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## FIRST Semester B. E. Degree Semester End Examination (SEE), Jan/ Feb 2024

### Integrated Mechanical Systems
**(Model Question Paper - 1)**

| [Time: 3 Hours] | | [Maximum Marks: 100] |
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**Instructions to students:**

i.   **Answer FIVE FULL Questions as per choice.**
ii.  **Use BLACK ball point pen for text, figure, table, etc.**
iii. **Assume missing data, if any.**

| | | Module-1 | Marks | CO | RBT Level |
|---|---|---|---|---|---|
| **1.** | **a)** | Discuss the role of Mechanical Engineers in Industries and Society | **[07 Marks]** | CO1 | L2 |
| | **b)** | With a neat sketch explain the formation of steam. | **[08 Marks]** | CO1 | L2 |
| | **c)** | List the applications of steam | **[05 Marks]** | CO1 | L1 |
| | | **OR** | | | |
| **2.** | **a)** | Differentiate between open and closed-cycle Gas Turbine | **[07 Marks]** | CO1 | L2 |
| | **b)** | Sketch and explain the working of the Pelton wheel | **[08 Marks]** | CO1 | L2 |
| | **c)** | List out the advantages of hydraulic turbine | **[05 Marks]** | CO1 | L1 |
| | | Module-2 | | | |
| **3.** | **a)** | Sketch and explain the following lathe operations: <br> i) Turning  ii) Facing  iii) Thread cutting  iv) Knurling | **[12 Marks]** | CO2 | L2 |
| | **b)** | Sketch and explain the following drilling operations: <br> i) counter boring  ii) counter sinking | **[08Marks]** | CO2 | L2 |
| | | **OR** | | | |
| **4.** | **a)** | Sketch and explain the following milling operations: <br> i) Plane Milling  ii) End Milling  iii) Slot Milling  iv) Gang Milling | **[12 Marks]** | CO2 | L2 |
| | **b)** | List the advantages and applications of CNC | **[08Marks]** | CO2 | L1 |
| | | Module-3 | | | |
| **5.** | **a)** | With a neat sketch explain the working principle of a four-stroke Diesel engine | **[10 Marks]** | CO3 | L2 |
| | **b)** | Reference to the following observations during a trial on a 4-stroke diesel engine: Crankshaft speed =260 rpm, Cylinder diameter =24cm, Stroke of piston =1.6 times the bore, Brake load = 65 kg, Brake drum diameter =2m, Mean effective Pressure =5 bar, Diesel consumption =0.1 litre/min, Specific gravity of diesel = 0.78, Calorific value of diesel = 43900 KJ/Kg, Determine: <br> (i) BP (ii) IP (iii) FP (iv) Mechanical efficiency (v) I-thermal efficiency (vi) B-thermal efficiency | **[10 Marks]** | CO3 | L3 |
| | | **OR** | | | |
| **6.** | **a)** | Explain the main components of an Electric vehicle with a neat sketch | **[08Marks]** | CO3 | L2 |
| | **b)** | List out the advantages and disadvantages of Electric vehicle | **[06 Marks]** | CO3 | L1 |

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| | **c)** | Differentiate between Hybrid and Electric vehicle | **[06 Marks]** | **CO3** | **L2** |

Module-4

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| **7.** | **a)** | Sketch and explain the following:<br>i) Spur Gear ii) Helical Gear iii) Rack and Pinion Gear | **[09 Marks]** | **CO4** | **L2** |
| | **b)** | A simple gear train consists of four gears having 30,40,50,60 teeth respectively. Determine the speed and direction of the last gear if the first gear makes 60 rpm in a clockwise direction. | **[06 Marks]** | **CO4** | **L3** |
| | **c)** | Mention the advantages and disadvantages of V-belts | **[05 Marks]** | **CO4** | **L1** |

**OR**

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| **8.** | **a)** | Define Robot. List and classify Robot anatomy based on its physical configuration | **[07 Marks]** | **CO4** | **L2** |
| | **b)** | Differentiate between open-loop and closed loop control systems with an example. | **[08 Marks]** | **CO4** | **L2** |
| | **c)** | List the industrial applications of robots. | **[05 Marks]** | **CO5** | **L1** |

Module-5

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| **9.** | **a)** | Differentiate between active, passive, and hybrid cooling systems | **[10 Marks]** | **CO5** | **L2** |
| | **b)** | Write a short note on<br>(i) Automobile Radiator (b) Transducers and Sensors | **[10 Marks]** | **CO5** | **L3** |

**OR**

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| **10.** | **a)** | List and explain the types of sensors | **[10 Marks]** | **CO5** | **L2** |
| | **b)** | Mention the advantages and applications of Mechatronics | **[10 Marks]** | **CO5** | **L1** |

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