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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 10^5 N/mm^2 and the modulus of rigidity is 0 35 10^5 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 10^5 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

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