Hall Ticket Number :										

R-20

Code: 20A133T

II B.Tech. I Semester Supplementary Examinations June 2024

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 marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer *all* the following short answer questions (5 X 2 = 10M)		
a)	What is difference between hydrostatic pressure and centre of pressure?	1	1
b)	State the typical characteristics of velocity potential function?	2	1
c)	What is proportional Weir?	3	1
d)	State the practical use of Moody's diagram?	4	1
e)	What is necessity of Priming of a Centrifugal Pump before stating?	5	1

PART-B

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

		Marks	CO	BL
	UNIT-I			
2. a)	Explain the Practical significance of following fluid properties (i) Viscosity (ii) Surface Tension (iii) Compressibility	6M	1	2
b)	An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.9m × 0.9m and an inclined plane having an angle of inclination 30^0. The weight of the square plate is 400N, and it slides down the plane with a uniform velocity of 0.2m/s. Find the dynamic viscosity of the oil and kinematic viscosity of oil.	6M	1	3
	OR			
3. a)	What is pressure at a point? Derive a methodical expression for Law of Hydrostatic pressure distribution?	6M	1	6
b)	Find the volume of the water displaced and the position of center of buoyancy for a wooden block of width 2.5 m and depth 1.5 m when it floats in water horizontally. The density of the wooden block is 650 kg/m3 and its length is 6 m.	6M	1	3
	UNIT-II			
4. a)	Explain the different types of flow with practical examples	6M	2	2
b)	If the velocity potential function Φ = 4x(3y-4), determine the velocity at (4,6,0). Determine the stream function at the same point.	6M	2	3
	OR			
5. a)	What is flow net? Explain the various methods of flow net construction	6M	2	2
b)	Examine whether flows are possible or not based continuity equation. (i) U = x+y-z, V = 2x+y+8z, W= 3x+2y-2z (ii) U = x+y+z, V= 2x=2y=2z, W=3x-4y-5z	6M	2	3

UNIT-III

6.	a)	Derive Bernoulli's equation from fundamentals	6M	3	6
	b)	A tapered pipe of diameters 300 mm and 200 mm is laid parallel to the ground. The pressure intensity at the two ends are 250kPa and 150 kPa respectively while a discharge of 50 L/s is flowing through the pipe. Compute the total energy at each of the two sections. Mention the direction of fluid flow in the pipe and justify	6M	3	3

OR

7.	a)	Differentiate between (i) weir and notch (ii) submerged weir and broad crested weir	6M	3	2
	b)	Determine the maximum discharge over a broad crested weir built across a rectangular channel 4 m when the head of water above the sill of the weir is 75 cm. Determine also head causing flow. Take C_d = 0.61	6M	3	3

UNIT-IV

8.	a)	Derive Darcy-weisbach equation. Mention its assumptions	6M	4	6
	b)	Find the head loss due to friction in a pipe of diameter 300 mm and length 50 m, through which water is flowing at a velocity of 3 m/s using (i) Darcy-Weisbach formula (ii) Chezy's Formula for which C=60. Take kinematic viscosity (v) for water = 0.01 stoke.	6M	4	3

OR

9.	a)	Differentiate between (i) Hydraulic gradient line and Total energy line (ii) Hydrodynamically smooth and rough pipes	6M	4	2
	b)	Pipes of 50 cm diameter, 1800 m length, 40 cm diameter, 1200m length and 30 cm diameter , 600 m length are connected in series (i) if these pipes are to be replaced by an equivalent pipe of 40cm diameter, What would be its length? (ii)What would be the diameter of the equivalent pipe of 3600 m length?	6M	4	3

UNIT-V

10.	a)	Explain the work done and efficiency of Pelton Wheel	6M	5	2
	b)	A pelton wheel is receiving water from a penstock with a gross head of 510 m. One -third of gross head is lost in friction in the penstock. The rate of flow through the nozzle fitted at the end of penstock is 2.2 m^3/s. The angle of deflection of the jet is 165^0. Determine the power given by water to the runner and hydraulic efficiency of the pelton wheel. Take C_v =1.0 and speed ratio=0.45	6M	5	3

OR

11.	a)	Explain the working principle of centrifugal pump with neat sketches	6M	5	2
	b)	A centrifugal pump is to be discharge 0.118 m^3 /s at a speed of 1450 rpm against a head of 25 m. The impeller diameter is 250mm, its width at the outlet is 50 mm and manometric efficiency is 75%. Determine the vane angle at the outer periphery of the impeller.	6M	5	3

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC36T

II B.Tech. I Semester Supplementary Examinations June 2024

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 marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	What is Law of demand?	1	L1
b)	Cost – volume- profit analysis.	2	L1
c)	Define departmental organizations.	3	L1
d)	Uses of Accounting rate of return.	4	L1
e)	Write a note on Debt-Equity ratio.	5	L1

PART-B

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

		Marks	CO	BL
	UNIT-I			
2. a)	Define Managerial Economics? Explain its scope.	6M	1	L2
b)	Explain the significance of Elasticity of Demand.	6M	1	L2
	OR			
3.	What is Law of demand? Explain the difference between demand schedule & demand curve.	12M	1	L3
	UNIT-II			
4. a)	Illustrate Cob-Douglas Production function	6M	2	L3
b)	Explain the managerial uses of Break-even analysis.	6M	2	L2
	OR			
5. a)	Explain cost output relationship in long-run.	6M	2	L2
b)	From the following particulars Calculate BEP. Fixed factory overheads cost – Rs. 60000 Fixed selling overheads cost – Rs. 12000 Variable manufacturing cost per unit – Rs. 12 Variable selling cost per unit – Rs. 3 Selling price per unit – Rs. 24.	6M		L3
	UNIT-III			
6.	Explain how the price is determined in case of perfect competition. Illustrate.	12M	3	L2

OR

7. What is monopolistic competition? Explain the determination of equilibrium output and price of firm under monopolistic competition. 12M 3 L3

UNIT-IV

8. What do you mean by Capital Budgeting? Explain different techniques of Capital Budgeting. 12M 4 L2

OR

9. A company has an investment opportunity costing Rs.40,000 with the following expected net cash inflows:

Year	Cash Inflows (Rs.)
1	7,000
2	7,000
6	8,000
7	10,000

Year	Cash Inflows (Rs.)
8	15,000
9	10,000
10	4,000

Determine the following:

a) Payback period.
b) NPV (10% discount rate)
c) Profitability Index. 12M 4 L4

UNIT-V

10. Given,
Gross profit ratio 20%
EPS 2/-Rs,
no of shares 25000@ 10/-Rs each
profit 25% of share capital.
Current ratio3:1 and
Acid test ratio1.5:1
Quick Assets 30,000/-
inventory turnover ratio10 times,
operating ratio 90%,
closing Stock less by Rs 6000/- in opening stock
find out
i) Current Liabilities ii) Quick Liabilities iii) Current Assets iv) Opening Stock v) Closing Stock. 12M 5 L4

OR

11. From the following Trail Balance of Maanas Prepare trading & Profit and loss a/c for the year ended 31st December 2020 and Blanace sheet as on that date.

Debit Balances	**Rs.**	**Credit Balances**	**Rs.**
Purchases	90,000	Sales	1,45,000
Returns	2,000	Returns	2,000
Cash in Hand	5,000	Commission	3,000
Cash at Bank	8,000	Capital	56,000
Debtors	20,500	Creditors	40,000
Furniture	13,000	**Total**	**246000**
Machinery	25,000		
Opening stock	15,000		
Rent	4,500		
Wages	11,000		
Insurance	1,000		
Carriage outwards	2,000		
Travelling expenses	1,000		
Bills receivable	34,000		
Salaries	8,000		
Drawings	6,000		
Total	**246000**		

Adjustments:

a) Closing stock Rs. 32,000 12M 5 L3

*** End ***

Hall Ticket Number :										

R-20

Code: 20AC31T

II B.Tech. I Semester Supplementary Examinations June 2024

Partial Differential Equations and Numerical Methods

(Common to CE & 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 marks.**

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 BL

a) Write the formula for iteration method and specify its order of convergence. CO1 L1

b) Explain Interpolation. CO2 L2

c) Evaluate $\int_{0.6}^{2.0} y\,dx$ by using trapezoidal rule to the following table

x	0.6	8	1.0	1.2	1.4	1.6	1.8	20
y	1.23	1.58	2.03	4.32	6.25	8.38	10.23	12.45

CO3 L5

d) Write the formula for Runge-Kutta method of second order. CO4 L1

e) Write One-dimensional Heat flow equation, Two-dimensional Heat flow equation. CO5 L1

PART-B

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

Marks CO BL

UNIT-I

2. a) By using the bisection method, find an approximate root of the equation $\sin x = 1/x$, that lies between x=1 and x=1.5 (measured in radians). Carry out computations up to the 7th stage 6M CO1 L3

b) Find the root of the equation $\cos x = 3x - 1$ by using Iteration method 6M CO1 L4

OR

3. a) Find a real root of the equation $x \log_{10} x = 1.2$ by using regula – falsi method correct to four decimal places. 6M CO1 L4

b) Using Newton-Raphson method, find a root of the equation $x^4 - x = 10$ correct to three decimal places. 6M CO1 L3

UNIT-II

4. a) Find the value of $f(42)$ to the following data

X	20	25	30	35	40	45
$f(x)$	354	332	291	260	231	204

6M CO2 L4

b) Using Lagrange's formula, express the function $\frac{3x^2+x+1}{(x-1)(x-2)(x-3)}$ as a sum of partial fractions. 6M CO2 L3

OR

5. a) Using Newton's backward formula, find the value of f (2.0), if

x	1	1.4	1.8	2.2
f(x)	3.49	4.82	5.96	6.5

6M CO2 L3

b) Find the relation between E and D. 6M CO2 L4

UNIT-III

6. Given that

x	1	1.2	1.4	1.6	1.8	2
y	2.72	3.32	4.06	4.95	6.05	7.39

Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ at $x=1.1$ and $x=1.2$ 12M CO3 L4

OR

7. a) Use the Trapezoidal rule to estimate $\int_0^6 x\sec x\,dx$ taking 8 intervals. 6M CO3 L3

b) A river is 80 feet wide; the depth is d in feet at a distance x foot from one bank is given by the following table, find approximately the area of cross-section

x	0	0.8	1.0	30	40	50	60	70	80
y	0	4	7	9	12	15	14	8	3

6M CO3 L4

UNIT-IV

8. Employ the Taylor's series method to find an approximate value of y at x=1.1, x=1.2 for the differential equation $\frac{dy}{dx}=\log xy, y(1)=2$ 12M CO4 L4

OR

9. a) Using Picard's process of successive approximation, obtain a solution when $x = 2$ up to 5th approximation of $\frac{dy}{dx}=2x-y$ such that y (0) =3 6M CO4 L3

b) Apply Runge-kutta fourth order method, find an appro ma e value of y when $x = 0.1$ Given that $\frac{dy}{dx}=x+y^2$, such that $y = 1$ when x = xi at o 6M CO4 L4

UNIT-V

10. solve the Laplace equation $\frac{\partial^2 u}{\partial x^2}+\frac{\partial^2 u}{\partial y^2}=0$ =0 subjected to the conditions

$u(0,y)=u(l,y)=u(x,0)=0$ and $u(x,a)=\sin\left(\frac{n\pi x}{l}\right)$ 12M CO5 L3

OR

11. A tightly stretched string with fixed end points x=0 and x=l is initially in a position given by $y=y_0\sin^3\left(\frac{\pi x}{l}\right)$. If it is released from fest from this position, find the displacement $y(x,t)$ 12M CO5 L4

*** End ***

Hall Ticket Number :										

R-20

Code: 20A132T

II B.Tech. I Semester Supplementary Examinations June 2024

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 marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer *all* the following short answer questions (5 X 2 = 10M)		
a)	What is meant by resilience?	1	1
b)	Enlist the types of beams and draw the neat sketches showing the support reactions.	2	1
c)	Write the equation of simple bending and mention the names various terms in the equation.	3	1
d)	Write the equations for slope and deflection of simply supported beam carrying a central point load 'W' with a neat sketch.	4	1
e)	Write the equations pertaining to maximum principal stress theory.	5	1

PART-B

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

		Marks	CO	BL
	UNIT-I			
2.	A Steel bar of 2 cm diameter and 20 cm length was subjected to a tension test. On applying a load of 20KN, the extension was found to be 0.0054 cm and the change in diameter was 0.00022 cm .Calculate the values of (i) Modulus of Elasticity (ii) Poisson's ratio and (iii) Change in Volume.	12M	1	3
	OR			
3.	An aluminum rod 22 mm diameter passes through a steel tube of 25 mm internal diameter and 3 mm thick. The rod and tube are fixed at a temperature 180^{o}C. Find the stress in the rod & tube when the temperature falls to 60^{o}C.	12M	1	3
	UNIT-II			
4.	A simply supported beam of span 4m carries an UDL of 2 t/m over a length of 1.5m and a point load 2 t at a distance 3 m from left support. The beam is also subjected to anticlockwise couple of 3 t-m at a distance 2m from left support. Draw SFD & BMD.	12M	2	3
	OR			

5.	An overhanging beam length 9 m, resting over two supports 6m apart at a distance of 1.5 m from left end. The beam carries a UDL of 20 kN/m over its entire length. Draw S.F and B.M diagrams and find out the position of contra flexure.	12M	2	3

UNIT-III

6.	A cast iron beam is of T-Section. Flange width=100mm, Thickness if flange=20mm Web depth=80mm, Thickness of web=20mm. The beam carries UDL of 1.5 kN/m length on the entire span. Determine the maximum Tensile and Compressive stress.	12M	3	3

OR

7.	The cross section of a joist is a T- section 120mm X 200mm X 12mm, with 120mm side horizontal. Sketch the shear stress distribution and hence find the maximum shear stress if it has to resist a shear force of 250KN.	12M	3	3

UNIT-IV

8.	A beam AB of span 6m span is simply supported at the ends and is loaded with a point load of 6 KN at 2m from left end A and a udl of 2 KN/m on the right half span. Determine maximum deflection and slope at end A. Take $E=2x10^5$ N/mm^2 and I=2000cm^4.	12M	4	3

OR

9.	Calculate the slope and deflection at the free end of the cantilever of length 3m carrying two point loads of 20KN each acting at free end and 1.5m from the free end. Take $E=2x10^5$N/mm^2 and I=10. 8mm^4.	12M	4	3

UNIT-V

10.	The stresses at a point in a bar are 200 N/mm^2 (tensile) and 100N/mm^2 (compressive). Determine the resultant stress in magnitude and direction on a plane inclined at 60^o to the axis of major stress. Also determine the maximum intensity of shear stress in the material at that point.	12M	5	3

OR

11.	Determine the resultant stress in magnitude and direction on a plane inclined at 600 to the axis of the major principal stress At a point in a strained material, the principal stresses are 100N/mm^2 tensile and 40 N/mm^2 compressive. What is the maximum intensity of shear stress in the material at that point?	12M	5	3

*** End ***

Hall Ticket Number :										

R-20

Code: 20A131T

II B.Tech. I Semester Supplementary Examinations June 2024

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 marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	What is the principle of chain surveying	1	1
b)	Write any two applications of contours.	2	1
c)	Explain the selection of triangulation stations.	3	1
d)	An instrument was set up at a point 200m way from a transmission tower. The angle of elevation of the top of the tower was $35^0 45'$, whereas the angle of depression to the bottom was $3^0 30'$. Calculate the total height of the transmission tower.	4	2
e)	What are uses of total station survey?	5	1

PART-B

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

		Marks	CO	BL

UNIT–I

2. a) The bearings observed in traversing with a compass at a place where local attraction was suspected are given below:

Line	Fore Bearing	Back Bearing
AB	S45^{0}30'E	N45^{0}30'W
BC	S60^{0}00'E	N60^{0}40'W
CD	N03^{0}20'E	S05^{0}30'W
DA	S85^{0}00'W	N83^{0}30'E

At what stations do you suspect local attraction? Find the corrected bearings of the lines. 6M 1 3

b) With a neat sketch elaborate the field procedure of In-direct method of ranging. 6M 1 2

OR

3. a) A straight tunnel is to be run between two points '*A*' and '*B*' whose coordinates are given below:

Point	Coordinates	
	N	***E***
A	0	0
B	3014	256
C	1764	1398

It is desired to sink a shaft at '*D*', the middle point of '*AB*', but it is impossible to measure along '*AB*' directly, so *'D'* is to be fixed from 'C' a third know point.

Calculate: (i) The coordinate of '*D*'

(ii) The length and bearing of '*CD*'

(iii) The angle '*ACD*' given that the bearing of '*AC*' is $38^0 24'$E of N. 6M 1 3

b) A river is flowing from west to east. For determining the width of the river, two points P & Q are selected on the southern bank such that the distance PQ=180m. Point P is west wards. The bearing at a tree R on the northern bank are observed to be 40^0 and 340^0 respectively from P and Q, calculate the width of the river. 6M 1 3

UNIT–II

4. a) In running fly levels from a B.M. of RL 250.00m the following reading (in m) were obtained:

Backsight 1.315 2.035 1.980 2.625

Foresight 1.150 3.450 2.255

From the last position of the instrument, five pegs at 20m interval are to be set out on a uniform rising gradient of 1in40. The first peg is to have a R.L. of 247.245m. Work out the staff reading required for setting the tops of the pegs on the given gradient. 6M 2 3

b) The following offsets were taken from a chain line to an irregular boundary line at an interval of 10 m: 0, 2.50, 3.50, 5.00, 4.60, 3.20, 0 m. Compute the area between the chain line, the irregular boundary line and the end of offsets by: i) mid ordinate rule, ii) the average –ordinate rule, iii) the trapezoidal rule, iv) Simpson's rule. 6M 2 3

OR

5. a) Discuss the effect of curvature and refraction in leveling. Derive an expression for curvature and refraction correction. Also provide for combined correction for curvature and refraction. 6M 2 2

b) In a railway cutting, the side slopes are 1.5:1 and the surface of the ground has a uniform side slope of 1 in 10. The width at the formation level is 4.0 m. determine the volume of excavation between two points 50 m apart on the c/l with the depth of cutting at the first point being 6.0 m and at the second part being 8.0 m, while at a point halfway between them the depth is 6.5 m. If the points at which the depth of cutting is measured lie on a curve of radius 300 m, what will be the correction to be applied? 6M 2 3

UNIT–III

6. a) Derive an expression for finding out the height of the object when the base is not accessible using the concepts of trigonometric surveying. The height of the thedolite at A is lower than that at B 6M 3 3

b) Explain how horizontal angles are measured using theodolite instrument. 6M 3 2

OR

7. a) The distance between two stations '*A'* and '*B*' was 3489.36m. Find out the reduce level of the station *'B'* if the R.L. of 'A' was 950.75m. The following observations were recorded

Description	Station '*A'*	Station '*B'*
Height of instrument	1.433m	1.463m
Height of signal	4.572m	3.962m
Vertical angle	(+) $1^0$52'20" (to *'B'*)	(-)$1^0$48'20" (to *'A'*)

R sin1" = 30.88 m 6M 3 4

b) Explain the importance of fundamental lines in a theodolite instrument. With neat sketch draw the fundamental lines of a theodolite instrument. What are their desired relationships? 6M 3 2

UNIT–IV

8. a) The diaphragm of a theodolite in good adjustments is broken and replaced. What tests and adjustments must be carried out in order to bring the instrument in good working order again? 6M 4 2

b) The ruins of an old fort exist on a hill. It was required to determine the distance of the fort from the road and the height of its roof above the plinth with a tacheometer. Observations were made on a 4 m staff held vertical on the entrance gate of the fort and on the roof from the road. Constants of the instrument were 100 and 0.

Instrument station	Height of instrument	Staff station	Vertical angle	Staff readings (m)
Road	1.45 m	Plinth	+ 10°30'	2.150, 2.720, 3.290
		Roof	+ 16°24'	1.850, 2.400, 3.040

6M 4 3

OR

9. Two tangents '*AB*' and '*BC*' intersect at a point '*B*' and another line '*DE*' intersects '*AB*' and '*BC*' at '*D*' and '*E*' such that $\angle ADE = 150^{o}$ and $\angle DEC = 140^{o}$. The radius of the first curve is 200m and that of the second is 300m. The chainage of B is 950m. Calculate all data necessary for setting out the compound curve using Rankine's method. 12M 4 4

OR

UNIT–V

10. a) Explain briefly, how we can perform topographic survey using total station instrument. 6M 5 2

b) A vertical photograph was taken from a height of 2000m above MSL. Determine the scale of photograph for an area at an average elevation of 200m above MSL, if focal length of camera is 20cm 6M 5 3

OR

11. a) Explain the distance measurement in EDM and its computation from phase measurement of EDM. Also elaborate the uses and advantageous of it in surveying. 6M 5 2

b) A vertical photograph of size 30cmX25cm were taken to cover total area on ground of 250km^2. If the scale of the photograph is 1cm= 250m. Calculate the number of photographs required if longitudinal overlap is 30% and side overlap is 25%. 6M 5 3

*** End ***