Course Code: 2040114 Roll No: MLRS-R20

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

II B.Tech II Sem Regular End Examination, July 2022

Strength of Materials – II

(Civil Engineering)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

1.	a)	What is a laminated spring? Where is it used.	2M	CO1	BL1
	b)	Explain term polar modulus	2M	CO1	BL4
	c)	What are the functions of beam column	2M	CO2	BL1
	d)	Define the term equivalent length	2M	CO2	BL1
	e)	Define bending moment.	2M	CO3	BL1
	f)	Determine conditions for stability of the dam	2M	CO3	BL3
	g)	State assumption made in Lame's theory	2M	CO4	BL1
	h)	Name the stresses set up in a thin cylinder subjected to internal fluid pressure.	2M	CO4	BL1
	i)	State the principles involved in locating the shear centre	2M	CO5	BL1
	j)	State the two reasons for unsymmetrical bending.	2M	CO5	BL1

PART- B

(10*5 Marks = 50 Marks)

2	a)	Find the maximum torque that can be safely applied to a shaft of 80mm diameter. The permissible angle of twist is 1.5 degree in a length of 5m shear stress not to exceed 42MPa. Take G=84GPa	5M	CO1	BL3
	b)	A closely coiled helical spring is made up of 10mm diameter steel wire having 10 coils with 80mm mean diameter .If the spring is subjected to an axial twist of 10kN-mm, determine bending stress and increase in number of turns. Take E=200GPa	5M	CO1	BL3

OR

3		A solid shaft is subjected to a torque of 1.6kN-m. Find the necessary diameter of the shaft if the allowable shear stress is 60MPa. The allowable twist is 1^0 for every 20 diameters length of the shaft .Take G=80 GPa	10M	CO1	BL3

4	a)	Calculate shear force for laterally loaded strut subjected to concentric load	5M	CO2	BL3
	b)	A steel rod 5mm long and of 40mm diameter is used as a column with an end fixed and other free. Determine crippling load by Euler's formula. Take E as 200GPa	5M	CO2	BL3
		OR			
5		The line of thrust, in a compression testing specimen 15mm diameter is parallel to the axis of the specimen but is displaced from it. Calculate the distance of the line of than the mean stress on a normal.	10M	CO2	BL3
6	a)	A hollow circular column having external and internal diameters of 300mm and 250mm respectively carries a vertical load of 100kN at the outer edge of the column. Calculate maximum and minimum intensities of stress in the ection	5M	CO3	BL3
	b)	Determine the limit of eccentricity for hollow circular section	5M	CO3	BL3
		OR			
7		A rectangular hollow masonry pier of 1500 x 900mm with wall thickness of 150mm carries a vertical load of 500kN at an eccentricity of 100mm in the plane bisecting to 1500mm side. Calculate Maximum and minimum stress intensities in the section	10M	CO3	BL3
8	a)	A Cast iron pipe of 400mm internal diameter and 100mm external diameter carries water under a pressure of 8N/mm2. Determine the maximum and minimum intensity of hoop stress across the section	5M	CO4	BL3
	b)	A cylindrical vessel 2m long and 500mm in diameter with 10mm thick plates is subjected to an internal pressure of 3MPa, Calculate the change in volume of the vessel take E=210GPa and poisson ratio as 0.3	5M	CO4	BL3
		OR			
9		A pipe of 200mm internal diameter and 50mm thickness carries a fluid at a pressure of10 MPa. Calculate the maximum and minimum intensities of circumferential stress across the section. Also sketch the radial stress distribution and circumferential stress distribution across the section	10M	CO4	BL3
10	a)	Explain the stresses induced due to unsymmetrical bending.	5M	CO5	BL4
	b)	A beam of T-section (flange: 100 × 20 mm, web: 150 mm × 10 mm) in 3 m in length and simply supported at ends (Fig). It carries a load of 2.2 kN inclined 20° to the vertical and passing through the centroid of the section. Calculate the maximum tensile stress and maximum compressive stress. Also find the position of the neutral axis	5M	CO5	BL3
		OR			
11		Derive the equation of Shear centre for channel section.	10M	CO5	BL6

---oo0oo---