3503

C09-M–403

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BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2021

DME - FOURTH SEMESTER EXAMINATION

STRENGTH OF MATERIALS

Time : 3 hours] [*Total Marks* : 80

PART—A

4×5=20

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **four** marks.

(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define the term strain with units.

2. List three types of elastic constants.

3. Define the term resilience.

4. What is meant by shear force diagram?

5. What is meant by bending moment diagram?

6. Write the bending equation with notations.

7. Define the term point of contra-flexure.

8. State the function of a shaft.

9. Write the formulae for deflection of laminated spring.

10. What the are stresses developed in a thin cylinder subjected to internal pressure?

PART—B

15×4=60

Instructions : (1) Answer *any* **four** questions.

(2) Each question carries **fifteen** marks.

(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

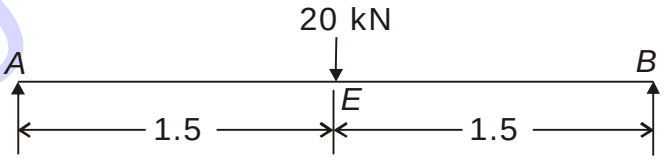
11. Draw stress-strain curve for a mild steel specimen subjected to tensile stress and indicate salient points on it.

12. A mild steel bar has a diameter of 20 mm and is 300 mm long. A tensile load of 64 kN is applied longitudinally. Calculate the elongation of the bar, change in diameter and change in volume. Take $E = 2 \times 10^5$ N/mm^2 and Poisson's ratio as 0·25.

13. A mild steel bar of length 3 m having a diameter of 50 mm, hangs vertically. A load of 25 kN falls from a distance of 25 mm on a collar attached to the lower end. Find the maximum stress and elongation. Take $E = 2 \times 10^5$ N/mm^2.

14. With usual notations and sign convention, draw the shear force and bending moment diagrams of a cantilever beam subjected to UDL over its entire span.

15. Draw shear force diagram for a simply supported beam as shown in the following figure :



16. List the assumptions made in the theory of simple bending.

17. Find the torque transmitted by a circular shaft of 50 mm diameter at 250 r.p.m. The maximum shear stress in the shaft is not to exceed 55 N/mm^2.

18. *(a)* Write torsion equation and specify the terms in it with units.

(b) Derive an expression for hoop stress developed inside a thin cylindrical shell subjected to internal pressure.