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B. M. S. College of Engineering, Bengaluru - 560019

Autonomous Institute Affiliated to VTU

October / November 2021 Supplementary Examinations

Programme: B.E. **Semester: I / II**
Branch: ALL **Duration: 3 hrs.**
Course Code: 18ME1ESEME / 18ME2ESEME **Max Marks: 100**
Course: Elements of Mechanical Engineering **Date:06.11.2021**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1. a) Differentiate between conventional and non-conventional source of energy. **04**

   b) Explain the working principle of flat plate solar collector with the help of neat sketch. **06**

   c) Explain the following with the help of Temperature-Enthalpy diagram: **10**
   (i) Sensible heat, (ii) Dry saturated steam, (iii) Dryness fraction and (iv) Enthalpy of wet steam.

OR

2. a) Define boiler and classify boilers based on its working principle with example. **04**

   b) Compare open and closed cycle gas turbines. **06**

   c) Classify hydraulic turbines based on hydraulic action. Explain the construction and working of Pelton turbine with the help of neat sketch. **10**

UNIT - II

3. a) Compare vapour compression and vapour absorptions refrigeration systems. **04**

   b) A petrol engine working on a four-stroke cycle has a cylinder of 250 mm diameter, length of stroke 450 mm, and is running at 180 RPM. Its mechanical efficiency is 80 % when the mean effective pressure is 0.65 MPa. Find the following: (i) Indicated power, (ii) Brake power and (iii) Friction power. **06**

   c) With the help of line diagrams, explain the working of a four-stroke diesel engine. Also draw the Pressure-Volume diagram. **10**

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.

UNIT - III

4. a) Sketch and label metric V-thread profile. **04**

   b) Differentiate between soldering and brazing. **06**

   c) Explain the working principle of electric arc welding with a neat sketch. **10**

OR

5. a) What is grinding? Explain the principle of working of grinding machines. **04**

   b) Explain Tapping and Countersinking operation in drilling machine with the help of neat sketches. **06**

   c) What is taper turning in Lathe? Explain the following taper turning methods with the help of neat sketches: **10**

      (i) Swiveling the compound rest method

      (ii) Tailstock set over method.

UNIT - IV

6. a) What is lubrication? List types of lubricants with an example. **04**

   b) A simple gear train is made up of four gears A, B, C and D having 20, 40, 60 and 70 teeth respectively. If gear A is the main driver rotating at 500 RPM clockwise, calculate the following: (i) Speeds of intermediate gears (ii) Speed and direction of the last follower and (iii) Train value. **06**

   c) With the help of sketches explain radial ball bearing and thrust ball bearing. List at least two advantages of rolling contact bearings. **10**

UNIT - V

7. a) Define Mechatronics. What are its advantages? **04**

   b) Sketch and explain Open loop and closed loop control systems. **06**

   c) Explain constructional features and working principle of Fused Filament Fabrication (FFF) method of Additive manufacturing with the help of neat sketch. **10**

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