C09–EE–406

# 3478

## BOARD DIPLOMA EXAMINATION, (C–09)
## OCT/NOV—2013
## DEEE—FOURTH SEMESTER EXAMINATION

GENERAL MECHANICAL ENGINEERING

*Time* : 3 hours ]　　　　　　　　　　　　[ *Total Marks* : 80

### PART—A

***Instructions*** :　(1)　Answer **all** questions.

(2)　Each question carries **three** marks.

(3)　Answer should be brief and straight to the point and shall not exceed *five* simple sentences.

**1.**　Define 'linear strain'.

**2.**　Define 'shear modulus' and state its units.

**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 the shaft.

**4.**　A hollow shaft transmits a torque of 1·76 kN-m. The external diameter of the shaft is 60 mm and inside diameter of the shaft is 40 mm. Determine the shear stress at the outer and inner surfaces.

**5.**　Classify steam turbine based on action of steam.

**6.**　State the function of *(a)* crankshaft and *(b)* flywheel.

**7.**　What do you understand by a hydraulic reaction turbine? Give examples of such turbine.

**8.** State the functions of *(a)* carburetor and *(b)* governor.

**9.** What is pump?

**10.** List out the types of lubricant with examples.

### PART—B

***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 length 3 meter has a diameter of 50 mm over half its length and a diameter of 25 mm over other half. If $E = 2 \cdot 06 \times 10^5$ N/mm$^2$ and the bar is subjected to a pull of 50 kN, find the stress in each section and total extension of the bar.

**12.** The following results are obtained from a tensile test on an MS specimen :

*(i)* Diameter of the specimen = 20 mm

*(ii)* Gauge length = 100 mm

*(iii)* Extension at a load of 80 kN = 0·125 mm

*(iv)* Load at yield point = 110 kN

*(v)* Maximum load = 185 kN

*(vi)* Final elongation = 30 mm

*(vii)* Diameter of neck = 12·6 mm

Calculate—
   *(a)* young's modulus;
   *(b)* stress at yield point;
   *(c)* the ultimate tensile stress;
   *(d)* the percentage elongation;
   *(e)* the percentage reduction in area.

**13.** A solid steel shaft, 50 mm diameter, transmits power at 75 r.p.m. If the maximum shear stress induced in it is 12 N/mm$^2$, calculate—

(a) the angle of twist per meter length of shaft when $G$ 80 kN/mm$^2$;

(b) the value of shear stress at a radial distance of 10 mm from the centre.

**14.** State the functions of the following :

(a) Water level indicator

(b) Pressure gauge

(c) Stop valve

(d) Feed check valve

(e) Safety valve

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

**16.** Describe the working of any one type water tube boiler with a neat sketch.

**17.** (a) Differentiate between gas turbine and IC engine.

(b) What are the applications of gas turbine?

**18.** Explain with a neat sketch, the working of a multistage centrifugal pump for high heads.

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