Hall Ticket Number :										

R-17

Code: 7G632

II B.Tech. I Semester Supplementary Examinations November 2023

Fluid Mechanics

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. State Pascal's law. Derive the equation for the same. 14M

OR

2. Define total pressure and centre of pressure. Also derive the expressions for the same for an inclined immersed surface. 14M

UNIT–II

3. Classify the types of flows. 14M

OR

4. Given that $u= x^2-y^2$ and $v= -2xy$, determine the stream function and potential function for the flow. 14M

UNIT–III

5. a) Explain the terms 'Total Energy line' and 'Hydraulic gradient line'. 7M
   b) Distinguish between notch and weir ,orifice and mouth piece 7M

OR

6. a) During an experiment 95litres of water is flowing over a right angled notch was collected in two minutes. If the head of the still is 4cm, determine the coeffient of discharge of the notch. 8M
   b) Classify the various types of orifice? 6M

UNIT–IV

7. Derive the Hagen poiseuille equation for the loss of head in pipes. 14M

OR

8. The two reservoirs with surface level difference of 20m are to be connected by 1m dia pipe 6km long. Calculate the discharge when a cast iron pipe of roughness k=0.3mm is used. What will be the percentage increase in discharge if cast iron pipe were to be replaced by steel pipe of roughness k=0.1mm. neglect local losses 14M

UNIT–V

9. Explain different model laws. 14M

OR

10. a) Explain distorted and undistorted models. 6M
    b) Water is flowing through a pipe of diameter 30 cm at a velocity of 4m/s. Find the velocity of oil flowing in another pipe of diameter 10 cm if the condition of dynamic similarity is satisfied between the two pipes. The viscosity of water and oil is given as 0.01 poise and 0.025 poise. Take 'G' of oil as 0.8. 8M

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Hall Ticket Number :										

R-17

Code: 7G633

II B.Tech. I Semester Supplementary Examinations November 2023

Strength of Materials

(Civil Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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		Marks	CO	BL

UNIT–I

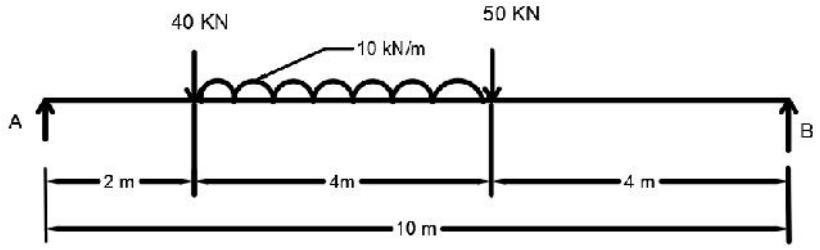
1. Mild steel rod of 25mm diameter and 300 mm long is enclosed centrally inside a hollow copper tube of external diameter 30 mm and internal diameter 25mm. The composite bar is subjected to an axial pull of 50 kN. If E for steel and copper is 200 GPa and 100 GPa respectively, find the stresses developed in the rod and the tube. Also find the extension of the rod. 14M CO1 B4

OR

2. A bar is subjected to tensile test with a diameter of 30mm, tensile load is 54KN, gauge length 300mm and extension of the bar is 0.112mm and change in diameter 0.00366. Determine poisons ratio and three elastic constants. 14M CO1 B4

UNIT–II

3. A simply supported beam of length 10 carries the uniformly distributed load and two point loads as shown in Fig. Draw the S.F. and B.M. diagram for the beam. Also calculate the maximum bending moment.



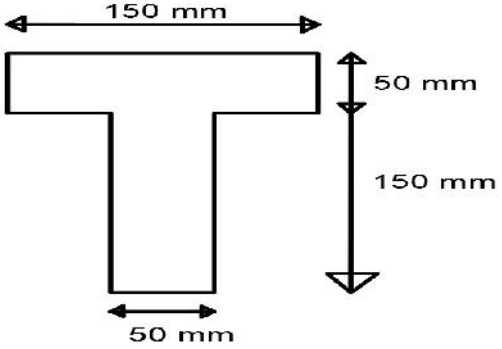
14M CO2 B4

OR

4. A Simply supported beam 6 meter span carries UDL of 10 KN/m for left half of span and two point loads of 25 kN end 50 kN at 4 m and 5 m from left support. Find maximum SF and BM and their location drawing SF and BM diagrams. 14M CO2 B4

UNIT–III

5. A beam is simply supported at its ends and having cross-section as shown in figure is loaded with a U.D.L., over whole of its span. If the beam is 8m long, find the U.D,L, if maximum permissible bending stress in tension is limited to 30MN/m^2 and in compression to 45MN/m^2. What are the actual maximum bending stresses set up in the section.



14M CO3 B4

OR

6.	Sketch the shear stress distribution across the circular section of dimension 100mm	14M	CO3	B4

UNIT–IV

7.	State the significance and application of theories of failure. Derive an expression for distortion energy theory of failure	14M	CO4	B4

OR

8.	A cantilever of length 3 m carries a uniformly distributed load of end 2.5KN/m run for a length of 1.25 m from the fixed end & a point load of 1KN at the free end. Find the deflection at the free end if the section is rectangular 12 cm wide & 24 cm deep & E =1 x 10^4 N/mm^2	14M	CO4	B4

UNIT–V

9.	Derive the expression for maximum shear strain Energy theory.	14M	CO5	B1

OR

10.	State and explain any three theories of elastic failure with neat sketch.	14M	CO5	B3

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Hall Ticket Number :										

R-17

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations November 2023

Engineering Mathematics-III

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any five full questions* by choosing one question from each unit (5x14 = 70 Marks)

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Marks

UNIT–I

1. a) Find the real root of equation $x^3 - x - 11 = 0$ by bisection method. 7M

b) Using Taylor's series method, compute the value of y at x=0.2 from $\frac{dy}{dx} = x + y$; $y(0) = 1$. 7M

OR

2. Using R-K method of 4th order, solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$, $y(0) = 1$. Find $y(0.2), y(0.4)$. 14M

UNIT–II

3. a) Find the first and second derivatives of the function tabulated below at the point x = 1.5

x	1.5	2.0	2.5	3.0	3.5	4.0
y	3.375	7.0	13.625	24.0	38.875	59.0

7M

b) Evaluate f(10) given f(x) = 168, 192, 336 at x = 1, 7, 15 respectively. Use Lagrange interpolation. 7M

OR

4. A solid of revolution is formed by rotating about the x-axis, the area between the x-axis, the lines x=0 and x=1 and a curve through the points with the following co-ordinates:

x	0.00	0.25	0.5	0.75	1.00
y	1.0000	0.9896	0.9589	0.9089	0.8415

Estimate the volume of the soli formed using Simpsons rule. 7M

UNIT–III

5. a) Form the partial differential equation by eliminating the arbitrary constants $x^2 + y^2 + (z - c)^2 = a^2$ 7M

b) Fit a second degree parabola to the following data by the method of least squares

x	10	12	15	23	20
y	14	17	23	25	21

7M

OR

6. a) Fit a straight line $y = a + b\,x$ to the data by the method of least squares

x	0	1	3	6	8
y	1	3	2	5	4

7M

b) Form the partial differential equation by eliminating a, b from $z = a\,x + b\,y + a^2 + b^2$ 7M

UNIT–IV

7. a) Find the Fourier series expansion for $f(x) = ® - x$ in $0 < x < 2®$ 7M

   b) Expand $f(x) = \cos x, 0 < x < ®$ in half range sine series. 7M

OR

8. Express $f(x) = x$ as half range sine and cosine in $0 < x < 2$ 14M

UNIT–V

9. a) Find the Fourier sin and cosine transform of $f(x) = \frac{e^{-ax}}{x}, a > 0$ 7M

   b) Find the Fourier cosine transform of $f(x) = e^{-ax}\,(x > 0, a > 0)$. 7M

OR

10. Find the Fourier transform of $f(x) = \begin{cases} 1 - x^2, |x| \le 1 \\ 0, |x| \ge 1 \end{cases}$.

    Hence evaluate $\int_0^{\infty} \frac{x\cos x - \sin x}{x^3} \cos\frac{x}{2}\,dx$ 14M

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