**Code No.PC301ME**

**METHODIST COLLEGE OF ENGINEERING & TECHNOLOGY (An Autonomous Institution)**

**B.E. (MECH) III-Semester (AICTE) (Supplementary) Examination,August -2023**

**Subject: THERMODYNAMICS**

**Time: 3 hours Max.Marks:60**

**Note: Missing data, if any, maybe suitably assumed.**

**PART-A**

**Answer All the questions.**

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| **Q.No.** | **Questions** | **Marks** | **CO** | **BTL** |
| **1. a** | **Differentiate macroscopic and microscopic view point of thermodynamics.** | **2** | **1** | **2** |
| **b** | **State zeroth law of thermodynamics.** | **2** | **1** | **1** |
| **c** | **Discuss compressibility chart.** | **2** | **5** | **1** |
| **d** | **Define throttling and free expansion process.** | **2** | **2** | **1** |
| **e** | **Explain Perpetual motion machine of second kind.** | **2** | **3** | **2** |
| **f** | **Write Maxwells relations.** | **2** | **5** | **1** |
| **g** | **Define critical point of water.** | **2** | **4** | **1** |
| **h** | **Define mole fraction.** | **2** | **4** | **2** |
| **i** | **Sketch Diesel cycle on P-V and T-S graph and mention the process.** | **2** | **4** | **3** |
| **j** | **Define thermal efficiency of Brayton cycle.** | **2** | **4** | **1** |

**PTO**

**PART-B**

**Answer Any Five questions**.

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| **Q.No.** |  | **Questions** | **Marks** | **CO** | **BTL** |
| **2.** | **a** | **Explain the principle of thermometry. What are reference points.** | **4** | **1** | **4** |
| **b** | **Explain Carnot cycle in detail.** | **4** | **3** | **3** |
| **3.** | **a** | **Explain Perpetual motion machine of first kind.** | **4** | **2** | **2** |
| **b** | **90 kJ of heat are supplied to a system at a constant volume. The system rejects 95kJ of heat at constant pressure and 18 kJ of work is done on it .The system is brought to original state by adiabatic process. Determine:-**  **[i] The adiabatic work;**  **[ii] The values of internal energy at all end states if initial value is 105 kJ.** | **4** | **2** | **5** |
| **4.** | **a** | **Explain Clausius inequality and stat its significance.** | **4** | **3** | **4** |
| **b** | **Explain (PMM-I) perpetual motion machine of first kind** | **4** | **5** | **2** |
| **5.** | **a** | **Explain H-S diagram (Mollier Diagram) of formation of steam.** | **4** | **4** | **5** |
| **b** | **Explain Amagat-Leducelaw of partial volumes.** | **4** | **4** | **5** |
| **6.** | **a** | **Sketch Otto cycle on P-V diagram and derive its air standard efficiency.** | **4** | **4** | **3** |
| **b** | **Explain the working of vapour compression refrigeration with the help of P-H diagram.** | **4** | **4** | **4** |
| **7.** | **a** | **Explain the working of a constant volume gas thermometer with the help of a neat sketch..** | **4** | **1** | **2** |
| **b** | **Write Vanderwaals equation of state.** | **4** | **5** | **1** |
| **8.** | **a** | **State the limitations of first law of thermodynamics.** | **4** | **2** | **1** |
| **b** | **An engine working on otto cycle has initial pressure 1 bar and pressure after compression 10 bar. Calculate the (1) Compression ratio (2) Percentage clearance (3) Thermal efficiency**  **if initial temperature is 260C (4) Temperature at the end of compression (5) Mean effective pressure. If the maximum pressure in the cycle is 20bar.** | **4** | **5** | **2** |
| **9.** | **a** | **Explain the processes in Rankine cycle.** | **4** | **4** | **4** |
| **b** | **Define and state the significance of Third Law of Thermodynamics.** | **4** | **5** | **1** |

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