Hall Ticket Number :										

R-14

Code: 4GC31

II B.Tech. I Semester Supplementary Examinations August 2021

Mathematics-II

(Common to CE & ME)

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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UNIT–I

1. Find the values of λ for which the equations (λ-1)x+(3λ+1)y+2λz=0; (λ-1)x+(4λ-2)y+(λ+3)z=0; 2x+(3λ+1)y+3(λ-1)z=0 are consistent and find the ratios of x:y:z when λ has the smallest of these values. What happens when λ has the greatest of these values?

OR

2. Find the characteristic of the matrix A= $\begin{bmatrix} 1 & 1 & 3 \\ 1 & 3 & -3 \\ -2 & -4 & -4 \end{bmatrix}$ and hence find its inverse

UNIT–II

3. a) Find a real root of the equation x^3-2x-5=0 by the method of false position correct to three decimal places.

   b) Find the cubic polynomial which takes the following values:

x	0	1	2	3
f(x)	1	2	1	10

OR

4. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by using (i) Trapezoidal rule, (ii) Simpson's 1/3 rule (iii) Simpson's 3/8 rule.

UNIT–III

5. Employ Taylor's method to obtain approximate value of y at x=0.2 for the differential equation dy/dx=2y+3e^x, y(0)=0.Compare the numerical solution obtained with the exact solution.

OR

6. Using Runge-Kutta method of order 4, find y for x=0.1,0.2,0.3 given that dy/dx=xy+y^2, y(0)=1.Continue the solution at x=0.4 using Milne's method.

UNIT–IV

7. Obtain the Fourier series for $f(x)=x$ in the interval $-® < x < ®$

OR

8. Find the half range sine and cosine series of $f(x)=x$ in $0<x<2$

UNIT–V

9. Determine p such that the function $f(z)=\frac{1}{2}\log\left(x^2+y^2\right)+i\tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function

OR

10. Evaluate $\int_c \frac{e^z}{\left(z^2+®^2\right)^2}dz$ where c is $|z|=4$

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Hall Ticket Number :										

R-14

Code: 4G631

II B.Tech. I Semester Supplementary Examinations August 2021

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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UNIT–I

1. a) Explain the stress strain relations in 1, 2 and 3 dimesional system?

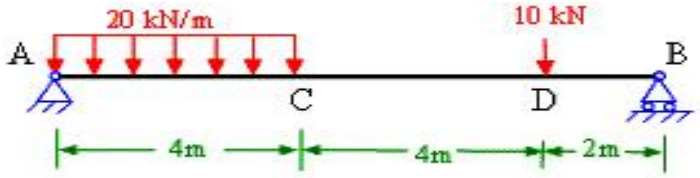
   b) Derive the expression for the analysis of uniformly tapered circular rod?

OR

2. Derive the expression for volumetric strain of a rectangular bar subjected to three forces in mutually perpendicular directions?

UNIT–II

3. Draw the shear force and Bending moment diagram, for the beam shown below?



OR

4. A beam of span 6m which is simply supported at its edges subjected to concentrated loads of 10KN and 20KN at a distance of 2m and 5m respectively from left support, with an overhanging span of 2m from its right support subjected to UDL of 2KN/m at its overhanging span. Determine the maximum bending moment and shear force.

UNIT–III

5. A rolled steel joist of I section has top flange: 200×10 mm, bottom flange : 150×10 mm, thickness of web 10 mm and overall depth : 400 mm. Find the maximum shear stress across the section if it is subjected to a shear force of 150 KN. Also, sketch the shear stress distribution across the cross section.

OR

6. An I-Section beam 340mmx200mm has a web thickness of 10mm and flange thickness of 20mm. It carries a shear force of 120KN.Sketch the shear stress distribution across the section.

UNIT–IV

7. Determine the maximum deflection of a cantilever beam subjected to uniformly distributed load over the entire span?

OR

8. A girder of uniform section and constant depth of 400 mm is freely supported over a span of 5 m. Calculate the deflection at four quarter junction points(i.e. x = 1.25m, 2.5m and 3.75m) using moment area method for a uniformly distributed load on it such that the maximum bending stress induced will not exceed 120 N/mm2. Take E = 2 ×105 N/mm2.

UNIT–V

9. Derive the expression for maximum shear strain theory and maximum shear stress theory of failure.

OR

10. A bolt is subjected to an axial pull of 20 KN together with a transverse shear force of 12KN. Elastic limit for the material in tension 250 N/mm2, Factor of safety is 3 and Poisson's ratio is 0.3.Determine the diameter of the bolt according to a) Maximum principal stress theory and b) Maximum strain energy theory.

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