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C14–EE–306

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BOARD DIPLOMA EXAMINATION, (C–14)

OCT/NOV—2015

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 the terms linear strain and lateral strain.

2. A steel rod of 20 mm diameter and 600 mm long is subjected to an axial pull of 40 kN. Determine the elongation of the rod if $E \quad 2 \quad 10^5 \text{ N} / \text{mm}^2$.

3. Write the formula for polar moment of inertia for solid shaft and hollow shaft.

4. *(a)* Define torsion.

(b) Which stress is induced in shaft, when it is subjected to the twisting moment?

5. Define the terms clearance volume and swept volume.

6. List out any six major components of IC engine.

7. Write the classification of boilers.

8. State the need of *(a)* pressure gauge and *(b)* stop value.

9. How are the impellers arranged to produce high head and to deliver high discharge in centrifugal pump?

10. Write the advantages and disadvantages of anti-friction bearings.

PART—B 10×5=50

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

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

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

11. A steel bar 350 mm long is 20 mm in diameter for 200 mm of length and 15 mm diameter for the remainder. If a tensile load of 20 kN is applied on the bar, calculate the stresses in each section and the total elongation of the bar.

12. For a given material, Young's modulus *(E)* and rigidity modulus *(G)* are 120 10^9 N / m^2 and 50 10^9 N / m^2 respectively. Find the bulk modulus and lateral contraction of a round bar of 36 mm diameter and 2·5 m long, when it is stretched by 2·5 mm.

13. Select a suitable diameter of a solid shaft to transmit 110 kW power at 240 r.p.m., if the allowable stress is not to exceed 70 N / mm^2 and twist not to exceed 1° in a length of 3 m.

14. Explain with the help of line sketches the working principle of 4-stroke petrol engine.

15. Distinguish between diesel engine and petrol engine.

16. Describe the working of a La Mont boiler with a neat sketch.

17. Distinguish between impulse and reaction turbines.

18. *(a)* Write the any five applications of lubricants.

(b) Explain about collar bearing with a neat sketch.

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