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C09–EE–406/C09–CHST–406

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BOARD DIPLOMA EXAMINATION, (C–09)

MARCH/APRIL—2016

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)* ultimate strength and *(b)* factor of safety.

2. An aluminum specimen has a modulus of elasticity of $0\ 7\ \ 10^5$ N / mm^2 and a modulus of rigidity of $0\ 25\ \ 10^5$ N / mm^2. Determine the Poisson's ratio of the material.

3. List the standard sizes of the shaft.

4. Write the formulae for polar moment of inertia for solid shaft and hollow shaft.

5. How do you classify IC engines?

6. What is a steam condenser?

7. State any three advantages and three disadvantages of water tube boiler.

8. State the function of *(a)* cylinder and *(b)* piston.

9. What are semisolid lubricants? Give examples.

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 30 mm diameter is subjected to a pull of 60 kN. The measured extension over a gauge length of 200 mm is 0·09 mm and the change in diameter is 0·0039 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 10^5 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 10^5 N/mm^2]

14. Explain the working of fuel injection pump with a neat sketch.

15. Explain, with the help of line sketch, the working principle of a four-stroke diesel engine.

16. State the functions of the following boiler mountings :

(a) Water level indicator

(b) Pressure gauge

(c) Stop valve

(d) Feed check valve

(e) Safety valve

17. Explain the working of Kaplan turbine with a neat sketch.

18. Name the parts of a centrifugal pump with a neat sketch and mention their functions.

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