



Name :

Roll No. :

Invigilator's Signature :

CS/B.Pharm (NEW)/SEM-2/PT-203/2011

2011

PHARMACEUTICAL CHEMISTRY

(PHYSICAL CHEMISTRY)

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

i) One poise means

a) $1 \text{ gm} \cdot \text{cm}^{-1} \text{ sec}^{-1}$

b) $1 \text{ gm} \cdot \text{cm}^{-2} \text{ sec}^{-2}$

c) $1 \text{ gm} \cdot \text{cm} \cdot \text{sec}$

d) $1 \text{ gm} \cdot \text{cm} \cdot \text{sec}^{-1}$.

ii) Unit of Refractive Index is

a) dynes-cm

b) degree

c) poise

d) none of these.

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[Turn over



vii) The reaction between sulphur dioxide and oxygen is catalyzed by finely divided platinum. This reaction is an example of

- a) homogeneous catalysis
- b) heterogeneous catalysis
- c) enzyme catalysis
- d) none of these.

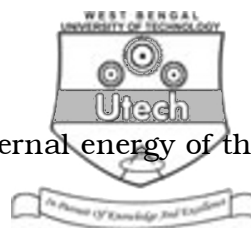
viii) When a small quantity of HCl is added to a mixture of sodium acetate and acetic acid (equimolar), the pH value of the mixture

- a) increases
- b) decreases
- c) remains the same
- d) decreases abruptly.

ix) For a colloidal system, increase in Gold number will result in

- a) increase in the protective property
- b) decrease in the protective property
- c) coagulation of colloids
- d) none of these.

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x) For a cyclic process the change in internal energy of the system is

- a) equal to zero
- b) infinity
- c) always positive
- d) always negative.

xi) The enthalpy change, ΔH of a process is given by the relation

- a) $\Delta H = \Delta E + P \Delta V$
- b) $\Delta H = \Delta E + \Delta n RT$
- c) $\Delta H = \Delta E + W$
- d) All of these.

xii) Expression for spreading coefficient is

- a) $W_{\text{Adhesion}} - W_{\text{Cohesion}}$
- b) $W_{\text{Adhesion}} + W_{\text{Cohesion}}$
- c) $W_{\text{Cohesion}} - W_{\text{Adhesion}}$
- d) $W_{\text{Adhesion}}/W_{\text{Cohesion}}$



GROUP – B
(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Define order of a reaction. Derive the rate equation for a First Order Reaction.
3. What are the applications of Clausius-Clapeyron equation ?
4. State the postulates of the kinetic theory of gases. A given quantity of a gas at a pressure of 730 mm and at a temperature of 20° C occupies 20.0 L. What is its volume at S.T.P. ? How many moles of gas are present in the system ?
How many molecules are also present ? 2 + 3
5. If the vapour pressures of water at 95° C and 100° C are 634 mm and 760 mm respectively, calculate the latent heat of vaporization per mole.
6. Differentiate between homogeneous and heterogeneous catalysis with examples.

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GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Describe the Bronsted-Lowry and Louis electronic theories.
- b) Define pH. Derive the equation for calculating the pH of strong acid and strong base.
- c) What is buffer capacity ?
- d) Derive the relationship between dissociation constant of a weak acid (K_a) and that of its conjugate base (K_b).
- e) Hydrogen ion concentration of a 0.05 (M) solution is 0.06 (M). What is the pH of the solution ?

4 + 4 + 1 + 4 + 2

8. a) What is plane polarized light ?
- b) Define optical activity of a substance ?
- c) What are Dextrorotatory and Levorotatory compounds ?
With examples write how they are expressed.
- d) Define specific rotation with mathematical expression.
- e) Describe with a schematic diagram the function of a Polarimeter to determine optical activity of a substance.

1 + 1 + 2 + 4 + 7

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9. What is an ideal solution ? Explain the utility of colligative property in determination of molecular weight of an unknown compound. A mixture of quinoline and water boils at 98.9°C under a pressure of 740 mm Hg. The distillate contains 7.79×10^{-2} kg of quinoline and 1 kg of water. The vapour pressure of quinoline at 98.9°C is 7.96 mm Hg. Calculate the molar mass of quinoline. 2 + 7 + 6

10. a) Using Arrhenius equation, explain how activation energy of a reaction can be determined graphically.
- b) Explain Langmuir Adsorption Isotherm.
- c) Calculate the average kinetic energy of a hydrogen molecule at 0°C . 5 + 5 + 5
11. a) Define specific conductance, equivalent conductance of an electrolyte solution and explain effect of dilution on them.
- b) Discuss Debye-Huckel theory with equations. 8 + 7

