

Total No. of Printed Pages: 03

SUBJECT CODE NO:- 2006
FACULTY OF SCIENCE & TECHNOLOGY
B.Sc. S.Y Sem-III
EXAMINATION JUNE / JULY 2022
Chemistry Paper-VIII
(Physical Chemistry)

[Time: 1 : 53 Hours]

[Max. Marks:50]

- N.B Please check whether you have got the right question paper.
- 1) Attempt all questions.
 - 2) Illustrate your answer with suitable diagram
- Q.1
- a) What is Gibb's energy function? Give its variation with respect to temperature and pressure. 10
 - b) Define the terms open, closed, isolated, homogeneous and Heterogeneous systems. When 2 moles of an ideal gas expands isothermally and reversibly at constant temperature 300 k from 10dm³ to 20 dm³ . calculate ΔE , q and W . (Given : $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$) 10
- OR
- c) Write any five statements of second law of thermodynamics. Calculate the efficiency and amount of heat supplied to carnot cycle operating between temperatures 300k and 423k , if maximum work obtained is 575 J. 10
 - d) State and explain Hess's law of heat summation. Give its applications. 10
- Q.2
- a) Define entropy. Explain how entropy can be used as criteria of spontaneity and equilibrium. 10
 - b) Define Clapeyron – Clausius equation. Give its applications. 10
- OR
- Write short notes on (any four) 20
- a) Reversible and irreversible processes.
 - b) First law of thermodynamics.
 - c) Helmholtz free energy function.
 - d) Carnot theorem.
 - e) Reaction isochore.
 - f) Le – chatelier's principle.
- Q.3 Multiple choice questions. 10
1. Which out of the following is not an intensive property?
 - a) Viscosity

- b) Density
 - c) Energy
 - d) Surface tension
2. An isochoric process takes place at constant.....
- a) Volume
 - b) Pressure
 - c) Temperature
 - d) Heat
3. The amount of heat required to raise the temperature of one mole of the substance by 1k is called
- a) Molar heat
 - b) Molar capacity
 - c) Heat capacity
 - d) Molar heat capacity
4. Change in enthalpy in reversible isothermal expansion of an ideal gas is
- a) Zero
 - b) One
 - c) Less than zero
 - d) Greater than zero
5. Which is the correct unit for entropy.
- a) KJ mol.
 - b) Cal deg⁻¹ mol⁻¹
 - c) JK⁻¹ mol.
 - d) Cal deg⁻¹ mol.
6. The efficiency of heat engine operating 200K to 100K is
- a) 1.0
 - b) 0.25
 - c) 0.75
 - d) 0.50
7. In an irreversible process the entropy is
- a) Increases
 - b) Decreases
 - c) Zero
 - d) None of these
8. The work function (A) is defined as
- a) $A = E + TS$
 - b) $A = H + TS$
 - c) $A = E - TS$
 - d) $A = H - TS$

9. $\frac{dp}{dt} = \frac{\Delta H_v}{T(v_2 - v_1)}$ is a
- Vant hoff isotherm
 - Gibbs equation
 - Clapeyron equation
 - Helmholtz equation
10. According to Le-chatelier's principle. Increase in pressure shifts the equilibrium towards the direction in which the
- No. of moles increases
 - No. of moles decreases
 - Equal no. of moles
 - None of these