B-2006

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SUBJECT CODE NO:- B-2006
FACULTY OF SCIENCE AND TECHNOLOGY
B.Sc. S.Y. (Sem-III) Examination Oct/Nov 2019
Chemistry Paper-VIII
Physical Chemistry

[Time: 1:30 Hours] **[Max.Marks:50]**

Please check whether you have got the right question paper.
i) Attempt all questions.
ii) Illustrate your answer with suitable diagram.

Q.1 a) State and explain Hess's law of constant heat summation. 10

Calculate the maximum work done when one mole of an ideal gas expands isothermally and reversibly from 0.12 m^3 to 0.24 m^3 at 300 K.($R=8.314\ JK^{-1}mol^{-1}$)

b) What is Helmholtz work function? Give its variation with pressure and volume. 10

OR

c) Define the term isothermal, adiabatic, reversible and irreversible process with suitable examples. 10

d) State and explain Carnot theorem. Calculate efficiency and work done of an engine operating between 325 K and 425 K which absorbs 700 J of heat. 10

Q.2 a) What is the law of mass action. Derive it thermodynamically. 10
b) Explain the concept of entropy. Give its physical significance. 10

OR

Write short notes on any **four** of the following. 20
a) Homogeneous and heterogeneous system.
b) Molar heat capacity at constant pressure and constant volume.
c) Statements of second law of thermodynamics.
d) Gibbs free energy.
e) Reaction isotherm.
f) Le Chatelier's principle.

Q.3 Multiple choice questions. 10

1) The enthalpy of a system is given by ---
(a) H=E+PV (b) H=E-PV
(c) E=H+PV (d) None of these

2) The heat of neutralization of strong acid and strong base is always—
(a) zero (b) constant
(c) positive (d) changing

3) Example of intensive property is –
   (a) surface tension (b) density
   (c) viscosity (d) all

4) A part of universe which is under thermodynamic study is called as –
   (a) system (b) surrounding
   (c) process (d) thermochemistry

5) Entropy is a measure of--
   (a) concentration (b) velocity
   (c) zig – zag (d) randomness

6) Which of the following is true for a cyclic process?
   (a) $\Delta E = 0$ (b) $\Delta E = q - w$
   (c) q=w (d) all of these

7) Efficiency of heat engine operating between 400 K and 200 K is—
   (a) 0.25 (b) 0.50
   (c) 0.75 (d) 1

8) A spontaneous reaction proceeds with a decrease in--
   (a) entropy (b) enthalpy
   (c) free energy (d) internal energy

9) The equation $\frac{dp}{dt} = \frac{\Delta H}{T(V_2 - V_1)}$ is called—

   (a) Gibbs – Helmholtz's equation (b) Kirchoff's equation
   (c) Clapeyron equation (d) Clausius – Clapeyron equation

10) Equilibrium reactions are characterized by —
   a) Going to completion
   b) of being nonspontaneous
   c) the presence of both reactants and products in a definite proportion
   d) both a & b