



C14-EE-306

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BOARD DIPLOMA EXAMINATION, (C-14)  
MARCH/APRIL—2018  
DEE—THIRD 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 Poisson's ratio and state its units.
2. Draw the stress-strain diagram for mild steel and locate the salient points on it.
3. Find the power transmitted by a 75 mm diameter shaft at 140 r.p.m. at a maximum shear stress of  $60 \text{ N/mm}^2$ .
4. Write the formula for polar moment of inertia for solid shaft and hallow shaft.
5. Classify IC engines based on fuel used and method of cooling.  
 $1\frac{1}{2}+1\frac{1}{2}=3$
6. Define (a) TDC, (b) BDC and (c) stroke length.
7. List out any six boiler mountings.

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8. State the function of steam turbine. How they are classified?
9. State the process of arrangement of impellers to produce high head and to deliver high discharge in centrifugal pump.
10. Define the term 'priming'.

**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. The following data refer to a mild steel specimen tested in a laboratory :

- (i) Diameter of the specimen = 25 mm
- (ii) Length of the specimen = 300 mm
- (iii) Extension under a load of 15 kN = 0.045 mm
- (iv) Load at yield point = 127.65 kN
- (v) Maximum load = 208.60 kN
- (vi) Length of the specimen after failure = 375 mm
- (viii) Neck diameter = 17.75 mm

Determine, (a) Young's modulus, (b) yield stress, (c) ultimate stress, (d) percentage of elongation, (e) percentage reduction in area and (f) working stress adopting a factor of safety of 2.

12. A bar of 30 mm diameter is subjected to a pull of 60 kN. The measured extension on gauge length of 200 mm is 0.09 mm and the change in diameter is 0.0039 mm. Calculate the Poisson's ratio and the values of the three moduli.

13. A solid shaft of 100 mm diameter transmits 75 kW power at 150 r.p.m. Calculate (a) torque on the shaft, (b) the maximum shear stress induced, (c) the angle to twist in the length of 600 mm and (d) the shear stress at a radius of 30 mm. Take  $G = 0.8 \times 10^5 \text{ N/mm}^2$ .

- 14.** With a legible sketch, explain the working principle of 4-stroke petrol engine.
- 15.** (a) Differentiate between petrol engine and diesel engine.  
(b) Draw a legible sketch of simple carburetor and explain its working.
- 16.** Describe the working of a La-Mont boiler with a legible sketch.
- 17.** Explain the construction and working of de-level turbine with the help of legible sketch.
- 18.** (a) Explain the construction of ball and roller bearings.  
(b) Write the advantages and disadvantages of antifriction bearings.

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