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C14-EE-306

4248

BOARD DIPLOMA EXAMINATION, (C-14)

JUNE—2019

DEEE—THIRD SEMESTER EXAMINATION

GENERAL MECHANICAL ENGINEERING

Time : 3 hours ]

[ Total Marks : 80

PART—A

3×10 =30

**Instructions :** (1) Answer **all** questions.

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

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

1. Define (a) Hooke's law and (b) factor of safety.
2. For a mild steel bar the values of Young's modulus and rigidity modulus are 200 GPa and 80 GPa respectively. Find the value of Poisson's ratio and bulk modulus of elasticity.
3. A solid shaft transmits 50 kW power at 8 RPS. The allowable shear stress of the shaft material is 40 MPa. Calculate the diameter of the shaft.
4. Define torsion and write the torsion equation for shafts.
5. Define (a) BDC, (b) TDC and (c) stroke length.
6. What is carburetion and write any two functions of carburettor?
7. Write about the following with two examples for each :
  - (a) Boiler mountings
  - (b) Boiler accessories

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8. What is natural circulation and forced circulation in relation with boilers?
9. What is priming in the centrifugal pump?
10. What are the desired properties of lubricants?

**PART—B**

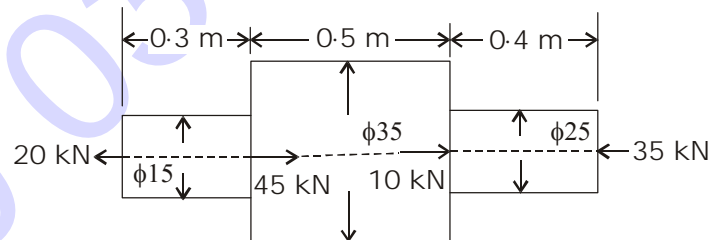
10×5=50

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

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

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

11. A mild steel bar has a diameter of 25 mm and is 350 mm long. A tensile load of 75 kN is applied longitudinally. Calculate the elongation of the bar, the change in diameter and the change in volume. Take  $E = 210$  GPa and Poisson's ratio is 0.3.
12. A bar of varying cross-section is subjected to axial load as shown in figure. Find the stress in each section.



13. Select a suitable diameter of solid shaft to transmit 110 kW of power at 240 r.p.m. If the allowable shear stress is not to exceed  $75 \text{ N/mm}^2$  and twist is not to exceed  $1^\circ$  in a length of 3 m. Take  $G = 0.8 \times 10^5 \text{ N/mm}^2$ .

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14. Compare 2-stroke engines with 4-stroke engines.
15. Describe the working principle of 4-stroke petrol (SI) engine with a neat sketch.

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16. Describe the working of any fire tube boiler with neat sketch.
17. With a neat sketch describe the working of—
  - (a) water level indicator;
  - (b) pressure gauge.
18. Explain the working of a jet pump with a neat sketch.

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