C **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 54103

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2018

Fourth Semester

Civil Engineering

15UCE403-MECHANICS OF SOLIDS - II

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

PART A - (10 x 1 = 10 Marks)

1. The stress due to suddenly applied load is _____ times that of gradually applied load CO1- R

   (a) two (b) three (c) four (d) five

2. In simply supported beam the value of moment at support CO2- R

   (a) 0 (b) 1 (c) 2 (d) None

3. A fixed beam is a beam whose end supports are such that the end slopes CO3- R

   (a) are maximum (b) are minimum

   (c) are zero (d) any value greater than 1

4. The ratio of equivalent length of the column to the minimum radius of gyration is called CO4- R

   (a) Poisson's ratio (b) Buckling factor (c) Factor of safety (d) None of these

5. The maximum tangential stress in a thick cylindrical shell is always _____ the internal pressure acting on the shell. CO5- R

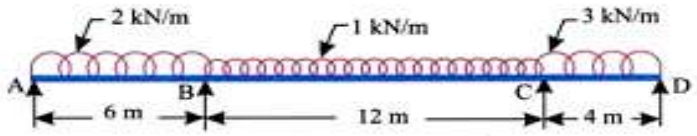
   (a) equal to (b) less than (c) greater than (d) All the above

PART – B (5 x 3= 15Marks)

6. State Castigliano's first and second theorem. CO1- R
7. What are the methods for finding out the slope and deflection at a section? CO2- R
8. What do you understand by the term point of contra flexure? CO3- R
9. Define Equivalent length of the column. CO4- R
10. Define unsymmetrical bending and state the reasons for unsymmetrical bending CO5- R

PART – C (5 x 16= 80Marks)

11.	(a)	A bar 50cm long has 1.5cm^2 cross sectional area for 30 cm of its length and 1 cm^2 for the remaining length. If a load of 50N falls on the collar which is provided at the end of the rod, the other end being fixed, from a height of 3 cm, find the maximum stress induced in the bar. Take E = 200GN/m^2.	CO1- App	(16)
		Or		
	(b)	A simply supported beam AB of length 6m carries a point load 40KN at 2m from left support A. Using the principle of virtual work, determine the deflection under the load if EI=2800 kn.m^2.	CO1- App	(16)
12.	(a)	Determine the slope and deflection at the free end of a 2.5 m cantilever beam have 5kN at a distance of 1.5 m from left end support and 10kN at a distance from 2.5 from the left end support by moment area method E I= 4000 kN	CO2- App	(16)
		Or		
	(b)	A simply supported beam of span 10m carries point loads of 90 KN and 60 KN at 3m and 4.5m from left and right ends respectively. Using Macaulay's method, calculate the deflection under the loads if E=210x10^{-6} KN/m^2, I=64 x10^{-6} KN/m^4.	CO2- Ana	(16)
13.	(a)	A fixed beam AB of length 6m carries point loads of 160kN and 120kN at a distance of 2m and 4m from the left end A. Find the fixed end moments and the reactions at the support .Draw Bending moment and Shear force diagrams	CO3- Ana	(16)
		Or		
	(b)	Analyze the beam shown in fig. and draw the B.M diagram.	CO3- Ana	(16)



14.	(a)	Calculate the Euler's critical load for a strut of T – Section, the flange width being 10 cm, overall depth 8 cm and both flange and stem 1 cm thick. The strut is 3m long and is built in at both ends. Take E = 2 x 105 N / mm^2.	CO4- U	(16)

Or

(b) Determine the maximum and minimum hoop stress across the section of a pipe of 400 mm internal diameter and 100 mm thick, when the pipe contains a fluid at a pressure of 8 N/mm^2. CO4- Ana (16)

15. (a) A 80 mm x 80 mm x 10 mm angle is used as a simply supported beam over a span of 2.4 m. It carries a load of 400 N along the vertical axis passing through the centroid of the section. Determine the resulting bending stress on the outer corners of the section, along the middle section of the beam. CO5- App (16)

Or

(b) A steel plate of width 120 mm and of thickness 20 mm is bent into a circular arc of radius 10 m. determine the maximum stress induced and the bending moment which will produce the maximum stress. Take $E = 2 \times 10^5$ N / mm^2. CO5- U (16)

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