Question Paper Code: R18A22CE01

R18

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech II Semester Supplementary Examinations, June/July-2024

STRENGTH OF MATERIALS II

(CIVIL ENGINEERING)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (25 Marks)

Answer All Questions

		Course Outcome	B.T Level	Marks
1.	State the assumptions made in the theory of pure tension.	CO1	L1	2M
2.	A solid shaft of 20cm diameter is used to transmit torque. Find the maximum torque transmitted by the shaft if the maximum shear stress induced in the shaft is 50 N/mm^2.	CO1	L2	3M
3.	Define the terms; (i) Column (ii) Strut	CO2	L1	2M
4.	Explain the assumption made in Euler's column theory.	CO2	L2	3M
5.	What do you mean by direct stress and bending stress?	CO3	L1	2M
6.	What is the difference between a dam and retaining wall?	CO3	L2	3M
7.	Define thin cylinder.	CO4	L1	2M
8.	Define Lame's equation?	CO4	L2	3M
9.	Define shear centre.	CO5	L1	2M
10.	How will you find the resultant stress in unsymmetrical bending?	CO5	L2	3M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	Determine the diameter of a solid shaft which transmit 300kW at 250 r.p.m. the maximum shear stress should not exceed 30N/mm^2 and twist should not be more than 1° in a shaft length of 2m. take modulus of rigidity = 1x 10^5 N/mm^2.	CO1	L3	10M
	OR			
B)	A closely coiled helical spring is to carry a load of 1kN. Its mean coil diameter is to be 10 times that of wire diameter. Calculate these diameters if the maximum shear stress in the material of the spring is to be 90 N/mm^2.	CO1	L3	10M
12. A)	Derive the expression for the Euler's crippling load for a long column with following end conditions. (i) Both ends are hinged (ii) Both ends are fixed	CO2	L3	10M
	OR			
B)	Determine the Euler's crippling load for an I section joist 400mmx200mmx10mm and 5m long which is used as strut with both ends fixed. Take young's modulus for the joist as 2.1x10^5 N/mm^2.	CO2	L3	10M
13. A)	A rectangular column of width 120mm and of thickness 100mm carries a point load of 120kN at an eccentricity of 10mm. Determine the maximum and minimum stresses at the base of the column.	CO3	L3	10M
	OR			
B)	A masonry trapezoidal dam 4m high, 1 m wide at its top and 3 m width at its bottom retains water on its vertical face. Determine the maximum and minimum stresses at the base (i) when the reservoir is empty. Take the weight density of masonry as 19.62 N/mm^3.	CO3	L3	10M

14. A)	Calculate: (i) the change in diameter, (ii) change in length and (iii) change in volume of a 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= $2x10^5$ N/mm^2 and Poisson's ratio = 0.3.	CO4	L3	10M
	OR			
B)	A steel cylinder of 300 mm external diameter is to be shrunk to another steel cylinder of 150 mm internal diameter. After shrinking, the diameter at the junction is 250 mm and radial pressure at the common junction is 28 N/mm^2. Find the original difference in radii at the junction. Take E= $2x10^5$ N/mm^2.	CO4	L3	10M
15. A)	Find the position of principal axes and the values of the principal moments of inertia for an unequal angle 75 mm by 45 mm by 75mm.	CO5	L3	10M
	OR			
B)	Determine the position of the shear centre for a channel section of 120 mm by 120 mm outside and 10 mm thick.	CO5	L3	10M