CBCS SCHEME

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17EME14/24

First/Second Semester B.E. Degree Examination, Aug./Sept.2020
Elements of Mechanical Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain any three petroleum based gaseous fuels. **(06 Marks)**

b. With a neat sketch, explain the working principle of solar ponds. **(06 Marks)**

c. Briefly explain the working principle of hydroelectric power plant with a neat sketch. List the merits and demerits. **(08 Marks)**

OR

2 a. With a neat sketch, explain the working of Babcock and Wilcox boiler. **(10 Marks)**

b. What are boiler mounting and accessories? List examples for each. **(04 Marks)**

c. Explain terms: (i) Dry saturated steam (ii) Degree of super heat (iii) Internal energy, with reference to formation of steam. **(06 Marks)**

Module-2

3 a. Briefly explain parson's turbine. **(06 Marks)**

b. Differentiate between open cycle and closed cycle gas turbine. **(06 Marks)**

c. Describe a pelton wheel with a suitable sketch. **(08 Marks)**

OR

4 a. Give any four classifications of IC engines. **(06 Marks)**

b. With a schematic and P-V diagrams, explain the working of a four stroke cycle diesel engine. **(06 Marks)**

c. The following observations refer to a trial of a single cylinder diesel engine:
Brake power = 60 kW
Brake thermal efficiency = 40%
Mechanical efficiency = 80%
Calorific value of the oil used = 42000 kJ/kg
Determine: (i) Indicated power (ii) Frictional power (iii) Fuel consumption per brake power hour. **(08 Marks)**

Module-3

5 a. Deduce an expression for conicity and α. With a sketch describe briefly taper turning by survelling the compound rest. **(08 Marks)**

b. With a neat sketch, explain plane milling, end milling and slot milling. **(06 Marks)**

c. List any six applications of the robots. **(06 Marks)**

OR

6 a. Explain programmable and flexible automation. **(06 Marks)**

b. Briefly explain cylindrical and spherical configurations of a robot with a neat sketch. **(08 Marks)**

c. With a neat sketch explain the operations of counter sinking and counter boring on a drilling machine. **(06 Marks)**

Module-4

7 a. Give any six applications of Ferrous metals and its alloys. (06 Marks)
b. Explain the classification of composite materials based on matrix material. (06 Marks)
c. With a neat sketch describe the features of three different flames obtained in oxy acetylene gas welding. Mention the application of each flame. (08 Marks)

OR

8 a. Describe Electric Arc Welding with suitable sketch. (08 Marks)
b. Compare soldering, brazing and welding. (06 Marks)
c. Briefly discuss the applications of composite materials in aircraft and automobiles. (06 Marks)

Module-5

9 a. With a neat sketch, explain the working principle of vapour absorption refrigeration system. (08 Marks)
b. What are the desirable properties of a good refrigerant? (06 Marks)
c. Define the following:
(i) Tonne of refrigeration
(ii) COP
(iii) Ice-making capacity (06 Marks)

OR

10 a. Explain with a neat sketch, working of a room air conditioner. (08 Marks)
b. Compare vapor compression and vapor absorption refrigeration systems. (06 Marks)
c. List any five commonly used refrigerants and their specific applications. (06 Marks)

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