

Department: **Mechanical Engineering**

Subject Name: **Basics of Mechanical Engineering**

Branch: **M.E**

Subject Code: **ME-101-F**

Semester: **1st**

Max Marks: **30**

Time Allowed: **70 Minutes**

Instructions: - Attempt any 3 questions out of 6. All questions carry equal marks.

Q.1 (a) Define any TEN of the following terms: (5)

- | | |
|------------------------|---------------------------|
| 1. Thermodynamics | 11. Dryness Fraction |
| 2. Cyclic Process | 12. Saturated Steam |
| 3. State of the system | 13. Quality of steam |
| 4. State variables | 14. Saturated Liquid |
| 5. Thermal equilibrium | 15. Saturated Vapour |
| 6. Isothermal process | 16. Degree of superheat |
| 7. Adiabatic process | 17. Degree of sub-cooling |
| 8. State function | 18. Vaporization |
| 9. Enthalpy | 19. Evaporation |
| 10. Entropy | 20. Boiling |

(b) Define any THREE the concept of following: (5)

1. Zeroth Law of Thermodynamics
2. 1st law of thermodynamics
3. Second law of thermodynamics (Clausius & Kelvin-Planck Statement)
4. Third law of thermodynamics
5. Formation of Steam

Q.2 (a) Explain briefly the Throttling Calorimeter with neat Sketch and give the dryness fraction equation? (6)

(b) Difference between Shaper Machine and Planer Machine. (4)

Q.3 (a) Make a neat sketch of drilling machine. Name its various Parts/Components. Also give the types of operation perform by the drilling machine? (5)

(b) Give sketch of a single point cutting tool used on lathe machine. Giving all its angles and define if? (5)

Q.4 (a) Make a neat sketch of lathe machine and give the different parts name? Also classify the different operations performed by the lathe machine? (6)

(b) State the function of the following components of a simple vapour compression refrigeration system: (4)

1. Compressor & Condenser
2. Expansion Valve & Evaporator

Q.5 (a) What is meant by COP and show that $(COP)_{\text{Heat Pump}} = 1 + (COP)_{\text{Refrigerator}}$ (3)

(b) Explain and name the commonly used unit of Refrigeration? (2)

(c) Describe, with a schematic arrangement, the working of simple vapour compression refrigeration cycle. Represent the cycle on P-V & T-S Plot. (5)