IAY17ME074

CBCS Scheme

USN | I A X I 7 M E O 7 4 |

First Semester B.E. Degree Examination, Dec.2017/Jan.2018
Elements of Mechanical Engineering

Time: 3 hrs.   Max. Marks: 100

Note: *Answer FIVE full questions, choosing one full question from each module.*

Module-1

1 a. Write the differences between Renewable and Non-Renewable energy resources. **(06 Marks)**
   b. Explain liquid flat plate collector with neat sketch. **(06 Marks)**
   c. Explain principle of Nuclear power plant with neat sketch. **(08 Marks)**

OR

2 a. Explain the formation of steam with T-H diagram. **(08 Marks)**
   b. Explain the construction and working of "Lancashire Boiler". **(08 Marks)**
   c. What are boiler mountings and accessories? List examples of each. **(04 Marks)**

Module-2

3 a. Explain the De Laval turbine with neat sketch and Pressure-Velocity diagram. **(06 Marks)**
   b. Explain the open cycle gas turbine with block diagram. **(06 Marks)**
   c. The following observations were made during a trial run on a four stroke diesel engine:
   Cylinder diameter = 25 cm
   Stroke of the piston = 40 cm
   Crank shaft speed = 250 rpm
   Brake load = 70 kg
   Brake drum diameter = 2 m
   Mean effective pressure = 6 Bar
   Diesel oil consumption = 0.1 litre/min
   Specific gravity of diesel = 0.78
   Calorific value of diesel = 43900 kJ/kg
   Find : (i) Brake power (ii) Indicated power (iii) Friction power (iv) Mechanical efficiency (v) Brake thermal efficiency (vi) Indicated thermal efficiency. **(08 Marks)**

OR

4 a. Explain construction and working of Four stroke SI engine with neat sketch and P-V diagram. **(08 Marks)**
   b. Explain the working of Pelton wheel with neat sketch. **(08 Marks)**
   c. Define : (i) Steam turbine (ii) Internal combustion engine. **(04 Marks)**

Module-3

5 a. Explain the taper turning by swivelling compound tool rest. **(06 Marks)**
   b. List the various operations performed on drilling machine. Explain with the neat sketches Boring and counterboring operations. **(10 Marks)**
   c. What is milling? Differentiate drilling and milling operation. **(04 Marks)**

OR

6 a. Define automation and explain the flexible automation. (06 Marks)
   b. Define Robot and write the classification of robot based on physical configuration. Explain the Cartesian co-ordinate robot with neat sketch. (08 Marks)
   c. With the block diagram, explain the basic elements of NC automation system. (06 Marks)

Module-4

7 a. Write a note on ferrous alloys (any two). (08 Marks)
   b. Define composite material. Mention its applications in aerospace and automation industries. (06 Marks)
   c. Briefly explain types of non-ferrous alloys (any two). (06 Marks)

OR

8 a. Explain with neat sketch the arc welding method. (08 Marks)
   b. List the different types of Oxy-acetylene flames and state their applications. (06 Marks)
   c. Define : welding, brazing and soldering. (06 Marks)

Module-5

9 a. List out the desirable properties of an good refrigerant. (06 Marks)
   b. Explain the principle and working of vapour compression refrigeration with neat sketch. (08 Marks)
   c. Define the following : (i) Refrigeration (ii) Air conditioning (iii) Refrigerant (06 Marks)

OR

10 a. Explain with a neat sketch, working of room air conditioner. (08 Marks)
    b. What are the differences between vapour compression and absorption systems? (08 Marks)
    c. List out refrigerants commonly used in practice. (04 Marks)

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