



R18 Regulation *Subject code:2P4AB*
TKR COLLEGE OF ENGINEERING AND TECHNOLOGY
 (Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech IV Semester Supplementary Examinations, July 2024

Strength of Materials - II
(CE)

Maximum Marks: 70

Date:20.07.2024 Duration: 3 hours

- Note: 1.This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20 Marks)		CO	Bloom Tx
1	What is a torsional equation?	1	L1
2	Why hollow circular shafts are preferred when compared to solid circular shafts?	1	L1
3	Define slenderness ratio.	2	L1
4	What is effective length?	2	L1
5	What is the shape of distribution of bending stress in a curved beam?	3	L1
6	Who postulated the theory of curved beam?	3	L1
7	Define longitudinal stress.	4	L1
8	Define hoop stress.	4	L1
9	What is the shear centre equation for unsymmetrical I section.	5	L1
10	Define shear centre.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)			
11	A laminated spring 1 m long is made up of plates each 5 cm wide and 1 cm thick . If the bending stress in the plate is limited to 100 N/mm ² , how many plates would be required to enable the spring to carry a central point load of 2 kN? if E = 2.1 * 10 ⁵ N/mm ² . What is the deflection under the load? [10M]	1	L2
OR			
12	A hollow circular shaft 20 mm thick transmits 300 kW power at 200 r.p.m. Determine the external diameter of the shaft if the shear strain due to torsion is not to exceed 0.00086. Take modulus of rigidity = 0.8 * 10 ⁵ N/mm ² . [10M]	1	L2
13	Using Euler's formula, Find the critical stresses for a series of struts having slenderness ratio of 40, 80, 120, 160 and 200 under both ends hinged condition. Take E = 2.05 * 10 ⁵ N/mm ² . [10M]	2	L2
OR			
14	Derive an expression for crippling load when one end of the column are fixed and other end is hinged. [10M]	2	L2

15	A closed ring of mean radius of curvature 90 mm is subjected to a pull of 3 kN. The line of action of the load passes through the centre of the ring. Determine the maximum tensile and compressive stresses in the material of the ring if the ring is circular in cross section with diameter equal to 15 mm. [10M]	3	L2
OR			
16	Explain the various condition for stability of Dams. [10M]	3	L2
17	A boiler shell is to made of 15 mm thick plate having a limiting tensile stress of 120 N/mm ² . If the efficiencies of the longitudinal and circumferential joints are 70% and 30% respectively. Determine the maximum permissible diameter of the shell for an internal pressure of 2 N/mm ² . [10M]	4	L2
OR			
18	Determine the change in diameter, change in length and change in volume of a thin cylindrical shell 100 cm diameter, 1 cm thick and 5 m long when subjected to internal pressure of 3 N/mm ² . Take the value of $E = 2 * 10^5$ N/mm ² and poisson's ratio $\mu = 0.3$. [10M]	4	L2
19	Determine the shear centre of a channel section. [10M]	5	L2
OR			
20	A simply supported beam of span 3 m carries a load of 500 N at its centre. The section of the beam is an equal angle of size 100 mm by 100 mm and 12.5 mm thick. The load line passes through centroid of the section. Determine the position of neutral axis. [10M]	5	L2