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C09-C–106

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BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2021

DCE - FIRST YEAR EXAMINATION

ENGINEERING MECHANICS

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 scalars and vectors.

2. Distinguish between like and unlike parallel forces.

3. Define radius of gyration.

4. Sketch a square, rectangle, circle, right-angle triangle and locate their centroid.

5. Define Poisson's ratio.

6. State Hooke's law.

7. Write the equation for stress due to temperature.

8. Draw bending moment diagram for a simply supported beam of span 'L' with a point load of 'W' at the middle of the span.

9. Draw a fixed support and a hinged support.

10. What is an overhanging beam, explain briefly?

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. State various structural elements that are generally seen in a building.

12. Calculate the resultant of two forces 60 kN and 40 kN acting at an angle of 60° with each other through a point using parallelogram law of forces.

13. Calculate the centroid of a 'T' section of flange 150 mm×10 mm and web 200 mm×15 mm from the base of the section.

14. Calculate the radius of gyration of (a) circular section of 100 mm diameter and (b) square of 150 mm side.

15. Define the following terms :

(a) modulus of rigidity

(b) bulk modulus

(c) factor of safety

16. A bar of cross-sectional area 200 mm is subjected to a tensile force of 50 kN. Calculate the tensile stress induced in the bar.

17. A simply supported beam of span 5 m is subjected to a point load of 30 kN acting at the middle of span. Draw S.F.D. and B.M.D. and indicate the maximum values of shear force and bending moment.

18. Define point of contraflexure and explain briefly.

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