Code No: R1922011 **R19** SET - 1

II B. Tech II Semester Supplementary Examinations, February - 2022
STRENGTH OF MATERIALS - II
(Civil Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1	a)	Construct a Mohr's circle for unlike stresses and write the steps involved	[8M]
	b)	A rectangular block of material is subjected to a tensile stress of 50MN/m^2 on one plane and a compressive stress of 30MN/m^2 on a plane at right angles together with the shear stresses of 50MN/m^2 on the same planes. Find the magnitude of the principal stresses, the direction of the principal planes and the magnitude of the greater shear stress.	[7M]
		Or	
2	a)	At a point in a strained material the vertical shear stress is 15 MPa and the horizontal tensile stress is 25 MPa. Using Mohr's circle method, find the principal stresses and directions of principal planes.	[10M]
	b)	Discuss the Maximum shear stress theory?	[5M]
3	a)	A hollow shat of diameter ratio 3/5 is required to transmit 800 kw at 110 rpm. The maximum torque being 20% greater than the mean. The shear stress is not to exceed 63 MPa and twist in a length of 3m is not to exceed 1.4 degrees. Calculate the minimum external diameter satisfying these conditions.	[7M]
	b)	Explain the following terms of spring: (i) Free length (iii) Spring index (iii) stress factor (iv) Spring rate	[8M]
		Or	
4	a)	The internal diameter of a hollow shaft is two-third of its external diameter. Compare resistance to torsion with that of a solid of the same weight and material.	[8M]
	b)	Derive a relation for the shear stress develops in a shaft, when it is subjected torsion.	[7M]
5	a)	Derive Euler's equation when both ends of the columns are hinged.	[12M]
	b)	Differentiate between column and a strut.	[3M]
		Or	
6	a)	Derive Prof. Perry's formula.	[8M]
	b)	A steel tube is initially straight , has an external diameter of 50 mm and internal diameter of 25 mm, 3 m long and carries a compressive load of 25 kN acting parallel to the axis at an eccentricity of 0.3cm. Calculate the maximum stress in the tube.	[7M]
7	a)	Write about the stresses in the chimneys.	[10M]
	b)	What is the difference between symmetrical and unsymmetrical bending?	[5M]
		Or	
8		A masonary retaining wall is 20 m high and retains earth weighting 2000 kg/m^3 the top width of the retaining wall is 1m and bottom width 4m. The angle of repose is 30^o. Weight of masonary is 2500 kg/m^3. Determine the maximum and minimum stresses in the wall.	[15M]
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9 a) Find the shear centre for a equal I-section. [12M]

b) What is product of inertia? [3M]

Or

10 A 50 mm x 50 mm x 5 mm angle is used as a simply supported beam over a span of 3.2m. It carries a load of 300N along the vertical axis passing through the centroid of the section. Determine the resulting bending stresses on the outer corners of the section, along the middle section of the beam. [15M]