



C09-EE/CHST-406

3478

**BOARD DIPLOMA EXAMINATION, (C-09)
OCT/NOV—2017
DEEE—FOURTH 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. For a given material, Young's modulus is $0.9 \times 10^5 \text{ N/mm}^2$ and the modulus of rigidity is $0.35 \times 10^5 \text{ N/mm}^2$. Find the Poisson's ratio. 3
2. Define (a) yield stress and (b) ultimate stress. 1½+1½
3. A solid shaft transmits 560 kW power at 300 r.p.m. The maximum shear stress of the material is 60 N/mm^2 . Find the suitable diameter of a shaft. 3
4. A hollow shaft as 300 mm external diameter and 250 mm internal diameter. Find the polar moment of inertia. 3
5. State the functions of (a) crank shaft and (b) flywheel. 1½+1½

- * 6. Distinguish between the impulse turbines and reaction turbines. 3
7. Write any three advantages of 2-stroke engine over 4-stroke engine. 3
8. What is the function of governor? 3
9. What are the functions of lubricant? 3
10. Write the classification of multistage centrifugal pump. 3

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 bar of 16 mm diameter is subjected to a pull of 27 kN. The measured extension over a gauge length of 80 mm is 0.12 mm and change in diameter is 0.007 mm. Find the Poisson's ratio and elastic modulus. 5+5
12. A copper bar 250 mm long is 30 mm in diameter for 150 mm of its length and 20 mm in diameter for the remaining length. A tensile load is applied to the bar so that the maximum stress induced in the material is 50 N/mm^2 . Determine the magnitude of the load, and calculate the total extension of the rod. For copper, $E = 1.03 \times 10^5 \text{ N/mm}^2$. 3+7
- * 13. A hollow shaft of 120 mm outside diameter and 90 mm inside diameter. The allowable shear stress is 60 N/mm^2 . What torque can it transmit? What is the stress at inner surface of the shaft when the allowable torque is applied? 5+5
14. Explain the working of De-laval steam turbine with a neat sketch. 10

- * **15.** Describe the working principle of superheater with a neat sketch. 10
- 16.** Distinguish between four-stroke engine and two-stroke engine. 10
- 17.** Describe the working of any one type modern high pressure boiler. 10
- 18.** Draw a neat sketch of a centrifugal pump and name the parts. Explain the function of casing in the centrifugal pump. 7+3=10
