Code No: R1921012 **R19** SET - 1

II B. Tech I Semester Supplementary Examinations, September - 2021
STRENGTH OF MATERIALS - I
(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)	Distinguish between stress and strain, normal stress and shear stress, working stress and yield stress.	[7M]
	b)	A 10mm diameter rod was subjected to axial full of 10KN and the change in diameter was observed to be 0.003mm. Calculate poisson's ratio and modulus of elasticity. Find also bulk modulus. Assume rigidity modulus as $5 \times 104 N/mm^2$.	[8M]
		Or	
2	a)	Draw stress - strain diagram for mild steel. Indicate salient points and define them.	[7M]
	b)	Derive relation between three elastic moduli.	[8M]
3	a)	Draw the shear force and B.M diagram for a simply supported beam of length 8m and carrying a uniformly distributed load of 12KN/m for a distance of 4m from the left end. Also calculate the maximum B.M on the section.	[8M]
	b)	Draw the S.F and B.M diagrams for a cantilever with a point load at the free end and u.d.L through out.	[7M]
		Or	
4	a)	A cantilever of length 2 meter fails when a load of 2 KN is applied at the free end. If the section of the beam is 40 mm x 60 mm. find the stress at the failure	[8M]
	b)	Draw S.F and B.M diagrams for cantilever beam subjected o UDL	[7M]
5	a)	Prove that for a rectangular section the maximum shear stress is 1.5times the average stress. Sketch the variation of shear stress.	[7M]
	b)	A timber beam 120m wide and 185mm deep supports a u.d.l of intensity wKN/m length over a span of 2.7m. If the safe stresses are 29Mpa in bending and 3Mpa in shear, calculate the safe intensity of the load which can be supported by the beam.	[8M]
		Or	
6	a)	State the assumptions involved in the theory of simple bending.	[7M]
	b)	Derive the bending equation from the first principle.	[8M]
7	a)	Derive the differential equation for the elastic curve of a beam	[8M]
	b)	Explain about Mohr's theorems and how it differs with other methods	[7M]
		Or	
8	a)	Derive an expression for the deflection of a simply supported beam subjected to uniformly distributed load using integration	[7M]
	b)	A rectangular R.C simply supported beam of length 2m and cross section 100mmX200mm is carrying an uniformly distributed load of 10KN/m through its span. Find the maximum slope and deflection. Take $F = 2 \times 104 N/mm^2$.	[8M]
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9 a) Find the ratio of thickness to internal diameter of a tube subjected to internal pressure when the pressure is 3/8 of the max. Permissible hoop stress. [8M]

b) Find the increase in internal diameter of such a tube 100mm in internal diameter subjected to an internal pressure of 90N/mm^2 . Neglect longitudinal strain and take E = 200GN/m^2 and ym = 0.3 [7M]

Or

10 Derive the formula for the thickness of the thin cylindrical shell and solve the following problem. A thin cylindrical shell of 1 m diameter is subjected to an internal pressure of 1 N/mm^2 . Calculate the suitable thickness of the shell, if the tensile strength of the plate is 400 N/mm^2 and factor of safety is 4. [15M]