(i) Printed Pages: 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 0252

Exam. Code : 0003

B.A./B.Sc. (General) 3rd Semester

(2122)

CHEMISTRY

(Physical Chemistry—A)

(Same for B.Sc. Microbial & Food Technology)

Paper–XI

Time Allowed : Three Hours] [Maximum Marks : 22

Note :—Attempt **five** questions in all, including Question No. **IX** (Unit V) which is compulsory question and selecting **one** question each from Units I-IV.

UNIT–I

1. (a) What is thermography ? Explain its usefulness.

   (b) What do you mean by nematic and cholesteric phases ? 2,2

2. (a) Explain in detail seven segment cell.

   (b) Write a short note on liquid crystals. 2,2

UNIT–II

3. (a) Explain Clausius-Clapeyron equation. Give its application.

   (b) Define Le-Chatelier's principle. Give its significance. 2,2

4. (a) For a reaction the value of ΔG° is -8.368 kJ at 25°C. Calculate the equilibrium constant for this reaction.

(b) The equilibrium constant of a reaction becomes double of its value when the temperature is raised from 25°C to 35°C. Calculate ΔH° for the reaction. 2,2

UNIT–III

5. (a) Calculate the entropy change when 2 moles of an ideal gas expands reversibly from an initial volume of 1 litre to a final volume of 10 liters at 298 K.

(b) Calculate the entropy change on mixing of ideal gases. 2,2

6. (a) A Carnot engine absorbs 5.00 kJ at 400°C. How much work is done on engine and how much is the heat evolved at 150°C during each cycle ?

(b) What do you understand by the term enthalpy of fusion and enthalpy of vaporization ? 2,2

UNIT–IV

7. (a) The free energy change accompanying a given process is -85.8 kJ at 25°C and -82.62 kJ at 35°C. Calculate the enthalpy change of the process at 25°C.

(b) What do you understand by the residual entropy ? Give the causes of residual entropy. 2,2

8. (a) Discuss the utility of third law of thermodynamics.

(b) What is Nernst heat theorem ? How it leads to third law of thermodynamics ? 2,2

UNIT–V

9. (a) Define the term Parachor. Give an example.

(b) Write Van't Hoff reaction isotherm.

(c) Show that entropy is a state function.

(d) What are the limitations of the criterion for spontaneity ?

(e) What is Lennard-Jones potential ?

(f) What percent T_1 is of T_2 for a Carnot engine having efficiency 20% ?

$1 \times 6 = 6$