Roll No. | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(AE) (2018 Batch) (Sem.–3)

STRENGTH OF MATERIALS

Subject Code : BTAE301-18

M.Code : 76399

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

a. Define the term stress.

b. What do you mean by dilatation?

c. "*Brittle materials have zero strain*". Explain the statement.

d. Explain toughness and plot it on stress-strain diagram.

e. What is the use of Mohr circle?

f. Define the term Resilience.

g. What do you mean by plane and oblique?

h. What is moment of resistance?

i. Write the differential equation for the deflected shape of beam.

j. What do you mean by equivalent length of column?

SECTION-B

2. A steel wire of 6 mm diameter is used for lifting a load of 1.5 kN at its lowest end. The length of the wire hanging vertically being 160m. Taking the unit weight of steel = 78 kN/m^3 and E = 2×10^5 N/mm^2.

3. Draw the Mohr stress circle for direct stresses of 60 N/mm^2 (tensile) and 40 N/mm^2 (compressive) and estimate the magnitude and direction of the resultant stresses on planes making angles of 25° and 70° with the first principal stress. Find also normal and tangential stresses on these planes.

4. Draw shear force and bending moment diagram of the cantilever beam of length 10 m carrying udl of 5 kN/m over whole length of beam.

5. A floor has to carry a load of 8 kN per sq. meter and is supported by joists 10 cm wide and 30 cm over a span of 5 meters. Calculate the spacing centre to centre of the joists if the maximum permissible bending stress is 9.5 N/mm^2.

6. A beam of square cross section is used as beam with one diagonal horizontal. Find the magnitude and location of maximum shear tress in the beam. Sketch the shear tress distribution across the section.

SECTION-C

7. Derive the bending moment equation stating all the assumptions and using simple theory of bending.

8. A copper tube of outside diameter 38 mm and inside diameter 35.5 mm, is closely wound with steel wire 0.75 mm diameter. Estimate the tension at which the wire must have been wound if an internal gauge pressure of 20 kg/cm^2 produce a tensile circumferential stress of 70 kg/cm^2 in the copper tube. E for steel = 1.6 E for copper.

9. Stating all the assumptions, derive the torsion equation of the shaft.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.