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18ME15/25

First/Second Semester B.E. Degree Examination, June/July 2019
Elements of Mechanical Engineering

Time: 3 hrs. Max. Marks: 100

Note: *I. Answer FIVE full questions, choosing one full question from each module.*
2. Use of Steam table is permitted.

Module-1

1 a. List and explain any one source of energy. **(06 Marks)**

b. Explain briefly : (i) Global Warming (ii) Ozone depletion **(06 Marks)**

c. Find the enthalpy of 1 kg of steam at 12 bar when,
(I) Steam is dry saturated.
(ii) Steam is 22% wet and
(iii) Super heated to 250°C
Assume the specific heat of the super heated steam as 2.25 KJ/kgK. **(08 Marks)**

OR

2 a. Explain briefly any two of the following:
(i) Zeroth law of thermodynamics.
(ii) First law of thermodynamics.
(iii) Second law of thermodynamics. **(06 Marks)**

b. Explain formation of steam with the help of Temperature-Enthalpy (T-h) diagram. **(08 Marks)**

c. Find the specific volume and enthalpy of 1 kg of steam at 0.8 MPa.
(i) When the dryness fraction is 0.9.
(ii) When the steam is super heated to a temperature of 300°C.
The specific heat of the super heated steam is 2.25 KJ/kgK. **(06 Marks)**

Module-2

3 a. With a neat labeled diagram, explain working of Babcock and Wilcox boiler. **(08 Marks)**

b. Define prime movers and explain working of Pelton wheel turbine with a neat sketch. **(12 Marks)**

OR

4 a. Define (i) Boiler Mountings. (ii) Boiler Accessories.
Explain functions of any five mountings or accessories. **(12 Marks)**

b. What are hydraulic pumps? Explain centrifugal pump with a neat sketch. **(08 Marks)**

Module-3

5 a. Explain 4-s petrol engines with P-V diagram. (10 **Marks)**

b. Give comparisons between petrol and diesel engines. **(05 Marks)**

c. A four stroke IC engine running at 450 rpm has a bore diameter of 100 mm and stroke length 120 mm. The indicated diagram details are,
(i) Area of the diagram 4 cm²
(ii) Length of the indicated diagram 6.5 cm
(iii)Spring value of the spring used 10 bar/cm.
Calculate the indicated power of the engine. **(05 Marks)**

OR

6 a. Explain with a neat sketch working of vapour compression Refrigerator. **(08** Marks)
b. Define : (i) Ton of Refrigerator (ii) COP (iii) Ice making capacity **(06** Marks)
C. List commonly used refrigerants and mention the applications of air conditioners . **(06** Marks)

Module 4

7 a. Classify ferrous and non ferrous metals. **(05 Marks)**
b. Define composites, explain any two of the following : (i) Piezoelectric materials (ii) Shape memory alloys (iii) Optical fibre glass. **(05 Marks)**
c. Classify metal joining processes, explain TIG (Tungsten Inert Gas) Welding with a neat sketch. **(10 Marks)**

OR

8 a. Derive an expression for length of the belt in open belt drive. **(10 Marks)**
b. Mention advantages and disadvantages of V-Belt drive. **(05 Marks)**
C. List different types of gears and explain any one with its advantages. **(05 Marks)**

Module 5

9 a. Explain briefly the following:
(i) Turning
(ii) Facing
(iii) Thread cutting **(06 Marks)**
b. Explain the working of horizontal milling machine with a simple line diagram. **(08 Marks)**
c. Explain briefly:
(i) Angular milling.
(ii) Gang milling.
(iii) Plane milling. (06 Marks)

OR

10 a. Explain briefly the components of a CNC machine with a neat block diagram. **(08 Marks)**
b. Define Robots and mention its general applications. **(07 Marks)**
c. Write short note on:
CNC Machining Center or Turning Center. **(05 Marks)**

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