Hall Ticket No | | | | | | | | | | | Question Paper Code: AMEC35

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech VI SEMESTER END EXAMINATIONS (REGULAR) - JULY 2023
Regulation: UG-20
ELEMENTS OF MECHANICAL ENGINEERING
Time: 3 Hours **(AERONAUTICAL ENGINEERING)** **Max Marks: 70**

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) What are the conventional and non-conventional energy sources? Describe the fossil fuels as the conventional energy sources. [BL: Understand| CO: 1|Marks: 7]

   (b) Explain first law of thermodynamics. List the similarities and dissimilarities between work and heat. [BL: Understand| CO: 1|Marks: 7]

MODULE – II

2. (a) What are hydraulic pumps? Explain the working principle of centrifugal pump with a neat sketch. [BL: Understand| CO: 2|Marks: 7]

   (b) Classify turbines. Demonstrate the working principle of Francis turbine and its advantages in detail. [BL: Understand| CO: 2|Marks: 7]

MODULE – III

3. (a) How are composite material classified? State the composition and application of any two ferrous metals. [BL: Understand| CO: 3|Marks: 7]

   (b) Point out the properties of piezoelectric materials and shape memory alloys. Differentiate between soldering, brazing and welding. [BL: Analyze| CO: 3|Marks: 7]

4. (a) Illustrate the construction and working principle of gas welding process with neat sketch. [BL: Understand| CO: 4|Marks: 7]

   (b) With suitable diagram, discuss the working principle of MIG welding. What are the functions and names of shielding gases used in TIG and MIG? [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) With suitable sketch, explain the taper turning operation by swiveling the compound rest. [BL: Understand| CO: 5|Marks: 7]

   (b) Enumerate with neat sketch, the constructional features of a centre lathe. Differentiate between boring operation and reaming operation. [BL: Analyze| CO: 5|Marks: 7]

6. (a) With the neat sketch, explain the various operations performed in the milling machine. [BL: Understand| CO: 5|Marks: 7]

(b) Describe the construction and working principle of vertical milling machine with neat sketch. [BL: Understand| CO: 5|Marks: 7]

MODULE – V

7. (a) Mention the salient features of CNC turning centre. Describe the constructional and special features of a CNC machine. [BL: Understand| CO: 6|Marks: 7]

   (b) Discuss numeric control machine with a neat sketch and list out the advantages of numeric control machine. [BL: Understand| CO: 6|Marks: 7]

8. (a) Name and discuss the four basic arm configurations that are used in robotic manipulators. [BL: Understand| CO: 6|Marks: 7]

   (b) Discuss in detail about anatomy of serial manipulator and list various parts involved in constructing robot. [BL: Understand| CO: 6|Marks: 7]