Hall Ticket Number :										

R-20

Code: 20A131T

II B.Tech. I Semester Supplmentary Examinations August 2022

Advanced Surveying

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BTL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	Differentiate whole circle bearing and Quadrantal bearing system.	2	3
b)	List any four uses of contour maps.	3	2
c)	Find the height of a Tee beam above the floor level. The RL of the floor is 100.855m and the staff reading on the floor is 2.055m. The reading on a staff held inverted against the underside of the beam is 3.565m.	1	3
d)	With neat sketch explain elements of a simple circular curve.	5	2
e)	List the uses of DGPS	5	2

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BTL
	UNIT–I			
2. a)	List different types of cross staffs and explain their uses in surveying.	6M	1	2
b)	In passing an obstacle in the form of a pond, stations A and D, on the main line, were taken on the opposite sides of the pond. On the left of AD, a line AB, 200m long was laid down and a second line AC, 250m long was ranged on the right of AD. The points B,D and C being in the same straight line. BD and DC were then chained and found to be 125m and 150m respectively. Find the length of AD.	6M	5	3
	OR			
3. a)	Define ranging and explain the method of indirect ranging with sketch.	6M	3	2
b)	With neat sketch illustrate intersection method of plane table survey.	6M	2	2
	UNIT–II			
4. a)	Following consecutive readings were taken with a level and 4m staff on a continuously sloping ground at a common interval of 30m. Reduce level of the first point was 180.750m. Rule out a page of a level field book and enter the above readings. Calculate reduce levels of the points by collimation method. Apply Arithmetic check. Also find the difference in RL from first point to last point.			

0.780	1.535	1.955	2.430	2.985	3.480	1.155	1.960	2.365
3.640	0.935	1.045	1.630	2.545				

		8M	3	4
b)	Define the following terms. (i) Face left and Face right observation (ii) Swinging and Transiting the telescope	4M	1	2

OR

5.	a)	Explain temporary adjustments of dumpy level. Write neat sketch for three screw adjustment.	6M	1	2
	b)	An embankment is 8m wide with slopes 2:1. Assuming the ground to be level in a direction traverse to the center line. Calculate the volume contained in a length of 140m. The center height at 20m intervals being 2.3m, 3.7m, 3.9m, 4.1m, 3.7m, 2.9m, 2.7m.	6M	4	3

UNIT–III

6.	a)	Explain the method of measuring horizontal angle by repetition with table for recording readings	8M	2	2
	b)	Compare temporary and permanent adjustments of vernier transit	4M	1	3

OR

7.	a)	List the uses of vernier micrometer	4M	5	2
	b)	With the help of neat sketch enumerate fundamental lines and desired relations of a transit.	8M	1	2

UNIT–IV

8.	a)	Calculate the ordinates at 10m distances for a circular curve having a long chord of 80m and versed sine of 4m. And explain the procedure of setting out the same in field.	6M	5	3
	b)	The stadia intercept read by means of a fixed hair instrument on a vertically held staff is 1.05 meters, the angle of elevation being $5^o36'$. The instrument constants are 100 and 0.3. What would be the total number of turns registered on a movable hair instrument at the same station for a 1.75 meters intercept on a staff held on the same point, the vertical angle in this case being $5^o24'$ and the constants 1000 and 0.5?	6M	2	4

OR

9.	a)	The elevation of a point P is to be determined by observations from two adjacent stations of a tacheometeric survey. The staff was held vertically upon the point and the instrument is fitted within an anallactic lens, the constant of instrument being 100. Compute the elevation of the point P from the following data, taking both the observations as equally trustworthy. Also calculate the distance of A and B from P.	6M	2	4

Inst Station	Height of axis	Staff point	Vertical angle	Staff readings	Elevation of station
A	1.42	P	$+2^o24'$	1.230, 2.005, 2.880	77.750 m
B	1.40	P	$-3^o36'$	0.785, 1.800, 2.815	97.135 m

	b)	Explain the procedure of setting out a simple circular curve by offsets from tangents method with neat sketch.	6M	5	2

UNIT–V

10.	a)	Explain briefly any two softwares used in survey.	6M	3	2
	b)	Enumerate the advantages of total station over theodolite.	6M	5	2

OR

11.	a)	Enumerate the instrumental errors in DGPS	6M	5	2
	b)	List the advantages and disadvantages of Drone based survey	6M	5	2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A133T

II B.Tech. I Semester Supplmentary Examinations August 2022

Fluid Mechanics and Hydraulic Engineering

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

	1. Answer ***all*** the following short answer questions (5 X 2 = 10M)	CO	Blooms Level
a)	What are root causes for viscosity of fluids?	CO1	L1
b)	Give practical examples for laminar and turbulent flow in our daily life	CO1	L2
c)	Explain the working principle of Venturimeter?	CO1	L2
d)	Draw Moody's diagram. State its use in design of pipe	CO1	L2
e)	What is meant by minimum starting speed of centrifugal pump?	CO1	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	Blooms Level
		UNIT–I			
2.	a)	Difference between (i) mass density and Weight density (ii) Newtonian fluid and Non-Newtonian fluid (ii) Ideal fluid and Real fluid	6M	CO1	L2
	b)	The space between two square flat parallel plates is filled with oil. Each side of the plate is 720 mm. The thickness of the oil film is 15 mm. The upper plate, which moves at 3 m/s requires a force of 120 N to maintain the speed. Determine: (i) The dynamic viscosity of the oil; (ii) The kinematic viscosity of oil if the specific gravity of oil is 0.95	6M	CO1	L4
		OR			
3.	a)	What is centre of buoyancy? Explain the different types of equilibriums of floating body	6M	CO1	L2
	b)	A solid cylinder 2 m in diameter and 2m high is floating in water with its axis vertical. If the specific gravity of the material of cylinder is 0.65 find its meta-centric height. State also whether the equilibrium is stable or unstable	6M	CO1	L4
		UNIT–II			
4.	a)	Explain the typical characterizes of velocity potential function and stream function	6M	CO2	L2
	b)	In a three-dimensional incompressible fluid flow, the velocity components are: $u = x^2 + z^2 + 5$, $v = y^2 + z^2 - 3$ (i) Determine the third component of velocity. (ii) Is the fluid flow irrotational?	6M	CO2	L4
		OR			
5.	a)	How is the continuity equation based on the principle of conservation of mass stated? Derive the continuity equation in Cartesian coordinates	6M	CO2	L3
	b)	If the velocity field is given by $u = x^2 - y^2 + x$ and $v = -(2xy + y)$, determine φ and ψ.	6M	CO2	L4

UNIT–III

6.	a)	State assumption of Bernoulli's equation. Derive Bernoulli's equation	6M	CO3	L3
	b)	A pipe 300 meters long has a slope of 1 in 10^0 and tapers from 1.0 m diameter at the higher end to 0.5 m at the lower end. Quantity of water flowing is 90 litre/s. If the pressure at higher end is 70 kN/m^2 , find the pressure at the lower end.	6M		L4

OR

7.	a)	Find an expression for the discharge over a triangular notch or weir in terms of head of water over the crest of the notch or weir	6M	CO3	L2
	b)	A rectangular channel 2·0 m wide has a discharge of 0·25 m^3 /s, which is measured by a right angled V-notch. Find the position of the apex of the notch from the bed of the channel if the maximum depth of water is not to exceed 1·3 m. Assume Cd = 0·62.	6M	CO3	L4

UNIT–I

8.	a)	Derive the Darcy-Weisbach equation for loss of head due to friction	6M	CO4	L3
	b)	Two pipes of diameters 400 mm and 200 mm are each 300 m long. When the pipes are connected in series the discharge through the pipeline is 0·10 m^3 /s, find the loss of head incurred. What would be the loss of head in the system to pass the same total discharge when the pipes are connected in parallel? Take friction factor = 0·0075 for each pipe.	6M	CO4	L4

OR

9.	a)	Why pipes are connected in series and parallel? State their hydraulic conditions to be satisfied.	6M	CO4	L4
	b)	An oil of viscosity 9 poise and specific gravity 0.9 is flowing through a horizontal pipe of 60 mm diameter. If the pressure drop in 100 m length of the pipe is 1800 kN/m^2 , determine: (i) The rate of flow of oil; (ii) The centre-line velocity; (iii) The total frictional drag over 100 m length; (iv) The power required to maintain the flow; (v) The velocity gradient at the pipe wall; (vi) The velocity and shear stress at 8 mm from the wall	6M	CO4	L4

UNIT–V

10.	a)	A reaction turbine works at 450 r.p.m. under a head of 120 m. Its diameter at inlet is 1.2 m and the flow area is 0.4 m^2. The angles made by absolute and relative velocities at inlet are 20° and 60° respectively with the tangential velocity. Determine: (i) The volume flow rate, (ii) The power developed, and (iii) The hydraulic efficiency.	6M	CO5	L5
	b)	Draw a general layout of a hydroelectric power plant using an impulse turbine and define the following: (i) Gross head, (ii) Net head, (iii) Hydraulic efficiency, and (iv) Overall efficiency of the impulse turbine	6M	CO5	L2

OR

11.	a)	What is priming? Why is it necessary in centrifugal pump?	6M	CO5	L3
	b)	The impeller of a centrifugal pump has an external diameter of 400 mm and internal diameter of 180 mm and it runs at 1440 r.p.m. Assuming a constant radial flow through the impeller at 2·5 m/s and that the vanes at the exit are set back at an angle of 25°, determine : (i) Inlet vane angle, (ii) The angle, absolute velocity of water at the exit makes with the tangent, and (iii) The work done per N of water	6M	CO5	L5

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC36T

II B.Tech. I Semester Supplmentary Examinations August 2022

Managerial Economics and Financial Analysis

(Common to CE & ECE)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	Blooms Level
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	Law of diminishing marginal utility	CO1	L1
b)	Iso-quants and iso-costs	CO2	L1
c)	Characteristics of monopolistic competition.	CO2	L2
d)	Scope of capital budgeting	CO2	L2
e)	Double entry bookkeeping	CO1	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	Blooms Level
	UNIT–I			
2. a)	Discuss the nature and scope of managerial economics.	6M	CO2	L1
b)	Elucidate the relationship of managerial economics with other areas.	6M	CO3	L1
	OR			
3. a)	Define demand. Explain different types of demand.	6M	CO1	L1
b)	Explain the law of demand and its exceptions.	6M	CO2	L1
	UNIT–II			
4. a)	Explain the determinants of cost.	6M	CO2	L2
b)	Identify different bases of cost classification.	6m	CO1	L2
	OR			
5.	Explain graphically the cost-output relationship in the long-run.	12M	CO3	L2
	UNIT–III			
6. a)	State the characteristics of an oligopoly market.	6M	CO2	L2
b)	Differentiate joint stock company and cooperative society form business.	6M	CO3	L1
	OR			

7.		State the forms and functions of different types of public sector organizations.	12M	CO2	L2

UNIT–IV

8.	a)	Discuss the sources of raising capital.	6M	CO2	L3
	b)	Explain what is profitability index. Discuss which is a superior ranking criterion, profitability index or the net present value.	6M	CO3	L3

OR

9.		An investment would cost `100,000 and provide annual cash inflow of `21,150 for 6 years. If the opportunity cost of capital is 10 per cent, calculate the Net Present Value (NPV) and Internal Rate of Return (IRR) of the investment.	12M	CO3	L3

UNIT–V

10.	a)	State the accounting principles and accounting conventions.	6M	CO1	L3
	b)	"Every debit must have a corresponding credit". Explain.	6M	CO3	L3

OR

11.	a)	Define ledger. Explain its importance in accounting process.	6M	CO2	L3
	b)	For Pavani Ltd., calculate debtor's turnover ratio from the flowing information: Sundry debtors at beginning `20,00,000 Sundry debtors at end `12,50,000 Sales `25,50,250	6M	CO3	L4

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC31T

II B.Tech. I Semester Supplmentary Examinations August 2022

Partial Differential Equations and Numerical Methods

(Common to CE and ME)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	Blooms Level
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	Explain the Method of false position.	CO1	L1
b)	Define forward differences.	CO2	L2
c)	Write formulas for first and second derivatives using Newton's backward interpolation formula.	CO3	L3
d)	Explain Euler's method to solve the IVP $\frac{dy}{dx} = f(x,y)\ with\ y(x_0) = y_0$.	CO4	L2
e)	Write the suitable solution of one dimensional heat equation.	CO5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	Blooms Level
	UNIT–I			
2. a)	Find a real root of the equation $x \log_{10} x = 1.2$ by regula-falsi method correct to four decimal places.	6M	CO1	L4
b)	Develop an Iterative formula to find the k^{th} root of a positive number N .Using Newton-Raphson method.	6M	CO1	L3
	(OR)			
3. a)	Using bisection method, compute the real root of the equation $x^3 - x - 11 = 0$.	6M	CO1	L3
b)	Find a real root of the equation $2x - \log_{10} x = 7$, using iteration method.	6M	CO1	L4
	UNIT–II			
4. a)	Evaluate $\Delta\left(e^x \log 2x\right)$.	6M	CO2	L2

b) Using Newton's forward formula compute $f(142)$ from the following table:

x	140	150	160	170	180
$f(x)$	3.685	4.854	6.302	8.076	10.225

6M CO2 L4

(OR)

5. a) Use Lagrange's interpolation formula to find the value of y when x=10 if the following values of x and y are given.

x	5	6	9	11
y	12	13	14	16

6M CO2 L3

b) Find the polynomial $f(x)$ from the following data

x	0	1	4	5
y	4	13	24	39

6M CO2 L4

UNIT–III

6. a) Determine $\frac{dy}{dx}, \frac{d^2y}{dx^2}$ at $x = 2$ from the following data

x	0	1	2	3	4	5
y	0	1	8	27	64	125

6M CO3 L4

b) Evaluate $\int_0^1 x^3\,dx$ with five sub-intervals by Trapezoidal Rule

6M CO3 L3

(OR)

7. a) Find $\int_0^1 \frac{dx}{1+x^2}$ by Simpson's 3/8th rule taking $h = 1/6$.

6M CO3 L3

b) Evaluate, $\int_0^2 e^{-x^2}\,dx$ by using Trapezoidal rule and Simpson's $\frac{1}{3}$ rd rule taking $h = 0.25$.

6M CO3 L3

UNIT–IV

8. a) Find $y(0.1)$ by Taylor's series expansion when

$$\frac{dy}{dx} = x - y^2,\ y(0) = 1$$

6M CO4 L3

b) Apply Runge-Kutta method of 4th order, to find an approximate value of y when $x = 0.2$ given that

$$\frac{dy}{dx} = x + y,\ y(0) = 1.$$

6M CO4 L3

(OR)

9. a) Given that $\frac{dy}{dx} = 2 + \sqrt{xy}$, $y(1) = 1$.

Find $y(2)$ in steps of 0.2 using the Euler's method. 6M CO4 L3

b) Obtain Picard's second approximate solution of the initial value problem $\frac{dy}{dx} = \frac{x^2}{y^2 + 1}$, $y(0) = 0$.

6M CO4 L3

UNIT–V

10. Solve the wave equation $\frac{\partial^2 y}{\partial t^2} = c^2 \frac{\partial^2 y}{\partial x^2}$ under the conditions

$y(0,t) = 0$, $y(L,t) = 0$ for all t;

$y(x,0) = f(x)$ and $\left(\frac{\partial y}{\partial t}\right)_{t=0} = g(x)$, $0 < x < L$.

12M CO5 L2

OR

11. A homogeneous rod of conducting material of length 100 cm has its ends kept at zero temperature and the temperature initially is

$$u(x,0) = \begin{cases} x\ , & 0 \le x \le 50 \\ 100 - x\ , & 50 \le x \le 100 \end{cases}.$$

Find the temperature $u(x,t)$ at any time. 12M CO5 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A132T

II B.Tech. I Semester Supplmentary Examinations August 2022

Strength of Materials

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	Blooms Level
1.	**Answer *all* the following short answer questions (5 X 2 = 10M)**		
a)	A steel bar 600mm long and having 30mm diameter, is turned down to 25mm diameter for one fourth of its length. It is heated at 30C above room temperature, clamped at both ends and then allowed to cool to room temperature. If the distance between the clamps is unchanged, the maximum stress in the bar (α=12.5x10^{-6} per C and E=200 GN/m^2) is	CO1	2
b)	Draw the bending diagram for a simple supported carrying concentrated load at mid span.	CO2	2
c)	The safe stress for a hollow steel column which carries an axial load of 2100 kN is 125 MN/m2. if the external diameter of the column is 30cm, what will be the internal diameter?	CO3	2
d)	A simple supported beam of span l is carrying point load W at the mid span. What is the deflection at the centre of the beam?	CO4	2
e)	A water main of 1.5 m diameter and 20 mm thick is subjected to an pressure of 1.5N/mm2. Calculate the circumferential stress induced in the pipe.	CO5	2

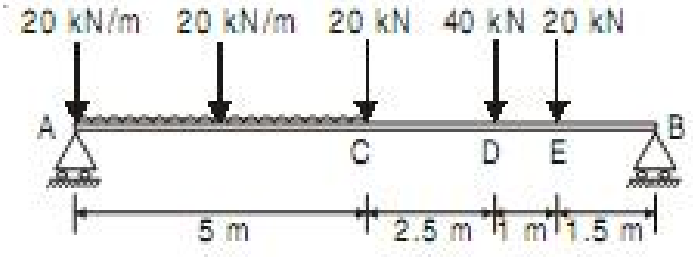
PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	Blooms Level
	UNIT–I			
2.	A circular rod of 25 mm diameter and 500 mm long is subjected to a tensile force of 60 kN. Determine modulus of rigidity, bulk modulus and change in volume if Poisson's ratio =0.3 and Young's modulus E = 2 × 10^5 N/mm^2 .	12M	CO1	2
	OR			
3.	A compound bar of length 600 mm consists of a strip of aluminium 40 mm wide and 20 mm thick and a strip of steel 60 mm wide × 15 mm thick rigidly joined at the ends. If elastic modulus of aluminium and steel are 1 × 10^5 N/mm^2 and 2 × 10^5 N/mm^2 determine the stresses developed in each material and the extension of the compound bar when axial tensile force of 60kN acts.	12M	CO1	2

UNIT–II

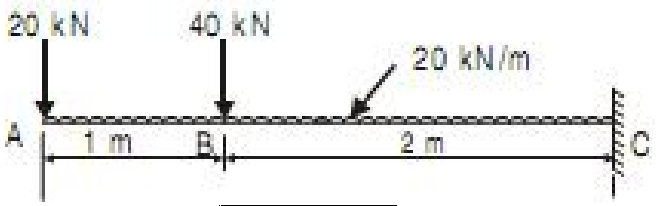
4. Draw the SF and BM diagrams for the beam shown in Figure and find out the position and the magnitude of maximum moment.



12M CO2 3

OR

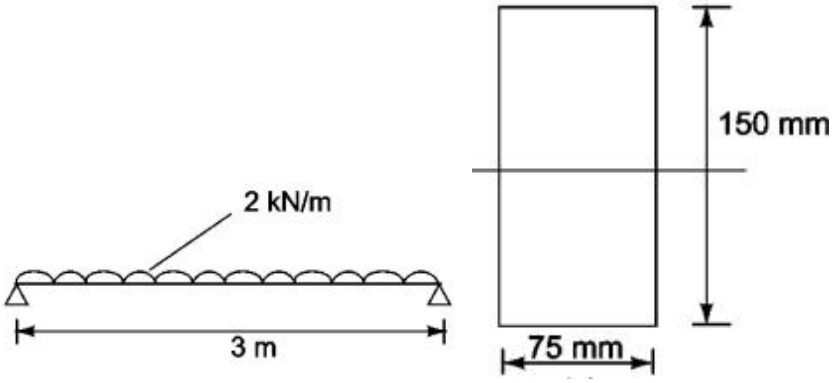
5. Draw shear force and bending moment diagram for the cantilever beam shown in figure



12M CO2 3

UNIT–III

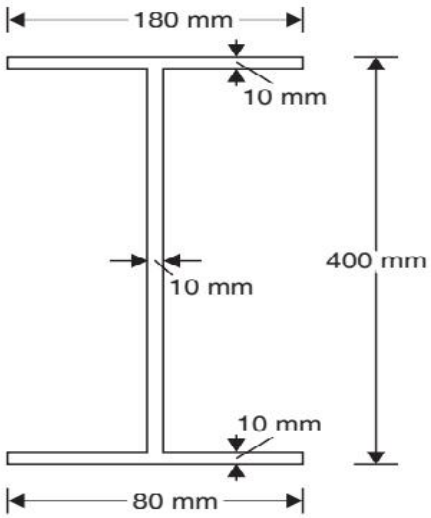
6. A timber beam has to carry a load of 2 kN/m over a span of 3 m. The permissible stresses are 12MPa in compression and 8 MPa in tension. Design the section if the width is half of the depth.



12M CO3 2

OR

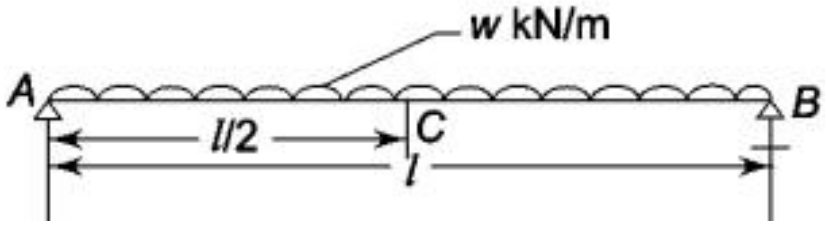
7. Draw the shear stress variation diagram for the I-section shown in Fig. if it is subjected to a shear force of 100 kN.



12M CO3 2

UNIT–IV

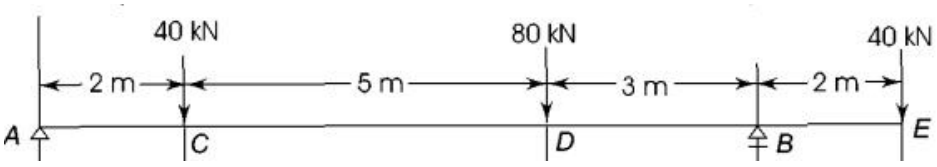
8. **A** simply supported beam carries a UD load of 20 kN/m over its span of 8 m. Determine the slope at the ends and the deflection at mid-span if E=200GN/m^{2}and I=30,000cm^4. Moment- Area method



12M CO4 3

OR

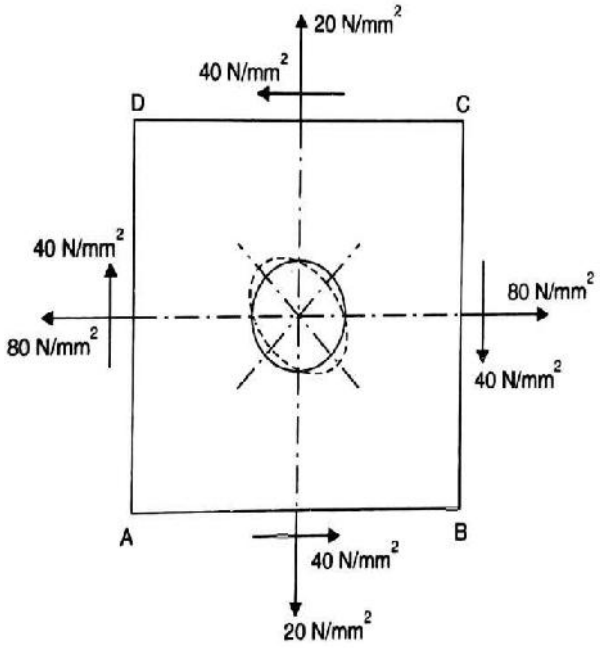
9. An overhanging beam is loaded as shown in Fig. Find the deflection under the loads. *EI* is constant. (All distances are in m and ordinates in kNm.)



12M CO4 3

UNIT–V

10. On a mild steel plate, a circle of diameter 50 mm is drawn before the plate is stressed. Find the lengths of the major and minor axes of an ellipse formed as a result of the deformation of the circle marked. Poisson's ratio 0.25 and E = 2 x 10^{2}N/mm^2



CO5 3

OR

11. Determine the shortest length for a pin-jointed steel column of cross- section 75 mm x 48 mm using Euler's formula. Take critical stress value as 220 MPa and E=205GPa. CO5 3

*** End ***