



C09-EE-406

3478

BOARD DIPLOMA EXAMINATION, (C-09)
APRIL/MAY—2015
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. Define (a) lateral strain and (b) linear strain.
2. Define (a) ultimate stress and (b) factor of safety.
3. (a) Define 'torsion'.
(b) Which stress is induced in shaft, when it is subjected to the twisting moment?
4. Define polar moment of inertia. Find the polar moment of inertia of a circle of radius 250 mm.
5. State the functions of inlet valve and exhaust valve.
6. State the functions of (a) carburetor and (b) governor.
7. List out any six parts of petrol engine.
8. State the working principle of hydraulic turbine.

- * 9. State the properties of a lubricant.
10. How are impellers arranged to produce high head and to deliver high discharge in centrifugal pump?

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 25 mm diameter is subjected to a pull of 50 kN. The measured extension over a gauge length of 200 mm is 0.1 mm and the change in diameter is 0.0035 mm. Find the values of three elastic moduli.
12. A copper bar of 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, $E = 1.03 \times 10^5 \text{ N/mm}^2$.]
13. Determine the diameter of solid shaft to transmit 450 kW of power at 100 r.p.m. The maximum torque is 15% greater than the mean torque. The allowable shear stress should not exceed 65 N/mm^2 and angle of twist in 3 m should not exceed 1° .
[Take, $G = 0.82 \times 10^5 \text{ N/mm}^2$.]
14. (a) Differentiate between fire-tube boiler and water-tube boiler.
(b) List the various mountings used in boiler.
15. Describe the working of air preheater with a neat sketch.
16. Explain with the help of line sketch the working principle of four-stroke diesel engine.
- * 17. Explain the working of jet condenser and surface condenser with a neat sketch.
18. What is meant by priming in a centrifugal pump? State the purpose of priming.
