



C09-EE-406

3478

**BOARD DIPLOMA EXAMINATION, (C-09)
OCT/NOV—2014
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 the stress-strain diagram for mild steel and locate the salient points on it.
 2. A hole of 20 mm diameter is to be pierced in a steel plate. If the ultimate shear stress of the plate is 400 N/mm^2 and the force exerted by the punch is 251 kN. Find the thickness of the plate.
 3. Define torsion and write the torsion equation.
 4. A solid circular shaft running at 500 r.p.m. transmits 400 kW. Corresponding shear stress produced is 150 N/mm^2 . Calculate the suitable diameter of the shaft.
 5. Compare SI and CI engines.
 6. What is the function of a boiler?
 7. What is steam turbine? How is it classified?

8. * What is draft tube? State its functions.
9. What are the difference between single-stage and multistage centrifugal pumps?
10. Name the different types of lubricant.

PART—B

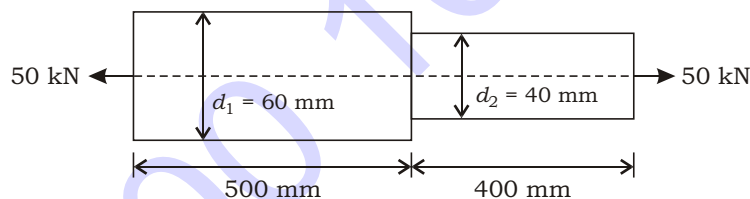
10×5=50

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. An axial load of 50 kN is acting on a bar consisting of two lengths as shown in the figure below. If $E = 2 \times 10^5 \text{ N/mm}^2$, determine (a) stress in each section and (b) total elongation of the bar.



12. (a) Define the term 'Poisson's ratio'.
- (b) The allowable stress for a hollow steel column which carries an axial load of 2000 kN is 125 N/mm^2 . If the external diameter of the column is 300 mm, determine the internal diameter.
13. A solid steel shaft 200 mm diameter transmits power at 250 r.p.m. If the maximum shear stress induced in it is 35 N/mm^2 , calculate—
- (a) the power transmitted in kW;
- (b) the angle of twist per metre length of shaft,
when $G = 80 \text{ kN/mm}^2$;
- (c) the value of shear stress at a radial distance of 30 mm from the centre.

- 14.** ^{*} Describe the working principle of 4-stroke diesel engine with a neat sketch.
- 15.** Draw a neat sketch of fire tube boiler and describe its working.
- 16.** Draw a neat sketch of open-cycle gas turbine and explain its working principles.
- 17.** Explain the working of Kaplan turbine with a neat sketch.
- 18.** (a) Write a short note on the thrust bearing.
(b) What are the advantages of centrifugal pump?
