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C09–EE–406/C09–CHST–406

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BOARD DIPLOMA EXAMINATION, (C–09)

MARCH/APRIL—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. Draw stress-strain diagram for mild steel and show the salient points on it. 3

2. Define *(a)* modulus of elasticity and *(b)* bulk modulus. 1½+1½=3

3. Write down simple torsion equation and name its terms. 3

4. A solid circular shaft of diameter 32 mm transmits 92 kW at 525 r.p.m. Find the shear stress developed in the shaft material. 3

5. State the functions of *(a)* piston rings and *(b)* connecting rod. 1½+1½=3

6. What is the function of a governing of IC engine? 3

7. Differentiate between fire-tube boiler and water-tube boiler. 3

8. State the differences between surface condenser and jet condenser. 3

9. State any three advantages of centrifugal pump. 3

10. Why is lubricant necessary? 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 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 change in diameter is 0·0035 mm. Find Poisson's ratio and moduli of elasticity. 10

12. The following results are obtained from a tensile test on an m.s. specimen :

Diameter of specimen	20 mm
Gauge length	100 mm
Extension at a load of 80 kN	0 125 mm
Load at yield point	110 kN
Maximum load	185 kN
Final elongation	30 mm
Diameter of neck	12 6 mm

Calculate—

(a) Young's modulus;

(b) stress at yield point;

(c) ultimate tensile stress;

(d) percentage elongation;

(e) percentage reduction in area. 10

13. A solid steel shaft of 150 mm diameter transmits 100 kW power at 250 r.p.m. Taking modulus of rigidity of 0 85 10^5 N/mm^2, determine *(a)* angle of twist in a length of 600 mm and *(b)* shear stress at a radius of 45 mm. 10

14. Explain the working principle of 4-stroke petrol engine with a neat sketch. 10

15. Explain the working of Babcock and Wilcox boiler with a neat sketch. 10

16. Explain the working principle of open-cycle gas turbine. 10

17. Describe the working principle of Francis turbine. 10

18. Draw a simple sketch showing the installation of a centrifugal pump indicating various components and hydraulic heads. 10

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