Roll No. ..... Total Pages : 3

GSM/D-20 **920**

COMPUTER PROGRAMMING AND THERMODYNAMICS

Paper - PH-301

Time allowed : 3 Hours *Maximum Marks : 40*

Note : Attempt any **five** questions, selecting at least one question from each unit. Question No. **1** is compulsory. All questions carry equal marks.

Compulsory Questions

1. (i) Convert $(12.125)_{10}$ into binary number. 2

(ii) Define Variables. Name different types of variables available in FORTRAN with suitable examples. 2

(iii) How cooling is produced by adiabatic demagnetisation, explain? 2

(iv) Define fusion, vaporisation and sublimation lines on a phase diagram. 2

UNIT-I

2. (i) What is a Computer? Explain the computer organisation with the help of block diagram. 6

(ii) What are builtin functions. Explain with examples. 2

3. (i) Explain various input-output statements available in FORTRAN with examples. 4

(ii) Explain the following statements with example:

(i) FORMAT statements.

(ii) DO statement 4

UNIT-II

4. Write an algorithm, flowchart and program to arrange marks in ascending or descending order. 8

5. Write an algorithm, flowchart and program to evaluate finite integral through Simpson's one-third rule. 8

UNIT-III

6. (i) Describe Carnot's cycle and deduce the efficiency of ideal heat engine? 6

(ii) A reversible heat engine converts two-fifth of input heat into work. When the temperature of the sink is reduced by 50°C, its efficiency is doubled. Find the temperature of the source and the Sink. 2

7. (i) Define Entropy. What is its physical significance? Show that the entropy remains constant during a reversible process, but increases in irreversible process. 6

(ii) Calculate the change in entropy, when a body of mass 5 gram is heated from 100K to 1000K. The specific heat of body is 0.1 cal/gram/degree. 2

UNIT-IV

8. Define Helmholtz and Gibb's functions. Derive them from Maxwell thermodyamical relations. 8

9. (i) Show that $C_p - C_v = TE\alpha^2V$, where C_p and C_v are the specific heats at constant pressure and volume respectively, E is the bulk modulus of elasticity, $\propto$ the co-efficient of volume expansion and V, the specific volume. 5

(ii) Calculate the change in boiling point of water due to change in pressure of 0.01 m of mercury. $L = 22.68\times10^5$ J Kg^{-1}, volume of 1 kg of water at 100°C is 1000 c.c and volume of 1 kg of saturated steam at 100°C is 1600×10^3c.c. 3