

GSM/D-21
COMPUTER PROGRAMMING
AND THERMODYNAMICS
Paper–PH-301

929

Time Allowed : 3 Hours]

[Maximum Marks : 40

Note : Attempt **five** questions in all, selecting **one** question from each Unit.
Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Question

1. (a) Convert $(1010.111)_2$ into decimal number. 2
- (b) Explain DIMENSION statement in FORTRAN with Syntax. 2
- (c) What is the difference between Joule Thomson effect and adiabatic cooling? 2
- (d) What do you mean enthalpy of a thermodynamical system? 2

UNIT-I

2. (a) Define Flow chart. What are various symbols available in drawing flowchart and what is function of each? 4
- (b) Distinguish between Executable and Non-Executable statements in FORTRAN with examples. 4
3. (a) Define an array. Explain two-dimensional array by giving examples. 4
- (b) Explain the following statements with example :
 - (i) Nested-logical IF statement.
 - (ii) GO TO statement 4

UNIT-II

4. Write an algorithm, flowchart and program to compute product of two matrices A and B of different dimensions. 8
5. Write an algorithm, flowchart and program to evaluate finite integral using trapezoidal rule. 8

UNIT-III

6. Define absolute scale of temperature. Show that it is identical with perfect gas scale. Explain why negative temperature on this scale is not possible. 8
7. (a) What is T-S diagram? Derive expression of the efficiency of a Carnot's engine directly from it. 6
- (b) One mole of a gas expands isothermally to ten times of its volume. Calculate change in entropy in terms of the gas constant. 2

UNIT-IV

8. Define four thermodynamical functions and hence derive Maxwell's thermodynamical relations. 8
9. Using Maxwell thermodynamical relations, prove that for van der wall's gas $C_P - C_V = R \left[1 + \frac{2a}{RTV} \right]$, where symbols have their usual meanings. 8