



R18 Regulation

Subject code: 2P4AB

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 (CE)

Maximum Marks: 70

Date: 19.02.2024 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.
 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 are the assumptions made in torsional equation?	CO1	L1
2	Define Torsion.	CO1	L1
3	What are the causes to fail the column?	CO2	L1
4	Define a column.	CO2	L1
5	What are the basic assumptions in the derivation of bending stress equation of Winkler-Bach formula?	CO3	L1
6	What do you mean by Curved beams?	CO3	L1
7	When will you call a cylinder as thin cylinder?	CO4	L1
8	In a thin cylinder will the radial stress vary over the thickness of wall?	CO4	L1
9	Define Shear Centre?	CO5	L1
10	Define unsymmetrical bending?	CO5	L1

Part-B

Answer All the following questions. (5X10M = 50 Marks)			
11	A closely coiled helical spring is to carry a load of 500 N. its mean coil diameter is to be 10 times that of the wire diameter. Estimate this diameter if the maximum shear stress in the material of the spring is to be 80 N/mm ² . [10M]	CO1	L5
OR			
12	A hollow shaft of external diameter 120 mm transmits 300 kW power at 200 r.p.m. Determine the maximum internal diameter if the maximum stress in the shaft is not to exceed 60N/mm ² . [10M]	CO1	L5
13	A hollow mild steel tube 6 m long 4 cm internal diameter and 5 mm thick is used as a strut with both ends hinged. Find the crippling load and safe load taking factor of safety as 3. Take $E = 2 \times 10^5 \text{ N/mm}^2$. [10M]	CO2	L4
OR			
14	Simplify an expression for crippling load when both ends of the column are hinged. [10M]	CO2	L4

15	Determine the location of neutral axis, maximum and minimum stress when a curved beam of rectangular cross section of width 20 mm and of depth 40 mm is subjected to pure bending of moment 600 Nm. The beam is curved in a plane parallel to depth. The mean radius of curvature is 50 mm. Also plot the variation of the stresses across the section. [10M]	CO3	L5
	OR		
16	A rectangular column of width 200 mm and of thickness 150 mm carries a point load of 240 kN at an eccentricity of 10 mm from the axis of the column. Determine the maximum and minimum stresses on the section. [10M]	CO3	L5
17	A water main 80 cm diameter contains water at a pressure head of 100 m. If the weight density of water is 9810 N/m^3 , find the thickness of the metal required for the water main. Given the permissible stress as 20 N/mm^2 . [10M]	CO4	L4
	OR		
18	A pipe of 200 mm internal diameter and 50 mm thickness carries a fluid at a pressure of 10 MN/m^2 . Determine the maximum and minimum intensities of circumferential stresses across the section. [10M]	CO4	L5
19	Determine the shear centre of a channel section. [10M]	CO5	L5
	OR		
20	A cantilever of length 1 m carries a point load of 2000 N at the free end. The cross section of the cantilever is an unequal angle of dimensions 100 mm by 60 mm and 10 mm thick. The small leg of the angle i.e (60 mm) is horizontal. The load passes through the centroid of the cross section. Determine the position of neutral axis. [10M]	CO5	L5