Roll No. .....

24171

B. Tech. (ME) 4th Semester, (Re-appear) Examination – October, 2020

STRENGTH OF MATERIALS - I

Paper : ME-206-F

Time : 1.45 Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt any ***three*** questions. All questions carry equal marks.

1. Explain the following :

(a) Stress

(b) Strain

(c) Bending Moment

(d) Torsion

(e) Deflection

(f) Hook's Law

(g) Shear Force

(h) Mohr's circle

(i) Moment Area Method

(j) Poisson's ratio

2. Explain Stress strain diagram for ductile and brittle materials.

3. Draw and describe Mohr's circle :-

If at a point in a material. the minimum and maximum principal stresses are $30N/mm^2$ and $90N/mm^2$, both tensile, find the shear stresses and normal stresses on a plane through this point making an angle of $\tan^{-1} 0.25$ with the plane on which maximum principal stress acts.

4. Derive the relationship between intensity of loading,. shear force and bending moment.

5. Derive the torsion formula for shafts of circular cross section.

6. A timber beam is freely supported on supports 6m apart. It carries a uniformly distributed load of 12KN/m run and a point load of 9KN at 3.5m from

the right support. Design a suitable section of the beam making depth twice the width,. if the stress in timber is not to exceed $8N/mm^2$.

7. Determine the crippling load for a T-section of dimensions 12 cm × 12 cm × 2 cm and of length 6 cm when it is used as a strut with both of its ends hinged. Take $E = 2 \times 10^5 N/mm^2$.

8. A simply supported beam has a span of 15m and carries to point loads of 4KN and 6KN at 6m and 10m respectively from one end. Find the deflection under each load and the maximum deflection. Take E = 200 GPa and $I = 400 \times 10^{-6}$ mm^{-4}.

9. A beam AB of 6m span is fixed at both ends and carries a point load of 30 KN at C, 2m from A. For portion AC, I = 1200 cm^4 and for portion BC, I = 2400 cm^4 . Find the fixed and moments and central deflection. Take E = 210 GPa.