R22 Regulation *Subject code:4E4AB*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Regular Examinations, July 2024

STRENGTH OF MATERIALS – II
(CIVIL ENGINEERING)

Maximum Marks: 60 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 10 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	CO	Bloom Tx
All the following questions carry equal marks	(10x1M=10 Marks)		
a)	Write torsional equation and explain the terms.	1	II
b)	Define spring.	1	II
c)	Explain the limitations of Euler's formula	2	II
d)	Distinguish between short column & long column.	2	II
e)	Write a short note on eccentric loading?	3	II
f)	State the importance of middle third rule in gravity dams.	3	I
g)	Write the maximum valve of shear stress in thin cylinder?	4	II
h)	Define longitudinal stress.	4	II
i)	Define shear centre.	5	II
j)	Write a short note on unsymmetrical bending.	5	II
	Part-B		
Answer All the following questions.	(5X10M=50Marks)		
2	A. Explain the theory of pure torsion with assumptions. [5] B. Differentiate and explain types of springs. [5]	1 1	IV II
	OR		
3	A hollow shaft of diameter ratio D/d=3/5 is required to transmit 800kW at 110rpm. The maximum torque being 20% greater than the mean. The shear stress is not to exceed 63MPa and the twist in a length of 3m is not to exceed 1.4^0. Calculate the minimum external diameter satisfying these conditions. [10]	1	VI
4	Drive the Euler's crippling load for column fixed at both ends. [10]	2	IV
	OR		
5	A hollow circular steel strut with its ends position – fixed, has a length of 3m, external diameter of 0.4m and internal diameter 10cm. Before loading, the strut is bent with a maximum deviation of 0.4cm. Assuming the central line to be sinusoidal, determine (a) the maximum stress due to a central compressive end load of 8kN. (B) If the load has an eccentricity of 1.5cm, then find the maximum stress induced. Take E = 200GPa. [10]	2	IV

6	Derive the equation for maximum bending moment of a strut subjected to compressive axial load and a transverse point load at centre and whose both Ends are pinned. [10]	3	IV
	OR		
7	A trapezoidal masonry dam having 4m top width, 8m bottom width and 12m high, is retaining water up to a height of 10m. The density of masonry is 2000kg/ m^3. The coefficient of friction between dam and soil is 0.55. The allowable compressive stress is 343350N/m^2. Check the stability of dams. [10]	3	IV
8	A cylindrical steel vessel with hemispherical ends is 60cm long over all, the outside diameter is 10cm and the thickness 5mm throughout. Calculate the change in internal volume of the vessel when it is subjected to an internal pressure of 15MPa. E=200GPa and $\upsilon = 0.28$. [10]	4	IV
	OR		
9	Derive the stresses developed in thin cylindrical vessel subjected to internal Fluid pressure. [10]	4	IV
10	Calculate shear centre for symmetrical I-sections. [10]	5	IV
	OR		
11	A simply supported beam T-section, 2.5m long carries a central concentrated load inclined at 30° to the Y-axis. If the maximum compressive and tensile stresses are not to exceed 75MPa respectively find the maximum load the beam can carry. [10]	5	IV