Q.P. Code: 19CE0103 **R19**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations December-2021

STRENGTH OF MATERIALS-II

(Civil Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	**a**	A cylindrical thin drum 80 cm in diameter and 3 m long has a shell thickness of 1 cm. If the drum is subjected to an internal pressure of 2.5 N/mm2, Take E= 2x 105 N/mm2 Poisson's ratio 0.25 Determine (i) change in diameter (ii) change in length and (iii) change in volume.	**L3**	**6M**
	b	A thin cylindrical shell is 3m long and 1m in internal diameter. It is subjected to internal pressure of 1.2 MPa. If the thickness of the sheet is 12mm, find the circumferential stress, longitudinal stress, changes in diameter, length and volume . Take E=200 GPa and μ= 0.3.	**L3**	**6M**

OR

2	**a**	Calculate 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 maximum hoop stress in the section is not exceed to 35N/mm^2 .	**L3**	**6M**
	b	A cylindrical shell has the following dimensions: Length = 3 m Inside diameter = 1 m Thickness of metal = 10 mm Internal pressure = 1.5 MPa Calculate the change in dimensions of the shell and the maximum intensity of shear stress induced. Take E = 200 GPa and Poisson's ratio = 0.3	**L3**	**6M**

UNIT-II

3	**a**	Derive kernel of section for (i) Rectangular section. (ii) Circular section	**L3**	**6M**
	b	A line of thrust, in a compression testing specimen 15 mm diameter, is parallel to the axis of the specimen but is displaced from it. Calculate the distance of the line of thrust from the axis when the maximum stress is 20 % greater than the mean stress on a normal section.	**L3**	**6M**

OR

4	**a**	Explain maximum shear stress theory.	**L2**	**6M**
	b	Explain maximum shear strain energy theory	**L2**	**6M**

UNIT-III

5	**a**	The ratio of inside to outside diameter of a hollow shaft is 0.6. If there is a solid shaft with same torsional strength, what is the ratio of the outside diameter of hollow shaft to the diameter of the equivalent solid shaft	**L3**	**6M**
	b	A solid shaft is to transmit 300 kW at 120 rpm. If the shear stress is not to exceed 100 MPa, Find the diameter of the shaft, What percent saving in weight would be obtained if this shaft were replaced by a hollow one whose internal diameter equals 0.6 of the external diameter, the length, material and maximum allowable shear stress being the same?	**L3**	**6M**

OR

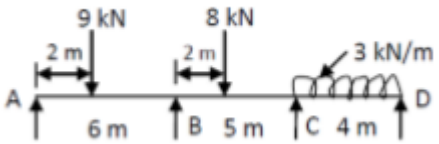
6	**a**	A hollow shaft, having an inside diameter 60% of its outer diameter, is to replace a solid shaft transmitting the same power at the same speed. Calculate the percentage saving in material, if the material to be used is also the same.	**L3**	**6M**
	b	A closely coiled helical spring made of 10 mm diameter steel wire has 15 coils of 100 mm mean diameter. The spring is subjected to an axial load of 100 N. Calculate : (i) The maximum shear stress induced, (ii) The deflection, and (iii) Stiffness of the spring. Take modulus of rigidity, C = 8.16 x 104 N/mm^2	**L3**	**6M**

UNIT-IV

7	**a**	Derive Clapeyron's Equation of three Moments.	**L3**	**6M**
	b	A continuous beam ABC of constant moment of Inertia carries a load of 10 kN in mid span AB and a central clockwise moment of 30 kN-min span BC. Span AB = 10 m and span BC = 15 m. Find the support moments and plot the shear froce and bending moment diagram.	**L3**	**6M**

OR

8	**a**	State advantages of fixed supports.	**L2**	**6M**
	b	Analyze the continuous beam ABCD shown in the figure below using theorem of three moments. Draw SFD and BMD.	**L3**	**6M**



UNIT-V

9	**a**	State the differences between straight beam and curved beam with examples.	**L2**	**6M**
	b	Explain the importance of curved beams in structures.	**L3**	**6M**

OR

10	**a**	Explain the importance of simply supported on three supports equally spaced	**L3**	**6M**
	b	Analyse the circular beam loaded uniformly and supported on symmetrically placed columns.	**L3**	**6M**

*** END ***