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

Total No. of Questions : 18

B.Tech. (ME) (2012 Onwards)/ B.Tech. (Marine Engg.) (2013 Onwards)
(Sem.–3)

STRENGTH OF MATERIALS – I

Subject Code : BTME-301
M.Code : 59111

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

Answer briefly :

1. What do you understand by engineering stress-strain curve?
2. Differentiate between column and beam.
3. What is relationship between modulus of elasticity, modulus of rigidity and bulk modulus?
4. What do you mean by principal planes and principal stresses?
5. What is a flitched beam?
6. What is the difference between UDL and point load?
7. What is do you mean by pure bending?
8. What is section modulus?
9. The maximum deflection in a cantilever beam is y. If the beam depth is doubled, what will be the corresponding deflection?
10. What will be the torque transmitted by solid circular shaft?

SECTION-B

11. A steel rod of 20 mm diameter passes centrally through a copper tube of 50 mm external diameter and 40 mm internal diameter. The tube is closed at each end rigid plates of negligible thickness. The nuts are tightened lightly home on the projecting parts of the rod. If the temperature of the assembly is raised by 50 °C, calculate the stresses devolved in copper and steel. Take E for steel and copper as 200GN/m ^{2} and 100GN/m^2 and ✔ for steel copper as 12×10^{-6} per °C and 18×10^{-6} per °C.

12. Define a composite bar. How will you find the stresses and load carried each member of a composite bar?

13. A hollow shaft of external diameter 120 mm transmits 300 kW power at 200 rpm. Determine the maximum internal diameter if maximum stress in the shaft is not to exceed 60 N/mm^2.

14. Derive an expression for the Euler's crippling load for a long column v both ends are fixed.

15. A simply supported beam of length 10 m carries point load of 5 kN each a distance of 3 m & 7 m from left support and also a UDL of 1 kN between the point loads. Draw S.F & B.M diagrams for the beam.

SECTION-C

16. Find an expression for deflection at any section of a simply supported beam with eccentric point load using Macaulay's method.

17. What is Mohr's circle? Explain the detailed procedure of drawing this circle in case of a general biaxial stress system. Discuss also in detail how point on the circumference of this circle gives the state on a plane represented by the point.

18. Write short note on :

    a. Failure of columns

    b. Thermal stress

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.