Section Section

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# GBCS Schame

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## First/Second Semester B.E. Degree Examination, Dec.2016/Jan.2017 **Elements of Mechanical Engineering**

Time: 3 hrs. Max. Marks: 80

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

### Module-1

- 1 Define renewable and non-renewable energy resources and differentiate them.
  - With the help of T-H diagram, explain the generation of steam at constant pressure. (10 Marks)

2 Define: i) Dryness fraction ii) Sensible heat iii) Latent heat iv) Enthalpy of steam.

(04 Marks)

b. Draw a neat diagram and explain the construction and working of "Liquid flat plate collector" used for water heating applications. (12 Marks)

#### Module-2

3 a. What is steam turbine? Show the classifications of steam turbine.

(06 Marks)

With a neat sketch, explain the working of Franci's turbine.

(10 Marks)

- 4 With the help of 'P-V' diagram, explain the operation of 4-S petrol engine. (08 Marks)
  - b. Following data are collected from a 4–S single cylinder engine at full load.

Bore = 200mm; stroke = 280mm; speed = 300rpm. Indicated mean effective pressure = 5.6 bar, Torque on the brake drum = 250N-m, fuel consumed = 4.2kg/hour, and calorific value of fuel = 41,000kJ/kg.

Determine:

- i) Mechanical efficiency
- ii) Indicated thermal efficiency, and
- iii) Brake thermal efficiency.

(08 Marks)

#### Module-3

- 5 With simple sketches, explain the following lathe operations:
  - i) Facing ii) Cylindrical turning.

(06 Marks)

b. Define automation. Discuss the types of automation along with their merits and demerits.

(10 Marks)

#### OR

Show the differences between drilling and boring.

(04 Marks)

b. Define robot. State the different types of robot configurations.

(04 Marks)

Draw a neat diagram to show the robot arm movement in Cartesian configuration and explain. (08 Marks)

#### Module-4

- State the characteristics and applications of: i) Aluminium and its alloys ii) Copper and its (08 Marks)
  - b. Differentiate between soldering and brazing.

(04 Marks)

c. State the advantages and disadvantages of welding over other types of joining processes.

(04 Marks)

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#### OR

8 a. List the advantages and limitations of composites.
b. With a neat diagram, explain the Oxy-acetylene welding process.
(08 Marks)
(08 Marks)

### Module-5

9 a. Define refrigeration. State the applications of refrigeration.
b. Define the following refrigeration terms:

i) Refrigerant ii) ton of refrigeration iii) COP iv) relative COP. (04 Marks)
c. With the help of a flow diagram, explain the functioning of "Vapour compression refrigeration cycle". (08 Marks)

#### OR

a. What is refrigerant? State the desired properties of refrigerant.
b. Draw a neat diagram of a room air conditioner and explain.
(06 Marks)
(10 Marks)

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