ACE
Engineering College
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An AUTONOMOUS Institution

Question Paper Code: ME302PC

ACE-R20

Semester Supplementary Examination
II B. Tech- I Semester- SEPTEMBER-2022
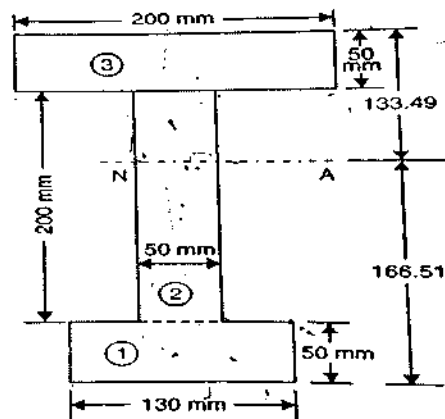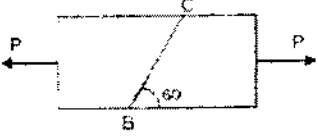## MECHANICS OF SOLIDS
(Mechanical Engineering)

Time: 3 Hours   **Max. Marks: 70**

H. T. No										

Answer any 5 Questions out of 8 Questions from the following

Q.No	Question	Marks
1. a)	Find the Young's Modulus of a brass rod of diameter 25 mm and of length 250 mm which is subjected to a tensile load of 50 kN when the extension of the rod is equal to 0.3 mm.	7
b)	Draw stress –strain diagram and explain salient points on it	7
2. a)	A solid copper rod 250 mm long and 40 mm diameter passes inside a steel tube of 50mm ID and 60 mm OD .The composite bar is tghtened by using washers of negligible thickness .when nut is tightened to a load of 110 kN in copper rod find stresses.	7
b)	Explain temperature stresses in structures	7
3.	A cantilever 2 m long loaded with an UDL of 1.5kN/m for one metre from fixed end and a point load of 3 kN at free end. Draw SFD and BMD.	14
4.	A simply supported beam of 5 m long 60 mm wide and 120 mm deep is carrying a point load of 10 kN at centre and an UDL of 2kN/m through out the span. Find the bending stress	14
5.	The shear force acting on a beam at an I Section with unequal flanges is 50kN.The section is shown in figure.The moment of inertia of the section about N.A is 2.849x10⁸mm⁴.Calculate shear stresses at salient points	14

6.	A rectangular bar of cross-sectional area of 11000 mm² is subjected to a tensile load P as shown in Fig. The permissible normal and shear stresses on the oblique plane BC are given as 7 N/mm² and 3.5 N/mm² respectively. Determine the safe value of P.	14
7. a)	Write about Mohr circle method of finding principal stresses	7
b)	Explain von-Mise theory of failure	7
8. a)	Find angle of twist per metre length of a circular shaft 120 mm OD and 100 mm ID ,if the shear stress is not to exceed 35 Mpa Take C=85 Gpa	7
b)	Calculate (i) change in diameter (ii) change in length and (iii) change in volume of a thin cylindrical shell 100cm diameter,1cm thick and 5cm long when subjected to an internal pressure of 3MPa.Take E=2x10⁵ N/mm² and poisson's ratio μ=0.3	7