R20 Regulation *Subject code: 3P4AC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech IV Semester Supplementary Examinations, February 2024

Strength of Materials-II

(Civil Engineering)

Maximum Marks: 70 Date: 21.02.2024 Duration: 3 hours

	Part-A		
All the following questions carry equal marks (10x2M=20 Marks)		CO	Bloom Tx
1	What do you understand by torsional rigidity?	CO1	L1
2	The extension springs are in considerably less use than the compression springs. Why?	CO1	L1
3	Define 'slenderness ratio'.	CO2	L1
4	What is crippling load?	CO2	L1
5	Give the stability conditions for dams.	CO3	L2
6	What are bending stresses?	CO3	L1
7	A cylindrical pipe of diameter 1.2 m and thickness 1.2 cm is subjected to an internal fluid pressure of 1.1 N/mm^2. Determine the hoop stress.	CO4	L3
8	Write the expression for radial pressure and hoop stress at any radius 'x' for thick cylinder.	CO4	L1
9	What do you mean by unsymmetrical bending?	CO5	L1
10	Define shear centre of a beam.	CO5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)			
11	The internal diameter of a hollow shaft is (2/3)rd of its external diameter. Compare the strength and stiffness of the shaft with that of a solid shaft of the same material. [10]	CO1	L4
	OR		
12	Design a spring for a balance to measure 0 to 1000 N over a scale of length 80 mm. The spring is to be enclosed in a casing of 25 mm diameter. The approximate number of turns is 30. The modulus of rigidity is 85 kN/mm^2. Also calculate the maximum shear stress induced. [10]	CO1	L5
13	An I-section 400 mm × 200 mm × 10 mm and 6 m long is used as a strut with both ends fixed. Find Euler's crippling load. Take Young's modulus for the material as 2 x 10^5 N/mm^2. [10]	CO2	L3
	OR		

14	A 1 m long column has a circular cross-section of 4 cm diameter. One of the ends of the column is fixed in direction and position and the other end is hinged. Taking factor of safety as 3, Report the safe load using. [10] (i) Rankine's formula. Take yield stress σ_c = 550 N/mm^2 and α=1/1600 for pinned ends (ii)Euler's formula. Take E= 1.1 x10^{5}N/mm^2.	CO2	L3
15	A masonry dam (density = 17,000 N/m^3), 6 m high, 3 m wide at base and 1.2 m wide at the top has vertical water face. Find the maximum and minimum pressure intensities at the base, if the density of water is 10000 N/m^3. [10]	CO3	L3
	OR		
16	A square chimney 25m high, having an opening of 1 m x 1 m is subjected to a horizontal wind pressure of 1.5 KN/m^2. Find the necessary thickness of brick work at base, if the density of the masonry is 21 KN/m^3 and the max permissible stress on brick masonry is limited to 0.8 N/mm^2. [10]	CO3	L3
17	Find the thickness of metal necessary for a cylindrical shell of internal diameter 160 mm to withstand an internal pressure of 8 N/mm^2, if the maximum hoop stress is 35 N/mm^2. [10]	CO4	L3
	OR		
18	A spherical shell of internal diameter 0.9 m and of thickness 10 mm is subjected to an internal pressure of 1.4 N/mm^2. Determine the increase in diameter and increase in volume. [10] Take E = 2 x 10^5 N/mm^2 and μ = 1/3.	CO4	L4
19	A beam of rectangular section 30 mm x 60 mm has its centre line curved to a radius of 50 mm. the beam is subjected to a bending moment of 45 x 10^5 Nmm. Solve the intensity of maximum stresses in the beam. Also plot the bending stress across the section. [10]	CO5	L3
	OR		
20	Locate the shear center of an L-section of a beam with dimensions: 80 mm x 80 mm x 20 mm. [10]	CO5	L4