

NEB-GRADE XII
2080 (2023)
Mechanics of Structure
 (New Course)

(For technical stream's regular student whose two digits of registration number start from 79)

Candidates are required to give their answers in their own words as far as practicable. The figures in the margin indicate full marks.

Time: 2 hrs.

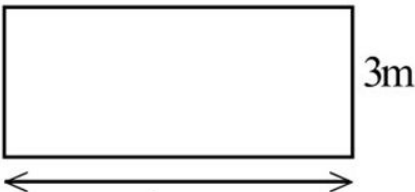
Full Marks: 50

Attempt **all** the questions.

Group 'A'

9×1=9

Rewrite the correct options of each questions in your answer sheet.

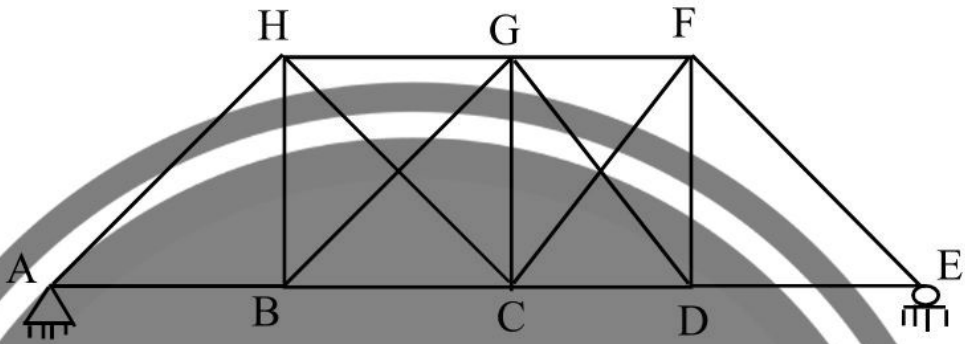
1. Live load in building is usually taken as..
 (A) 1.5 KN/m² (B) 2.0 KN/m² (C) 2.5 KN/m² (D) 0 KN/m²
 2. A material's resistance to elastic deflection is known as...
 (A) stiffness (B) toughness (C) hardness (D) elasticity
 3. Free body diagram is an :
 (A) Isolated joint with only body force acting on it
 (B) Isolated joint with internal forces acting on it
 (C) Isolated joint with all the forces, internal as well as external, acting on it.
 (D) None of the above
 4. Bending moment at the ends of a simply supported beam is :
 (A) maximum (B) minimum (C) uniform (D) zero
 5. The moment of inertia of a rectangular section about its neutral axis is given by...
 (A) $\frac{1}{3}bh^2$ (B) $\frac{1}{12}bh^3$ (C) $\frac{1}{12}bh^2$ (D) $\frac{1}{36}bh^3$
 6. Calculate the centre of gravity of the following section and write in terms of coordinates.
 (A) (6, 3) (B) (3, 15)
 (C) (6, 15) (D) (6, 2)
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7. A truss structure consist only... force members.
 (A) only one (B) two (C) three D) poly
 8. Poisson's ratio of steel is..
 (A) 0.20 (B) 0.30 (C) 0.40 (D) 0.50

9. For a rectangular beam, maximum shear stress is ... times the average shear stress.
 (A) 2.5 (B) 3 (C) 1.2 (D) 1.5

Group 'B'

5x5=25

10. Check the determinacy of the truss given below.



11. Derive relationship between Young's modulus, Bulk modulus and modulus of rigidity?
 12. Derive flexural formula.
 13. Define elastic curve and state the differential equation of elastic curve. What is beam deflection? Why are hollow shaft stronger than solid shafts?
<https://dhanrajgurung.com/>
 14. Define slenderness ratio. Write assumptions for Euler's column equations? 1+4

Group 'C'

2x8=16

15. Draw AF, SF and BM diagram for the beam loaded as shown in fig.1.

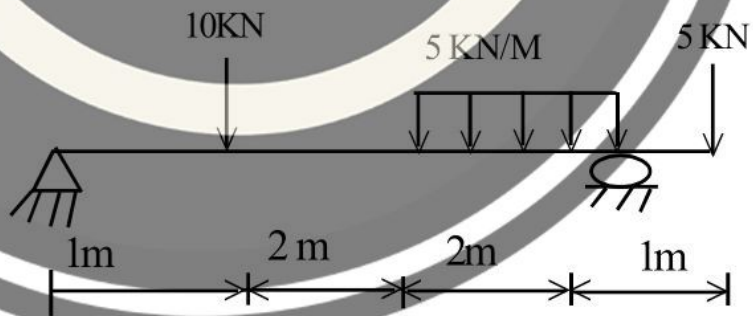


Fig. 1

16. The cross-section of a machine part is as shown in figure below. Determine its moment of inertia and radius of gyration about the horizontal centroidal axis.

