the following** **12**
  a. Explain following. (Any two).
     i) Air treatment in pneumatic system.
     ii) Condensation of compressed air.
     iii) Effect of temperature, pressure and humidity on fluids.
  b. Explain following with neat sketches. (Any two)
     i) 3/2 Poppet type DCV for hydraulic circuit.
     ii) 4/3 sliding Spool Valve for hydraulic circuit.
     iii) 4/2 Rotary Spool Valve for hydraulic circuit.
     iv) Counter balance Valve for hydraulic circuit.
     v) Sequence valve for hydraulic circuits.
  c. Explain following with neat sketch. (Any two)
     i) Pressure relief valve for Pneumatic circuit.
     ii) Sequence valve for Pneumatic circuit.
     iii) Check valve for Pneumatic Circuit.
  d. Explain various Components of PLC.

Q.No.5 **Solve any THREE of the following** **12**
  a. List requirements of hoses and hose fittings in hydraulic systems.
  b. Sketch and Label following. (Any two)
     i) Axial Piston air motor.
     ii) Gear type air motor.
     iii) Double acting Pneumatic cylinder.
  c. Sketch and Label hydraulic circuit of a shaper machine with 4/2 double solenoid DCV and two limit switches. Why speed of Ram during cutting stroke is controlled and during Return stroke fast?
  d. Explain Pneumatic Sequencing circuit operating Two SAC in sequence using 3/2 DCV.

Q.No.6 **Solve any THREE of the following** **12**
  a. Name any eight pipe and tube fittings used in hydraulic circuits. Write their functions in short.
  b. Sketch and label dual pump hydraulic circuit for punch and press application.
  c. Explain Time delay Pneumatic circuit for SAC
  d. Explain a Ladder programme for control of single acting cylinder in hydraulic circuit.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**

Enrollment No.

Course: **Machine Drawing.**   Course Code: **6M403**
Max Marks: **80**   Time: **04 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any ONE of the following**	**08**
CO1	a.	The elevation of a steel chimney 600 mm in diameter fitted to an inclined roof as shown in fig. 1. Develop the lateral surface of the chimney.	
CO1	b.	A right circular cone diameter of base 60mm & axis 60mm long is resting on its base on H.P. It is cut by a section plane perpendicular to V.P. and inclined at 45^0 to H.P. and bisecting the axis of cone. Draw the front view, top view & development of lateral surface of the cone.	
Q.No.2		**Solve any TWO of the following**	**16**
CO2	a.	A vertical square prism side of base 50mm has its faces equally inclined to V.P. It is completely penetrated by another square prism of base 30mm side, the axis of which is parallel to both H.P. and V.P. and is 6mm away from the axis of the vertical prism the faces of horizontal prism are also equally inclined to the V.P. Draw the projections of solids showing the lines of intersection.	
CO2	b.	A vertical cylinder of 75 mm diameter is penetrated by another cylinder of 50mm diameter, the axis of which is parallel to both H.P. & V.P. The two axis are 9mm apart. Draw the projections of two cylinders showing curves of inter section. Assume suitable axis lengths for both the cylinders.	
CO2	c.	A cone with base diameter of 70mm and axis length 65mm is kept on the H.P. on its base. It is penetrated by a horizontal cylinder of diameter 35mm with its axis parallel to V.P. and intersecting the axis of the cone at a distance of 20mm above the base of the cone. Draw the projections of solids showing curves of intersection.	

P.T.O.

Q.No.3 a. Draw conventional representation for any four of the following :   **08**

CO3   (i) Steel (ii) Diamond knurling (iii) Helical spring with flat end (iv) Bevel gear

(v) I-section (vi) External screw thread.

CO4   b. Attempt any TWO of the following :   **08**

(i) The shaft & hole size are as follows :

shaft $\emptyset 50^{+0.023}_{-0.012}$ Hole $\emptyset 50^{+0.018}_{-0.000}$

Determine the type of fit between then.

(ii) Draw the symbols for following features used in geometrical tolerances.

(a) Concentricity (b) Parallelism (c) Perpendicularity (d) Profile of any surface.

(iii) Draw the symbols of the following :

(a) Spot weld (b) Seam weld (c) Concave fillet weld (d) Convex double V-butt weld.

Q.No.4   **Solve any ONE of the following**   **20**

CO5   a. Fig. No. 2 shows the details of screw jack. Draw the following views of assembly. (i) Sectional front view (ii) Top view (iii) Prepare bill of material.

CO5   b. Fig. No. 3 shows the details of FOOT STEP BEARING. Draw the following views of the assembly (i) Sectional front view (ii) Top View (iii) Prepare bill of material

Q.No.5   **Solve any ONE of the following**   **20**

CO5   a. Fig. No. 04 shows assembly of 'Drill Jig'. Draw detailed drawing of the following parts.

(i) Base plate – sectional F.V. & T.V. (ii) Jig plate – sectional F.V. & T.V. (ii) Stem (iv) Latch washer – sectional F.V. & TV.

CO5   b. Fig. No. 5 shows assembly of 'Non return valve'. Draw detailed drawings of following parts.

(i) Body – sectional F.V. & T.V. (ii) Cover – Sectional F.V. & T.V. (iii) Valve seat – Sectional F.V. & T.V. (iv) Valve – Front view only.

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**   Enrollment No.

Course: **Heat Power Engineering**   Course Code: **6M404**
Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1		**Solve any FIVE of the following**	**15**
CO1	a.	Represent P-V & T-S diagram of dual cycle. Name processes on diagram.	
CO2	b.	Define the term w.r. to compressor i) FAD ii) Compression ratio iii) Swept volume.	
CO2	c.	Define multistaging in compressors. State two advantages.	
CO3	d.	Draw T-S diagram of Brayton cycle. State all processes in the cycle.	
CO5	e.	State any two expansion devices in refrigeration. Write its function.	
CO6	f.	Define the terms Relative humidity, WBT and specific humidity related to air-conditioning.	
CO1	g.	State three important applications of gas turbines.	

	B]	**Solve any ONE of the following**	**05**
CO1	a.	An engine working on Diesel cycle has stroke =0.25 m, cylinder bore=150 mm, clearance volume = 400 cm^3 & cut off takes place at 6% of the stroke. Find air standard efficiency Assume $\gamma = 1.4$.	
CO4	b.	A single stage reciprocating air compressor is required to compress 1 kg of air form 1 bar to 4 bar. The initial temperature is 27^0C. Find i) W.D. when $PV^{1.2} = C$ ii) W.D. when $PV = C$	

Q.No.2		**Solve any THREE of the following**	**12**
CO2	a.	Enlist four important factors considered for site selection of power plant. Explain any two in one or two lines.	
CO2	b.	Describe MHD power generation plant.	
CO5	c.	Draw vapour compression refrigeration cycle on P-H and T-S diagram with condition of refrigerant at the entry of compressor as dry and saturated. Name all processes.	
CO2	d.	An engine working on Otto cycle has clearance volume 0.035 m^3 & swept volume of 0.25 m^3. Calculate air standard efficiency. Draw P-V diagram.	

Q.No.3 **Solve any THREE of the following**   **12**

CO2 a. Draw layout of solar thermal power plant. Label all parts.

CO5 b. Prove that COP (Heat Pump)
          = 1+COP (Refrigerator)

CO2 c. Draw valve timing diagram of four strike petrol engine. Show on it overlapping of valve timing.

CO3 d. Explain construction & working of turbo-propeller with a labelled diagram.

Q.No.4 **Solve any THREE of the following**   **12**

CO5 a. Draw layout of domestic refrigerator. Name all parts. State function of evaporator.

CO4 b. Explain with the help of neat diagram perfect & imperfect intercooling in compressor.

CO3 c. Compare open cycle and closed cycle gas turbines on the basic
          i) Working substance   ii) Quality of fuel   iii) No. of components
          iv) Use/ application

CO4 d. Enlist rotary compressors. Explain axial flow type of compressor.

Q.No.5 **Solve any TWO of the following**   **12**

CO2 a. Explain working four stroke Diesel engine. Draw its cycle.

CO5 b. A device works on VCR cycle. The refrigerant has enthalpy of 1450 KJ/kg after compression, enthalpy of 1300 KJ/kg at the inlet to compressor. Calculate COP of VCR system if enthalpy before evaporation is 300 KJ/kg. Draw P-h diagram also.

CO4 c. A single acting two stage compressor with perfect intercooling delivers 5 kg/min air at 15 bar pressure. Initial conditions are 1 bar pressure & 15^0C. The equation of compression is $PV^{1.3} = C$.
          Calculate,
           i) Indicated power required   ii) Isothermal efficiency   Take R= 0.287 KJ/kgk

Q.No.6 **Solve any TWO of the following**   **12**

CO3 a. State methods of efficiency improvement of gas turbine. Explain method of intercooling. Draw its T-S diagram also.

CO2 b. Draw complete layout of steam power plant showing all parts. Explain its working.

CO6 c. Show the following processes on psychometric chart.
             i) Sensible heating ii) Sensible cooling with dehumidification
             iii) Sensible heating with humidification iv)Sensible cooling

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**   Enrollment No.

Course: **Tool Engineering**   Course Code: **6M409**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO3	a.	Define tool signature? State its importance.	
CO2	b.	Enlist any three limitations of ceramics as tool material.	
CO6	c.	Define (i) Bending allowance (ii) Spring back for sheet metal operation.	
CO1	d.	Define machinability. Enlist any four work material related parameter which affects machinability.	
CO1	e.	Explain crater wear with proper sketch.	
CO1	f.	Differentiate orthogonal and oblique cutting (Any 3 point)	
CO3	g.	Define (i) End cutting edge angle (ii) Side cutting edge angle (iii) Nose radius for single point tool.	
	B]	**Solve any ONE of the following**	**05**
CO1	a.	In metal cutting experimentation tool life was found to vary with the cutting speed in the following manner	

Cutting speed V,(m/min)	Tool Life T(min)
100	110
130	40

Estimate tool life for cutting speed of 105 m/min.

CO1	b.	Determine the size of blank (D) for the cylindrical shell to be manufactured by drawing operation.	

d = shell OD= 50mm,   r = corner radius of punch = 1.6 mm, h = Shell height = 40 mm

Q.No.2		**Solve any TWO of the following**	**12**
CO1	a.	Show schematically Merchant's force circle in orthogonal cutting. State the assumptions of theory and write the mathematical equations for different component of cutting forces.	
CO3	b.	State the desirable characteristics of a cutting tool material. Explain how carbide insert are classified by ISO?	
CO2	c.	List the different types of drills used? Enlist the applications of any four types of drills.	

Q.No.3		**Solve any TWO of the following**	**12**
CO2	a.	Explain in details the design procedure of plain milling cutter.	
CO1	b.	Draw and label the simple broach.	
CO1	c.	Describe with neat sketch the principle of gear hobbing process.	

P.T.O.

Q.No.4		**Solve any TWO of the following**	**12**
CO5	a.	Explain construction and working of leaf Jig with proper sketch.	
CO2	b.	A washer 1.5 mm thick having φ 8 mm hole and outside diameter 20 mm is to be made from a mild steel sheet. Calculate, The force needed to produce the washer, if both the punches operate at the same time. The force needed if only one punch operates at a time. Take shear strength of stock material as 385.5 N/mm2.	
CO1	c.	Enlist the factors affecting material flow during drawing. Explain any two of them in details.	

Q.No.5		**Solve any TWO of the following**	**12**
CO4	a.	Select the appropriate type of Jig for the clamping of component shown in fig. (1) Explain the selected type of jig for the given job with sketch.	
CO6	b.	What is meant by die clearance? What is the result of excessive die clearance. Support your answer with proper sketch.	
CO1	c.	Explain the cutting action in punch and die operations with sketches.	

Q.No.6		**Solve any TWO of the following**	**12**
CO6	a.	Define strip layout. Show with proper sketch. Write formulas for i) Percent Scrap ii) Total area used per blank	
CO6	b.	Write the functions of following die set components. i) Pilots ii) Strippers iii) Pressure pads iv) Stock guides.	
CO6	c.	Describe the following methods of bending with sketch i) V bending ii) Wiping	

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**   Enrollment No.

Course: **Mechanical Engg Materials**   Course Code: **6M410**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1 A] Solve any FIVE of the following   **15**

   a. How engineering materials are classified? Give examples of each.

   b. What is Solid solutions. Give its type.

   c. Classify iron carbon alloys on the basis of Carbon Percentage.

   d. State three limitation of normalizing.

   e. Differentiate between plain carbon steel and alloy steel. (three points)

   f. Differentiate between steels and cast iron. (three points)

   g. List six nonferrous alloys with applications.

B] Solve any ONE of the following   **05**

   a. What is hardening? And list 4 objectives of hardening.

   b. Explain different types of tempering.

Q.No.2   Solve any TWO of the following   **12**

   a. List 6 mechanical properties of metal. Explain in brief.

   b. Draw phase diagram of eutectic.system and Explain in brief.

   c. Draw Iron Carbon diagram and show various phases on it.

Q.No.3   Solve any TWO of the following   **12**

   a. Explain TTT curve for eutectoid steel.

   b. Name any four alloying element and write down effect of alloying element on   **P.T.O.**
     Iron Carbon diagram.

c. Compare Nodular cast iron and Alloy cast Iron on the basis of structure, properties and application.

Q.No.4   **Solve any TWO of the following**   **12**

    a. i) Explain lever rule for equilibrium diagram.

        ii) Draw microstructure of low, medium and High Carbon steel.

    b. Explain different Quenching   medium and their merit & demerits.

    c. Give the Chemical Composition of H.S.S. Spring steel and stainless steel.

Q.No.5   **Solve any TWO of the following**   **12**

    a. Describe flame harding with it's principle and neat sketch.

    b. i) Designate steel. T 75W18Cr4V1.

        ii) Give IS designation of plain carbon steel.

    c. Give any three properties of Cupronickel and three application.

Q.No.6   **Solve any TWO of the following**   **12**

    a. Select steels for following component i) Engine body ii) Chasis iii) Leaf Spring iv) Single paint cutting tool v) axle vi) Break drum

    b. List three couper alloyer with their application.

    c. Explain 'Y' alloy with their chemical composition and application.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**

Enrollment No.

Course: **Automobile Engg.**   Course Code: **6M413**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Mention classification of automobile.	
CO1	b.	Name different arrangements of cylinders in automobile engine.	
CO4	c.	List three methods of rating the battery.	
CO3	d.	State the functions of gear box.	
CO5	e.	State the significance of rack and pinion steering gear box.	
CO4	f.	Classify brakes on the basis of i) Construction ii) Method of actuation iii) Purpose.	
CO6	g.	Write down three advantages of alloy wheel.	

	B]	**Solve any ONE of the following**	**05**
CO2	a.	Compare battery ignition system & magneto ignition system (Any 5 points)	
CO5	b.	Explain understerring & oversteering with a neat sketch & its effect.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Explain Gas turbine power plant with neat sketch.	
CO4	b.	Maintenance free battery is commonly used in today's automobiles, justify the reason.	
CO5	c.	Define following terms with neat sketch i) Turning radius ii) Camber angle iii) Castor angle iv) Toe-in	
CO6	d.	List out any four advantages of Independent suspension system over rigid axle suspension system.	

Q.No.3   **Solve any THREE of the following**   **12**

CO1 a. State the function of following chassis components

   i) Flywheel   ii) Frame   iii) Propeller shaft   iv) Engine.

CO2 b. Draw block diagram of MPFI system. Name various sensors used in it.

CO2 c. Explain with neat sketch working of liquid cooling system.

CO6 d. In which vehicles air suspension is used? Write down difference between air suspension & spring suspension.

Q.No.4   **Solve any THREE of the following**   **12**

CO1 a. In which situation four wheel drive layout is preferred? How it differs from two wheel drive layout?

CO2 b. Write down function and material of following engine components

   i) Cylinder block   ii) Gasket   iii) Exhaust valve   iv) Camshaft

CO5 c. Describe hydraulic power steering with block diagram.

CO6 d. Explain the construction of telescopic hydraulic shock absorber.

Q.No.5   **Solve any TWO of the following**   **12**

CO1 a. Why electrical cars are preferred now a days? List out the problems of electric cars despite its advantages.

CO3 b. State the need of differential in automobile. Explain the concept of differential lock.

CO4 c. Distinguish between Drum brake and Disc brake (Any 6 points)

Q.No.6   **Solve any TWO of the following**   **12**

CO2 a. Name various oil pumps used in lubrication system. Explain splash lubrication system in details.

CO3 b. Today diaphragm spring clutch is used in many vehicles, Give reasons. Write down the function of clutch.

CO4 c. It is safer to drive the vehicle with antilock brake system explain with neat sketch.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Mechanical Engineering.**

Enrollment No.

Course: **Design Of Machine Elements**   Course Code: **6M504**

Max Marks: **80**   Time: **04 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1 A] Solve any FIVE of the following   **15**

  a. Define (i) Resilience (ii) Endurance limit and (iii) Rigidity

  b. Identify material and write its composition (i) FG200 (ii) FeE290 (iii) 40Ni14.

  c. Why taper is provided on cotter? What is its value?

  d. What is effect of keyway on the strength of shaft? How it is considered in design?

  e. Write equations for (i) Self locking and (ii) Overhauling of power screws & explain the terms used.

  f. What are ways of converting any ordinary bolt into bolt of uniform strength?

  g. Explain meaning of following colour codes in Aesthetic considerations while designing a product (i) Red (ii) Yellow (iii) Orange (iv) Green (v) Blue (vi) Gray

B] Solve any ONE of the following   **05**

  a. Design a Knuckle Joint to transmit 60 kN load. The permissible stresses in tension, shear and compression are 70 MPa, 55 MPa and 130 MPa respectively. Sketch parts and sectional areas in failure.

  b. Sketch a rigid flange coupling and write all the design equations related with it.

Q.No.2   Solve any THREE of the following   **12**

  a. What is significance of stress-strain diagram? Sketch stress-strain diagram for Grey cast iron.

  b. What is stress concentration? Illustrate methods to reduce stress concentration.

  c. The load P on C clamp as shown in figure 1 is 25 kN. Assuming the clamp is made up of cast steel and b= 3t and e= 140 mm, the allowable stress in material is 100 N/mm^2. Determine the dimensions of b & t.

d. Compare the weight, strength and stiffness of hallow shaft of same external diameter as that of solid shaft. The inside diameter of hallow shaft being half the external diameter. Both the shaft have same material and length.

Q.No.3   Solve any THREE of the following   **12**

a. What is turnbuckle? List its applications draw a neat sketch.

b. What are different types of failure considered while designing a rectangular key? Write steps in designing of keys with a sketch.

c. A bracket as shown in figure 2 is fixed to wall by means of four bolts. Find the sizes of bolt if σ_t=70 N/mm^2 for bolt material. Eccentric load W acting on bracket is 30 kN.

d. A closed coil helical spring is used for front suspension of an automobile. The spring has stiffness of 90 N/mm with square and ground ends. The load on spring causes a total deflection of 8.5 mm. Assume permissible shear stress of material as 450 MPa, Find (i) Spring wire diameter   (ii) Length of spring
Assume spring index σ and value of G= 80 x 10^3 N/mm^2

Q.No.4   Solve any THREE of the following   **12**

a. A right angle bell crank lever having one arm 500 mm and another arm 150 mm as shown in figure 3 is used to lift a load of 5 kN. The permissible stresses for pin and lever is 80 MPa in tension and in compression. The permissible stress in shear is 60 MPa. The bearing pressure on pin is not to exceed 10 MPa. Determine the dimensions of rectangular cross section of lever and pin diameter.

b. Compare Rigid coupling and flexible coupling on following parameter (i) Alignment (ii) Shock and vibration (iii) Deflection (iv) Applications.

c. State classification of Welded Joints. Two steel plates 120 mm wide and 12.5 mm thick are to be connected together by double transverse fillet weld. The maximum tensile strength for plate and welding not to exceed 70 N/mm^2. Find the length of weld for maximum static loading.

d. Define the following terms with reference to spring design (i) Solid length
(ii) Free length (iii) Spring Index (iv) Spring Rate.

Q.No.5   Solve any THREE of the following   **12**

a. Explain maximum principle stress, stress theory and maximum shear stress theory with their applications

b. Why square thread are used for power transmission? Give their advantages,

limitations and applications.

c. Explain design procedure for bolts of cylinder cover by taking suitable example.

d. Explain following with neat sketches & List their applications (Any four)

    (i) Thrust ball bearing   (ii) Internal self aligning bearing

    (iii) Double row angular contact bearing (iv) Taper roller thrust bearing

    (v) Needle Roller bearing

Q.No.6   **Solve any THREE of the following**   **12**

a. A bracket carrying a vertical load of 25 kN is shown in figure 4. The load is taken up by 4 bolts for fixing the bracket. Determine the size of bolt for permissible tensile strength of 80 N/mm^2.

OR

Attempt the following (Any Two)

    (i) Prove that for a square key, the permissible crushing stress is twice the permissible shear stress.

    (ii) Why coupling should be placed close to bearing as per permissible?

    (iii) Advantages of square threads over trapezoidal threads.

b. Draw a neat sketch of Screw Jack. List the steps in its design.

c. The lead screw of a lathe has square threads of 24 mm outside diameter and 5 mm pitch. In order to drive tool carriage, the screw exerts an axial thrust of 2.5 kN. Find power required to drive the screw and efficiency of screw. The screw rotates at 30 rpm. Neglect bearing friction and assume coefficient of friction as 0.12.

d. Explain following in short (Any two)

    (i)   Bearing materials

    (ii)   Aesthetics considerations regarding shape and size of machine.

    (iii)   Ergonomic design considerations in Man- Machine relationship.

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Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Computer Engineering .**	Enrollment No.
Course:	**Computer Hardware & Maintenance & Troubleshooting**	Course Code: **6P201**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1		**Solve any TEN of the following.**	**20**
CO 1	a.	Define system controller.	
CO 1	b.	State any two points of similarity between AT and ATX.	
CO 3	c.	Enlist the types of scanners.	
CO 1	d.	Enlist various types of motherboard.	
CO 4	e.	Define any two video basics.	
CO 5	f.	What is the diagnostics software for troubleshooting of PC?	
CO 1	g.	Write any two advantages of chipset.	
CO 4	h.	Write any two charecteristics of plasma display.	
CO 5	i.	Enlist any two troubleshooting procedure of motherboard.	
CO 1	j.	State the limitations of PS/2 port.	
CO 3	k.	State the types of keyboard.	
CO 1	l.	List any two points of similarity between North and South bridge .	
Q.No.2		**Solve any THREE of the following**	**12**
CO 3	a.	With the help of block diagram explain working of SMPS (Switch mode power supply).	
CO 2	b.	How the data is recorded on hard disk using FM technique?	
CO 1	c.	Explain any four BIOS features.	
CO 2	d.	Describe the process of formatting. List any two precautions to be taken before formatting.	

Q.No.3		**Solve any THREE of the following**	**12**

CO 2   a.   Define –

       i.   Track

       ii.   Sector

       iii.   Landing zone

       iv.   Cluster

CO 4   b.   Write components of graphic cards.

CO 5   c.   Explain the power problems for computer.

CO 5   d.   Enlist and explain preventive maintenance tools of computer.

Q.No.4		**Solve any TWO of the following.**	**12**

CO 1   a.   Describe Universal serial bus (USB) port with its advantages and limitations.

CO 2   b.   State and explain the specifications of Blue ray disk.

CO 3   c.   Explain following power supply charecteristics

       i.   Rated wattage.

       ii.   Ripple

       iii.   Load regulation.

Q.No.5		**Solve any THREE of the following**	**12**

CO 2   a.   Explain MFM data recording technique.

CO 2   b.   Explain the construction and recording of DVD drives.

CO 4   c.   Differentiate between CRT and LED display.

CO 3   d.   State and explain any two types of key switches.

Q.No.6		**Solve any TWO of the following**	**12**

CO 1   a.   Write a note on the following with respect to size, speed and shape.

       1.   SIMM

       2.   SDRAM

CO 4   b.   Describe the working of Laserjet printer. State the advantages of it over Inkjet printer.

CO 5   c.   Explain POST sequence in detail. State its need.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Computer Engineering.**   Enrollment No. ☐☐☐☐☐☐

Course: **Advanced Microprocessor & Microcontroller**   Course Code: **6P401**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Compare LDTR & GDTR (Any 3)	
CO2	b.	State any 6 salient feature of 80486.	
CO5	c.	Compare timer and counter operation.	
CO5	d.	Write addressing modes for following instructions. (i) ADD A, Ro (ii) ADD A, #20h (iii) Add A, 50h	
CO2	e.	Draw branch prediction in Pentium	
CO3	f.	Draw interrupt vector table (IVT) of X86 processor.	
CO1	g.	Give salient features of 80286 – microprocessor (any 6)	
	B]	**Solve any One of the following**	**05**
CO2	a.	Draw and explain super scalar execution of Pentium processor.	
CO4	b.	List and explain any four addressing modes of 8051 with example.	
Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Draw register organization format of 80386. State the function of segment register.	
CO2	b.	Describe the floating point unit operation in Pentium processor.	
CO1	c.	Draw the architecture of 80286 microprocessor.	
CO1	d.	Describe the paging Mechanism of 80386 with the help of neat diagram.	
Q.No.3		**Solve any THREE of the following**	**12**
CO1	a.	Draw the segment descriptor & cache registers with suitable diagram in 80386 microprocessor.	
CO1	b.	List any eight features of 80386 processor.	
CO3	c.	Explain the interrupt processing sequence of X86 microprocessor.	
CO3	d.	Differentiate between Hardware & Software interrupts.	
Q.No.4		**Solve any THREE of the following**	**12**
CO1	a.	Describe debug register of 80386 microprocessor.	
CO1	b.	Describe address generation PVAM mode of 80386 with neat diagram.	
CO3	c.	Explain any four function of INT21 # interrupt.	
CO4	d.	Draw the structure of inter RAM of 8051 microcontroller.	

P.T.O.

Q.No.5   **Solve any TWO of the following**   **12**
CO3   a.   Distinguish between DOS & BIOS interrupts (any 3)
CO4   b.   Compare microprocessor and microcontroller.
CO5   c.   Develop a program for time delay generation using loop & timer of 8051.

Q.No.6   **Solve any TWO of the following**   **12**
CO4   a.   Draw & explain architecture of 8051 microcontroller.
CO5   b.   Draw and explain concept of data serilization.
CO5   c.   Write an ALP to toggle all of the bits of port P1 continuously with 0.5 second
            delay in between.

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Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Computer Engineering.**

Enrollment No.

Course: **Mobile Computing.**   Course Code: **6P402**

Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1	**A]**	**Solve any FIVE of the following**	**15**
CO1	a.	Describe IS-95	
CO4	b.	What is a WAP Gateway?	
CO5	c.	How mobile IP works?	
CO1	d.	What is control channel?	
CO3	e.	Describe Roaming management.	
CO2	f.	Describe Baseband section.	
CO4	g.	Write in detail about WAP protocol.	
	B]	**Solve any ONE of the following**	**05**
CO3	a.	Draw and explain GSM architecture.	
CO2	b.	How charging control section works? Describe in detail.	
Q.No.2		**Solve any TWO of the following**	**12**
CO6	a.	Describe the following : (i) WML (ii) Cards (iii) Decks.	
CO4	b.	Write in detail about WAP model.	
CO1	c.	Explain 1G, 2G, 3G, 4G & 5G	
Q.No.3		**Solve any TWO of the following**	**12**
CO3	a.	How hard & soft handoff works? Explain in detail.	
CO6	b.	Describe the following (i) WML script. (ii) Validation of user control.	
CO2	c.	Explain general faults and fault finding procedure in mobile.	

P.T.O.

Q.No.4   **Solve any TWO of the following**   **12**

CO6   a.   With suitable example, describe WML control structure.

CO3   b.   How cellular system works? Explain in detail.

CO5   c.   Describe the following : (i) VOIP (ii) CDPD.

Q.No.5   **Solve any TWO of the following**   **12**

CO5   a.   What are the applications of IP6 in mobile computing?

CO1   b.   Enlist and describe principles of cellular communication.

CO3   c.   Explain handoff management in detail.

Q.No.6   **Solve any THREE of the following**   **12**

CO6   a.   How markup language works under WML? Describe with suitable example.

CO3   b.   Describe mobility management.

CO2   c.   Draw and explain block diagram of mobile hand set.

CO5   d.   What are the GPRS services available? Describe in detail.

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Examination: (191) NOV DEC – 2019

Programme: **Diploma in Computer Engineering**   Enrollment No.

Course: **Computer Networks**   Course Code: **6P403**
Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1	**A]**	**Solve any FIVE of the following.**	**15**
CO 1	a.	Define computer network? List advantages of computer network	
CO 1	b.	List any six application of computer network.	
CO 2	c.	Define following term -	
		i. Protocol	
		ii. Interface	
		iii. Services	
CO 3	d.	Give any three application of microwave communication.	
CO 4	e.	Describe FTP in brief.	
CO 4	f.	Explain concept of Hacking.	
CO 5	g.	Describe world wide web.	

	B]	**Solve any ONE of the following.**	**05**
CO 1	a.	Define network topology, suppose you are going to implement a computer network in a small business mall. Which topology will you use? Why?	
CO 2	b.	Explain the functions of various layer of OSI Reference model.	

Q.No.2		**Solve any TWO of the following**	**12**
CO 2	a.	Draw and explain layered structure of TCP/IP model.	
CO 1	b.	Describe the concept of Peer-to-Peer and client server network with diagram.	
CO 4	c.	Compare IPv4 and IPv6.	

Q.No.3   **Solve any THREE of the following**   **12**

CO 2   a.   What are the functions of network layer of OSI model.

CO 3   b.   Describe various factors to be considered while selecting transmission media.

CO 3   c.   Explain satellite communication with suitable diagram.

CO 4   d.   Compare UDP and TCP.

Q.No.4   **Solve any TWO of the following.**   **12**

CO 1   a.   Compare LAN, MAN and WAN (Any six points).

CO 3   b.   With the help of neat diagram describe the working of router. Also enlist type of router.

CO 5   c.   Explain SMTP and PoP3 in details.

Q.No.5   **Solve any TWO of the following**   **12**

CO 3   a.   Explain co-axial cable with neat diagram.

CO 3   b.   Compare guided and unguided transmission media.

CO 4   c.   Explain DNS with diagram

CO 5   d.   Compare ADSL and broad band MODEM.

Q.No.6   **Solve any THREE of the following**   **12**

CO 4   a.   Classify internet addresses. Explain any one in detail.

CO 4   b.   State different IP address classes. Explain any one in detail.

CO 5   c.   Classify and explain internet services.

CO 5   d.   Describe voice over IP in detail.

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GOVERNMENT POLYTECHNIC, AURANGABAD.

(An Autonomous Institute of Govt. of Maharashtra)

\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme: **Diploma in Civil / Mechanical / Automobile Engineering.**

Enrollment No.

Course: **Engineering Mechanics.**   Course Code: **6Q201**
Max Marks: **80**   Time: **03 Hours**   Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any TEN of the following**	**20**
CO3	a.	State the Varignon's theorem and its use.	
CO3	b.	Define resolution of a force and composition of forces.	
CO1	c.	With neat sketch, state the principle of transmissibility of forces.	
CO1	d.	Define force and state its S.I. unit.	
CO2	e.	Define efficiency of lifting machine.	
CO2	f.	Define non reversible machine with its condition.	
CO2	g.	What is law of machine? Draw related graph.	
CO3	h.	State graphical conditions of equilibrium for coplanar non concurrent force system.	
CO4	i.	Define angle of friction with neat sketch.	
CO4	j.	If angle of friction is 38^0, calculate angle of repose and co-efficient of friction.	
CO4	k.	State laws of static friction (any four).	
CO5	l.	A right circular cone has base diameter 50cm and height 120 cm. Calculate the position of center of gravity. Show it on the sketch.	
CO5	m.	Draw a neat sketch of semicircle of diameter 60 cm and show the position of centroid on it.	
CO5	n.	Define centroid and center of gravity.	

P.T.O.

Q.No.2   **Solve any THREE of the following**   **12**

CO2 a. A certain machine lifts a load of 400N and 800N by efforts of 60N and 80N respectively. Determine law of machine. Also calculate effort required to lift load of 1 kN.

CO2 b. A screw jack of pitch 8mm has a lever of 1m length. If the efficiency of the machine is 30%, calculate the effort required to lift a load of 2 kN.

CO2 c. In a certain lifting machine, the effort has to move through 1m in order to lift the load through 10mm. If the machine has efficiency of 60%, determine the load that can be lifted by an effort of 26 N.

CO2 d. In a differential axle and wheel, the diameter of wheel is 40cm and that of axles are 12 cm and 10 cm. If the efficiency of machine is 80%, determine the load lifted by an effort of 200N.

Q.No.3   **Solve any THREE of the following**   **12**

CO3 a. Determine analytically resultant of a force system shown in fig. no. 1

CO3 b. System of unlike parallel forces is as shown in Fig. No. 2. Determine resultant and locate its position with respect to 125N force.

CO3 c. Determine the resultant of the force system as shown in fig. No. 3 Locate position of resultant w.r.t. point 'C'.

CO3 d. A force of 500N acts along +ve x-axis. Resolve this force into two directions 40^0 and 60^0 on either side of force. Show the component forces by sketch.

Q.No.4   **Solve any THREE of the following**   **12**

CO3 a. Calculate the tension in the strings AB and BC for the assembly shown in Fig. No. 4.

CO3 b. Calculate reactions of beam loaded as shown in Fig. No. 5 by analytical method.

CO3 c. Using graphical method, determine the reactions of the beam loaded as shown in fig. No. 5.

CO3 d. A sphere weighing 600N is supported by two planes. One plane is vertical and other is inclined at 60^0 to the horizontal. Calculate the reactions offered by the planes using lami's theorem.

Q.No.5   **Solve any THREE of the following**   **12**

CO4 a. A body weighing 1200N is laying on horizontal rough plane for which μ=0.30. Calculate normal reaction, limiting force of friction, horizontal force required just to move the block. Also determine angle of friction.

CO4 b. A bock of 800N is placed on horizontal plane where the $\mu = 0.28$. Find the force at 30^0 with horizontal to just move the block.

CO4 c. A body weighing 200N is placed on rough horizontal plane. A pull of 38N applied at 30^0 up the horizontal just move the body. Determine coefficient of friction.

CO3 d. Calculate support reactions for a beam shown in Fig. No. 6 by analytical method.

Q.No.6   **Solve any TWO of the following**   12

CO4   a.   Draw free body diagram for a ladder of length 'L', weight 'W', placed over a rough horizontal floor and leans against a smooth wall, making an angle of 'θ' with the floor.

CO3   b.   Calculate support reactions of a beam loaded as shown in Fig. No. 7

CO5   c.   Determine centroid of an angle section 100mm x 80mm x 10mm. Show the position of centroid on sketch. Take longer leg vertical.

CO5   d.   A solid cone of base diameter 40cm and height 120 cm is rigidly connected to a hemisphere of same diameter. Determine position of C.G. of composite solid. Solid cone is kept vertical on base of hemisphere.

GOVERNMENT POLYTECHNIC, AURANGABAD.
(An Autonomous Institute of Govt. of Maharashtra)

\\PURSUIT FOR EXCELLENCE\\

Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Mechanical / Automobile Engineering.**	Enrollment No. ☐☐☐☐☐☐

Course:	**Strength Of Materials**	Course Code:	**6R202**
Max Marks:	**80** Time: **03 Hours**	Date:	**7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1   **Solve any TEN of the following**   **20**

a. Identify type of load and stress developed in the bar if A force is applied on the bar starting from zero to 10 kN maximum and area of bar is 1000 mm^2 .

b. Define temperature stress & strain.

c. Calculate modulus of elasticity if modulus of rigidity is 80 GPa & Poisson ratio=0.3.

d. Calculate M.I. about an axis passing through the vertex of a triangle, if base of triangle b= 75mm and height of triangle =50mm

e. Calculate polar M.I. for a circular lamina of diameter 60 mm.

f. Draw bending moment diagram for simply supported beam carrying concentrated load W at its center. Take span of beam L.

g. Draw shear force and bending moment diagram for cantilever of span L and carrying u.d.l. W N/m on the entire span.

h. Write relation between
 i) Intensity of loading and shear force. ii) Shear force and bending moment. State the value of shear force at point where $\frac{dM}{dx} = 0$

i. A 120 mm wide and 10mm thick steel plate is bent in to a circular arc of 8 m radius. Determine maximum value of the stress produced if E=200 GPa.

j. A rectangular section 100mm wide and 250 mm deep is acted upon by shear force of 60 kN. Calculate maximum shear stress developed in the section.

k. Draw distribution of result stress distribution diagram for across base of rectangular section of width b and depth d if (i) Direct Stress (σ_0) > Bending stress (σb)   (ii) If Direct stress (σ_0) < Bending stress (σb).

l. Draw limit of eccentricity for no tension to be developed in the rectangular **P.T.O.**

section and circular section.

m. Determine the torque applied to the solid steel shaft transmitting 100 kW power at 150 rpm.

n. Calculate maximum shear stress in solid shaft in terms of diameter.

Q.No.2   **Solve any TWO of the following**   12

a. A steel bar 35 mm X 35 mm in section and 100 mm in length is acted upon by compressive load of 180 kN along its longitudinal axis and compressive load of 400 kN and 300 kN along the axes of the lateral surface. Determine i) Changes in the dimensions of the bar ii) Change in volume if E= 205 GPa and μ=0.3, as shown in figure No.1.

b. A bar of 24 mm diameter and 400mm length is acted upon by an axial load of 38 kN. The elongation of the bar and the change in diameter are measured as 0.165mm and 0.0031mm respectively. Determine,

     i)   The Poisson's ratio.

     ii)   The values of three moduli.

c. An assembly of a steel bar of 60 mm diameter enclosed in an aluminum tube of 70 mm internal diameter and 110 mm external diameter is compressed between two rigid parallel plates by a force of 300 kN. The length of the assembly is 1m. Determine the stresses in the tube and bar if Es=200 GPa and Ea=70 GPa.

Q.No.3   **Solve any THREE of the following**   12

a. Calculate the M.I. about centroidal y axis for an angle section 100 mm X 80 mm X10 mm if $\overline{X}$ = 21.47 mm from extreme left edge of section and $\overline{Y}$ = 31.47 mm from bottom edge of section.

b. A T (Tee) section of uniform thickness 20mm having 400 mm as deep overall. If its flanges is 200mm wide, determine moment of inertia @ centroidal x axis.

c. Calculate Ixx and Iyy of a semicircular lamina of diameter 60 mm and also calculate Kxx (Radius of gyration)

d. i) Calculate M.I. about base of an isosceles triangle of base 100 mm and height 160 mm.

ii) Calculate modulus of section for square of side 30 mm.

Q.No.4   **Solve any TWO of the following**   **12**

a. Draw shear force and bending moment diagram for the overhanging beam loaded as shown in figure No.2.

b. A simply supported of span 9 m carries u.d.l. 20 kN /m over the whole span along with two point loads 30 kN and 40 kN at 6m and 7.5m respectively from left hand support. Draw the shear force and bending moment diagram for the beam.

c. A cantilever of 5m span carries concentrated loads 2 kN and 6 kN at 2m and 5m respectively from fixed end. Also carries u.d.l. of 2 kN /m in between two concentrated loads, draw shear force bending moment diagram for the beam.

Q.No.5   **Solve any THREE of the following**   **12**

a. A beam 120 mm wide and 200 mm deep is simply supported over a span of 4 m. If the bending stress in the material of the beam is not to exceed 80 N/mm^2. Calculate the maximum u.d.l. (including self weight) the beam can carry.

b. For a rectangular beam the maximum value of shear stress at a section is 3MPa. The shear force at a section is 48 kN. If the depth is 1.5 times the width, determine the dimensions of the beam.

c. Calculate the limit of eccentricity for a hallow circular section having 400 mm on external diameter & 200 mm as internal diameter.

d. A short cast iron column 150 mm external diameter and 110 mm internal diameter carries vertical compressive load of 200 kN. Find the allowable eccentricity of this load if the maximum tensile stress not to exceed 30 N/mm^2. Take I = 1766 x 10^4 mm^4.

Q.No.6   **Solve any TWO of the following**   **12**

a. Find the maximum torque that can be safely transmitted by a shaft of 300 mm diameter. Permissible angle of twist is limited to 1.5^0 in length of 7 m & the shear stress is limited to 45 MPa. Take G= 80 GPa.

b. A steel shaft of diameter 55 mm is subjected to a torque of 1800 N-M. If the angle of twist was observed to be 0.6^0 in a length of 600 mm. Calculate the maximum shear stress and the modulus of rigidity for the material of the shaft.

c. i) Write bending equation stating meaning of each term.

    ii) A column 450 mm wide & 230 mm thick carries an load 120 kN with an eccentricity of 100 mm on an axis bisecting 450 mm side. Calculate the maximum and minimum stress induced at the base.

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Examination [191] : Nov.-Dec. 2019

Programme:	**Diploma in Mechanical & Automobile Engineering.**	Enrollment No.
Course:	**Basics Of Electrical Engg. and Electronics**	Course Code: **6R203**
Max Marks: **80**	Time: **03 Hours**	Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mention prior to question bit.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	State Ohm's Law.	
CO1	b.	Define potential difference and give its unit.	
CO1	c.	Define Frequency and give its unit.	
CO2	d.	State Lenz's law.	
CO2	e.	Define magnetic flux and give its unit.	
CO3	f.	Compare squirrel cage Induction motor. with slipring Induction motor (Two points)	
CO3	g.	List types of single phase Induction motor.	
CO4	h.	Draw symbol for the following devices. i) PN junction diode ii) Zenor diode	
CO4	i.	List the names of Terminals of Bipolar Junction Transistor.	
CO4	j.	Compare DIAC with TRIAC.	
CO4	k.	List any two applications of LED.	
CO5	l.	List different types of filters used in electronics circuit.	
CO6	m.	List any two application of direct coupled amplifier.	
CO6	n.	List different types of power amplifier.	
CO6	o.	List the use of phase shift oscillator.	
Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Define the following terms- i) Time period ii) Amplitude iii) RMS value iv) Phase difference.	
CO2	b.	Compare Electric circuit with magnetic circuit.	
CO3	c.	Draw circuit diagram for following types of DC motor. i) DC series motor ii) DC shunt motor	

CO5   d. Differentiate between Half wave rectifier and full wave rectifier.

Q.No.3   **Solve any THREE of the following**   **12**

CO1   a. List any four advantages of three phase system over single phase system.

CO2   b. State and explain Faraday's laws of electromagnetic Induction.

CO4   c. Draw the symbol for following devices.

   i) SCR   ii) Varactor diode   iii) LED   iv) MOSFET

CO5   d. Draw the block diagram of UPS and give function of any two blocks.

Q.No.4   **Solve any THREE of the following**   **12**

CO1   a. State and explain Kirchhoff's current law.

CO3   b. Explain working principle of Transformer with neat diagram.

CO4   c. Explain working principle of PN Junction diode with neat diagram.

CO6   d. Compare class-A power amplifier with class-B power amplifier. (Any four point)

Q.No.5   **Solve any TWO of the following**   **12**

CO1   a. A house has following details of electricity consumption for a day.

Sr. No.	Application	No's	Rating	Working Hours
1.	Bulb	04	40 W	08
2.	TV set	01	200 W	05
3.	Refrigerator	01	400 W	24
4.	Fan	03	100 W	12

   Calculate the monthly electricity bill for November-2019 if rate of unit charge of electricity consumption is Rs. 6 per unit.

CO3   b. Explain principle of working of Three phase induction motor with neat sketch diagram and list any two application.

CO6   c. Explain the working of single stage transistor amplifier in CE configuration with neat circuit diagram.

Q.No.6   **Solve any TWO of the following**   **12**

CO3   a. Explain working principle of Alternator with neat diagram and list any two application.

CO4   b. Explain the working of Bipolar Junction Transistor with neat diagram.

CO6   c. Draw the circuit diagram for the following oscillator circuit and label all components.

   i) Hartey's oscillator   ii) Colpitt's oscillator.

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Examination [191]:Nov.-Dec. 2019

Programme:	**Diploma in Computer Engineering/Information Technology**	Enrollment No.						

Course:	**Elements of Electronics and Electrical Engg.**	Course Code:	**6S202**

Max Marks: **80**   Time: **03 Hours** Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.
6. Course outcomes of question bits are mentioned prior to question bit.

Q.No.1		**Solve any TENof the following**	**20**
CO1	a.	Differentiate between active and passive components.	
CO1	b.	Draw symbol for following devices i) PN Junction diode ii) LED.	
CO1	c.	Differentiate between voltage and current source.	
CO2	d.	List types of filters used in electronic circuit.	
CO2	e.	List any two application of LED.	
CO2	f.	Justify need of rectifiers.	
CO3	g.	Draw symbol for NPN transistor and list the names of terminals.	
CO3	h.	Differentiate between unipolar and bipolar devices.	
CO3	i.	List any two applications of transistors.	
CO4	j.	Define current and give its unit.	
CO4	k.	State Ohm's law.	
CO4	l.	Define Resistance and give its unit.	
CO4	m.	Define Transformation ratio of transformer.	
CO4	n.	List applications of Transformers.	
CO5	o.	Justify the need of fuse as protective device.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Define following I) Amplitude ii) Frequency iii) Phase iv) Wavelength	
CO2	b.	Compare half wave Rectifier with bridge Rectifier. (Any four points)	
CO3	c.	Define following Transistor Parameter. I) alpha (α) ii) beta(β) iii) Input resistance iv) Output resistance.	

P.T.O.

CO4   d.   State and explain Kirchhoff's Voltage law.

Q.No.3   **Solve any THREE of the following**   **12**

CO1   a.   List types of signal and draw waveform for any three type of signal.

CO2   b.   Draw the voltage regulator circuit using zener diode and explain the working in short.

CO3   c.   Explain working principle of N – channel JFET with neat diagram.

CO4   d.   Define following term in Electric Circuit. I) Power ii) Energy iii) Capacitance iv) Inductance

Q.No.4   **Solve any THREE of the following**   **12**

CO2   a.   Explain the working principle of Light Emitting diode with neat diagram.

CO3   b.   Give the relationship between alpha (α) and beta (β) for transistor and draw symbol for following devices. I) N – Channel JFET ii) P – Channel JFET

CO4   c.   Explain working principle of DC generator with neat diagram.

CO5   d.   Explain the necessity of Earthing.

Q.No.5   **Solve any TWOof the following**   **12**

CO2   a.   Draw and explain block diagram of regulated power supply.

CO3   b.   Explain working principle of NPN transistor with neat diagram.

CO4   c.   Explain the working Principle of Transformer with neat diagram and give emf equation for transformer.

Q.No.6   **Solve any TWO of the following**   **12**

CO2   a.   Draw and explain V-I characteristics for P – N junction diode.

CO3   b.   Draw and explain Input and output characteristics for transistor in CE configuration.

CO4   c.   Determine the current in 2Ω resistor in Fig.1 by using Kirchhoff's laws.

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Examination [191] : Nov.-Dec. 2019

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1		**Solve any TEN of the following**	**20**
CO1	a.	Convert $(111\ 0011)_2 = (?)_8 = (?)_{16}$	
CO2	b.	Realize the OR gate using NAND gate.	
CO4	c.	Write the truth table of full subtractor.	
CO3	d.	Define minterm & maxterm.	
CO5	e.	Define multiplexer & multiplexer trce.	
CO6	f.	What is race around condition?	
CO1	g.	Give any two disadvantage & advantage of digital system.	
CO2	h.	Enlist any four basic law of boolean algebra.	
CO3	i.	Draw 3 & 4 variable K-map format.	
CO4	j.	Define encoder & draw its general block diagram.	
CO5	k.	Define demultiplexer & draw its general block diagram.	
CO2	l.	Draw truth table for three input EX-OR gate & write its logic equation.	
CO4	m.	Define active high & active low decoder.	
CO1	n.	Define digital signal. Draw positive & negative logic diagram.	

Q.No.2		**Solve any THREE of the following**	**12**
CO1	a.	Perform the following arithmetic operation	
		i) $(41)_2 \times (2)_2$ (ii) $(41)_2 \div (2)_2$	
CO2	b.	State & prove demorgans theorem with its truth table.	
CO3	c.	Explain don't care condition with suitable example.	
CO6	d.	Compare combinational & sequential digital system.	**P.T.O.**

Q.No.3 **Solve any THREE of the following** **12**

CO1   a.   Convert $(63)_{10}$ in to following

    i) Binary   ii) BCD   iii) Gray code   iv) Excess-3 code.

CO3   b.   A stair is controlled by two switches one at top of the stairs & another at bottom of the stairs.

    i) Make a truth table of this system   ii) Write logic equation in SOP form

CO4   c.   Design full adder circuit using half adder & gates.

CO5   d.   Draw the following expression using multiplexer :

    $f(A,B,C,D) = \Sigma m\,(2,5,6,7,8,10,12)$

CO6   e   How to convert J-K flip flop T & D type flip flop. Write truth table & draw logic diagram.

Q.No.4 **Solve any THREE of the following** **12**

CO1   a.   Perform following subtraction using 1'S & 2'S complement method

    i) $(37)_{10} - (27)_{10}$ ii) $(27)_{10} - (37)_{10}$

CO2   b.   Realize basic gate using NOR gate.

CO3   c.   Convert the following equation into standard form

    i) $AB + \bar{B}C + \bar{A}\bar{C}$ ii) $(\bar{A}+D)\,(B+\bar{D})\,(\bar{A}+B)$

CO5   d.   Design 16:1 multiplexer using 8:1 multiplexer & one OR gate.

Q.No.5 **Solve any THREE of the following** **12**

CO2   a.   Prove the following using boolean algebraic theorem

    i) $A + \bar{A}B + A\bar{B} = A + B$ ii) $AB + \bar{A}B + \bar{A}\bar{B} = \bar{A} + B$

CO3   b.   Reduce the following function using k-map technique

    $f(A,B,C,D) = \pi M\,(1,3,5,8,9,11,15) + d(2,13)$

CO4   c.   Explain decimal to BCD encoder with its truth table & realization.

CO6   d.   Draw & explain S-R flip flop in detail.

Q.No.6 **Solve any TWO of the following** **12**

CO4   a.   Describe BCD to excess -3 conversion in detail with its truth table, k-map & realization.

CO5   b.   Design 1:64 de-multiplexer using 1:8 de-multiplexer & also give its truth table.

CO6   c.   Explain J-K flip flop in details with diagram using NAND gate. Also draw logic diagram of master slave J-K flip flop.

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Examination: (191) NOV DEC – 2019

Programme:	**Diploma in Computer Engg/ Information Technology**

Enrollment No. ☐☐☐☐☐☐

Course:	**C Programming**
Max Marks:	**80** Time: **03 Hours**

Course Code: **6S204**
Date: **7 May 2022**

Instructions:
1. All Questions are compulsory.
2. Figures to the right indicate full marks.
3. Assume suitable data wherever necessary.
4. Use of pocket size non-programmable calculators, mini-drafter, block patterns and mathematical and steam tables is permitted.
5. Illustrate your answers with neat sketches, if necessary.

Q.No.1   Solve any TEN of the following.   20

CO 1   a.   What is keyword? State any two keywords of C.

CO 1   b.   State four arithmetic operators and four logical operators.

CO 1   c.   State two features of C language.

CO 1   d.   Write the rule for constructing integer constant.

CO 1   e.   List four types of format specifier.

CO 2   f.   Write the use of break statement . Give example of it.

CO 3   g.   Define array.

CO 3   h.   Declare one dimensional array with 10 elements.

CO 4   i.   State need of functions.

CO 4   j.   Write syntax & example of function call.

CO 4   k.   Define recursion.

CO 4   l.   State any four advantages of pointer in C.

CO 5   m.   Give syntax for declaring structure.

CO 5   n.   What is the purpose of malloc.h?

CO 2   o.   Give syntax of switch case.

Q.No.2   Solve any THREE of the following   12

CO 2   a.   Write a program to find largest of three numbers using If-Else.

CO 3   b.   Write a program to copy content of one array into another array.

CO 4   c.   Explain the concept of pointers arithmetic operations with example.

CO 5   d.   Declare structure student having data member name, rollno, city. Accept this data for one variable and display accepted result.

Q.No.3   **Solve any THREE of the following**   **12**

CO 2   a.   Write a menu driven program for the following.
         i.   To find whether entered no is even or odd.
         ii.   To display sum of two entered number.

CO 3   b.   Write a program in C to accept 10 numbers in an array. Sort the array elements in ascending order.

CO 4   c.   Explain call by value and call by reference in C programming.

CO 5   d.   Write a program in C to declare the structure employee having member variable empid, name and phone_no. Accept the data for 5 employees and display it.

Q.No.4   **Solve any THREE of the following.**   **12**

CO 2   a.   Write a program to print factorial of number n.

CO 3   b.   Explain what is two dimensional array also explain how to declare two dimensional array with example.

CO 5   c.   Explain with example the concept of structure within structure.

CO 2   d.   Differentiate between do while and while loop.

Q.No.5   **Solve any THREE of the following**   **12**

CO 2   a.   Write a program to display even numbers from 1 to n where n is accepted from user.

CO 3   b.   Explain following string handling functions in C program
         i.   strcat()   ii.   strlen()

CO 4   c.   Justify the following statements
int   a =10;
int *b=&a;
int *c=b;
int   d=*b + *c;
And what will be the value of d.

CO 5   d.   Compare structure and union.

Q.No.6   **Solve any THREE of the following**   **12**

CO 1   a.   State the use of increment and decrement operators. Also gives difference between i++ and ++i statements with example.

CO 2   b.   Explain the working of do-while loop with example.

CO 3   c.   Write the output of the following program

```
Void main()
{
int sub[10],j;
for(i=0;i<=8;i++)
{
sub[i] = i;
printf("\n %d", sub[i]);
}
}
```

CO 4   d.   Write a program for following pattern.
```
* * * *
* * *
* *
*
```

<center>*****</center>