SRI SAIRAM COLLEGE OF ENGINEERING

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15EME14/24

First/Second Semester B.E. Degree Examination, June/July 2017

Elements of Mechanical Engineering

Time: 3 hrs. Max. Marks: 80

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain petroleum based solid, liquid and gaseous fuels. **(08 Marks)**

b. Explain with a neat sketch the principle and operation of a typical windmill. **(08 Marks)**

OR

2 a. Explain with a neat sketch a Lancashire boiler. **(08 Marks)**

b. Define internal energy of steam and explain with reference to a T-H diagram formation of steam. **(08 Marks)**

Module-2

3 a. With a neat sketch, explain a Parason's reaction turbine. **(08 Marks)**

b. Explain with a neat sketch, principle and working of a pelton turbine. **(08 Marks)**

OR

4 a. Explain a 4-stroke C.I. engine with neat sketch and PV diagram. **(08 Marks)**

b. During a trial on single cylinder 4-stroke petrol engine the following readings were recorded:
Brake torque = 640 N-m
Cylinder diameter = 210 mm
Speed of the engine = 350 rpm
Length of stroke = 280 mm
Mean effective pressure = 6.5 bar
Consumption of petrol = 8.16 kg/hr
Calorific value of fuel = 42.7 MJ/kg
Determine:
i) Mechanical efficiency
ii) Indicated thermal efficiency
iii) Brake thermal efficiency
iv) Brake specific fuel consumption **(08 Marks)**

Module-3

5 a. What is turning? Explain with a neat sketch the taper turning by swiveling compound rest method. **(08 Marks)**

b. Explain with sketches the following machining operations:
i) End milling
ii) Slot milling **(08 Marks)**

OR

6 a. Explain the cylindrical coordinate configuration and spherical coordinate configuration of robots with neat sketches. **(08 Marks)**

b. What is automation? Explain fixed automation and programmable automation. **(08 Marks)**

Module-4

7 a. Explain in brief ferrous metals and alloys. **(08 Marks)**

b. What is composite material? Discuss its applications in aircrafts and automobiles. **(08 Marks)**

OR

8 a. Define soldering, brazing and welding. Also differentiate between soldering and brazing. **(08 Marks)**

b. Explain in brief an arc welding process with a neat sketch. **(08 Marks)**

Module-5

9 a. List out the properties of good refrigerant. **(08 Marks)**

b. Define the following (any four):

i) Refrigeration
ii) Refrigerant
iii) C.O.P. of a refrigerator
iv) Relative C.O.P.
v) Ton of refrigeration
vi) Ice making capacity
vii) Refrigerator
viii) Air conditioning **(08 Marks)**

OR

10 a. Explain the principle and working of vapour absorption refrigeration with a neat sketch. **(08 Marks)**

b. Explain with a sketch working of a room air-conditioner. **(08 Marks)**

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