

**Scheme G**  
**Sample Test Paper-I**

**Course Name : Diploma in Mechanical Engineering**

**Course Code : ME/MH/MI**

**Semester : Fourth**

**17410**

**Subject Title : Thermal Engineering**

**Marks : 25**

**Time: 1 hour**

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**Instructions:**

- 1) All questions are compulsory
- 2) Illustrate your answers with neat sketches wherever necessary
- 3) Figures to the right indicate full marks
- 4) Assume suitable data if necessary
- 5) Preferably, write the answers in sequential order

**Q1. Attempt Any THREE**

**09 Marks**

- a. Define Thermodynamics system and state its different types.
- b. Define Boyle's law and Charles's law.
- c. Draw P-h diagram for steam formation process.
- d. State Kelvin-Planck's Statement of second law of thermodynamics.
- e. State uses of steam table

**Q2. Attempt any TWO**

**08 Marks**

- a. Prove the equivalence of Kelvin-Planck and clausius statement.
- b. Differentiate between Isothermal and Isentropic process.
- c. Define wet steam, dry steam, saturated steam and superheated steam.

**Q3. Attempt any TWO**

**08 Marks**

- a. State limitation of first law of thermodynamics.
- b. One kg of gas undergoes isothermal compression, at 300°K., during which its volume is reduced to 1/5 of it's original volume calculate (1) Work Transfer (2) Heat Transfer
- c. Explain Rankine cycle with P-V. And T-S diagram.

**Scheme G**  
**Sample Test Paper-II**

**Course Name : Diploma in Mechanical Engineering**

**Course Code : ME/MH/MI**

**Semester : Fourth**

**17410**

**Subject Title : Thermal Engineering**

**Marks : 25**

**Time: 1 hour**

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**Instructions:**

- 1) All questions are compulsory
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- 3) Figures to the right indicate full marks
- 4) Assume suitable data if necessary
- 5) Preferably, write the answers in sequential order

**Q1. Attempt Any THREE**

**09 Marks**

- a) Define nozzle. Give its types.
- b) Explain the function of cooling tower in steam power plant.
- c) State Fourier's law of conduction.
- d) Draw a Neat sketch of regenerative feed heating.
- e) What is heat Transfer? State different modes of heat transfer.

**Q2. Attempt any TWO**

**08 Marks**

- a) Define and state significance of Mach number
- b) Differentiate between jet condenser and surface condenser.
- c) Derive an expression for Heat flow through composite wall.

**Q3. Attempt any TWO**

**08 Marks**

- a) Explain pressure compounding with neat sketch
- b) Differentiate between forced draught and induced draught.
- c) Explain properties of Black body and Gray body.

**Scheme G**  
**Sample Question Paper**

**Course Name : Diploma in Mechanical Engineering**

**Course Code : ME/MH/MI**

**Semester : Fourth**

**17410**

**Subject Title : Thermal Engineering**

**Marks : 100**

**Time: 3 hour**

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**Instructions:**

1. All questions are compulsory
2. Illustrate your answers with neat sketches wherever necessary
3. Figures to the right indicate full marks
4. Assume suitable data if necessary
5. Preferably, write the answers in sequential order

**Q.1 A Attempt Any SIX**

**12 Marks**

- a. Define Pure Substance
- b. State Zeroth's law of thermodynamics
- c. Draw P-V and T-S Chart of Isobaric system
- d. State Avogadro's law
- e. State the application of Mollier chart
- f. Write Continuity equation of steam nozzle
- g. List out losses in steam turbines (Any Two)
- h. List any two applications of condenser

**Q.1 B Attempt Any TWO**

**08 Marks**

- a. Classify the Steam boiler on the basis of
  - (1) Content in the tube
  - (2) Circulation of water and steam
  - (3) According to boiler use
  - (4) According to axis of shell
- b. Define Dalton's law of partial pressure & gives its application.
- c. List any four applications of heat exchanger and material used for heat exchanger.

**Q.2 Attempt Any FOUR**

**16 Marks**

- a. Differentiate between Heat Engine and Heat Pump (Minimum Four point)

- b. Derive an Equation of State for a perfect gas
- c. Explain pressure temperature diagram for a pure substance
- d. What is compounding of turbines and explain any one types
- e. What is regenerative feed heating? What are the advantages of regenerative feed heating?
- f. Explain a quasi static process with example

**Q.3 Attempt any FOUR**

**16 Marks**

- a. Explain Clausius statement and its equivalence
- b. Write equation for i) change in internal energy ii) work done for polytropic process
- c. Explain construction and working of Cochran boiler
- d. Explain the concept of Mach number
- e. Differentiate between Natural draught and Induced draught of cooling towers
- f. Explain construction and working of shell & tube type heat exchanger

**Q. 4 Attempt any FOUR.**

**16 Marks**

- a. Explain with example extensive and intensive properties.
- b. List the importance of boiler mounting and explain any one
- c. Explain different types of steam nozzles and give their applications
- d. Explain the terms
  - (i) Absorptivity (ii) Transmivity
 & discuss their importance
- e. What are the different sources of air leakages of steam condenser and state its effect.
- f. Discuss the importance provisions made on IBR

**Q.5 Attempt any TWO**

**16 Marks**

- a) Write steady flow energy equation and apply it to boiler, nozzle, and turbine.
- b) With neat Sketch Explain Construction and working of Impulse turbine and Reaction turbine
- c) Draw P-V. and T-S. Chart of following Vapours process
  - 1) Constant pressure

- 2) Constant volume
- 3) Constant enthalpy
- 4) Constant entropy.

**Q.6 Attempt any TWO**

**16 Marks**

- a) Explain the construction, working and application of any one condenser
- b) Draw a neat sketch diagram of Loeffler boiler. Show the path of blue gases. Discuss the importance of this boiler.
- c) Discuss the application of
  - i) Second Law of Thermodynamics of refrigerator
  - ii) Plate type heat exchanger

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