

Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS/B. PHARM(NEW)/SEM-2/PT-203/2012**

**2012**

**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 )**

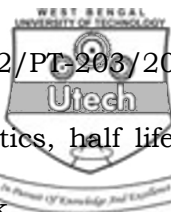
1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10
- i) Faraday-Tyndall Effect is due to
- a) diffraction of light      b) scattering of light  
c) transmission of light    d) reflection of light.
- ii) The reciprocal of viscosity is called
- a) surface tension          b) frictional resistance  
c) fluidity                    d) none of these.
- iii) If 's' is the solubility of AgCl in water, the solubility product *K* is given by
- a)  $K_{sp} = s$                     b)  $K_{sp} = s^2$   
c)  $K_{sp} = s^3$                     d)  $K_{sp} = \sqrt{s}$ .

2011

[ Turn over



- iv) The temperature at which two conjugate solution merge into one another to form one layer is called the
- critical temperature
  - critical solution temperature
  - distillation temperature
  - Dalton's temperature.
- v) The equation  $PV = nRT$  gives a relation between the temperature, pressure and volume of a gas. Such a relation connecting  $P-V-T$  of a system is called
- equation of uniformity
  - equation of ideal gas law
  - equation of state
  - equation of isotherm.
- vi) The heat input required to raise by 1 K the temperature of one mole of a substance is called
- heat capacity
  - specific heat
  - internal energy
  - all of these.
- vii) The process of dispersing a fine precipitate into colloidal state by adding a little specific electrolyte is called
- electrodialysis
  - lyophilization
  - peptization
  - electrophoresis.
- viii) Which of the following is not a colligative property ?
- Refractive index
  - Freezing point
  - Boiling point
  - Vapour pressure.
- ix) A change in pressure and volume which takes place at a constant temperature, is called
- isobaric change
  - isothermal change
  - adiabatic change
  - isochoric change.
- x) In physical adsorption the gas molecules are held to the solid surface by
- van der Waals' forces
  - $\pi$  bond
  - hydrogen bond
  - $\sigma$  bond.



- xi) In reactions that follow first order kinetics, half life is expressed as
- |                |                |
|----------------|----------------|
| a) $0.693/k^*$ | b) $0.301/k$   |
| c) $0.105/k$   | d) $k/0.693$ . |
- xii) Stalagmometer is used to measure
- |                     |                    |
|---------------------|--------------------|
| a) viscosity        | b) surface tension |
| c) refractive index | d) dipole moment.  |

**GROUP - B**

**( Short Answer Type Questions )**

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

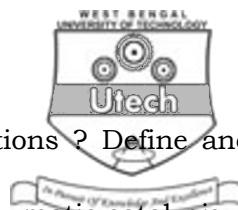
2. a) What is the molecular weight of gas A, 12.8 gm of which occupy 10 lit at a pressure of 750 mm and 27°C ?  
(  $R = 0.0082$  lit-atm degree<sup>-1</sup> mole<sup>-1</sup> )
- b) Describe van der Waals' equation. Discuss the volume correction & pressure correction.  $1\frac{1}{2} + 3\frac{1}{2}$
3. Explain the following :
- i) Adsorption is a surface phenomenon
- ii) Viscosity of liquid decreases with increase in temperature  $2\frac{1}{2} + 2\frac{1}{2}$
4. Differentiate between the following :
- i) Physical adsorption and Chemical adsorption
- ii) Ideal and Real gas.  $2\frac{1}{2} + 2\frac{1}{2}$
5. Define angle of contact. Show that  $\cos \theta = (\gamma_{as} - \gamma_{ls}) / \gamma_{al}$   
 $\gamma_{as}$  = Surface tension between air and solid  
 $\gamma_{ls}$  = Surface tension between liquid and solid  
 $\gamma_{al}$  = Surface tension between air and liquid.
6. Explain by deriving the equation that, work obtained from an isothermal and reversible process is always maximum and greater than the work obtained from an irreversible one.

**GROUP - C**

**( Long Answer Type Questions )**

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

7. a) Define catalysis. Discuss the general characteristics of catalytic reaction.
- b) What do you mean by Inhibitor, Poison and Promoter ?



- c) What are the types of catalytic reactions ? Define and give examples for each.
- d) What is enzyme ? Write in brief on enzymatic catalysis.  
5 + 3 + 3 + 4
8. a) Write down Boyle's law & Charles' law. Illustrate the laws with graphical representation.
- b) Write on the postulates of kinetic theory of gas.
- c) Derive (i) Boyle's law, (ii) Charles' law, (iii) Ideal gas equation & (iv) Avogadro's law from kinetic theory of gas.  
4 + 4 + 7
9. a) What are colloids ? How are they classified ? What is the difference between true solution and colloidal solution ?
- b) Explain the stability of colloids.
- c) Write notes on Tyndall effect and Brownian movement.
- d) Define the following terms : Gold number, Zeta potential, Krafft point, Diffusion coefficient.  
1 + 2 + 2 + 4 + 4 + 2
10. a) What is meant by viscosity ? What is its unit ? Give a method for determination of viscosity of liquid.
- b) At 20°C, 20 ml of water flows through a viscometer in 48 sec. At the same temp. 20 ml of acetone flows through the same viscometer in 20 sec. The density of acetone is 0.792 gm/cc. Calculate the relative viscosity of acetone.  
2 + 5 + 8
11. a) Explain the terms (i) order of reaction (ii) molecularity.
- b) Deduce the kinetic equation for a 1st order reaction and express the half-life of a 1st order reaction mathematically.
- c) A solution of a drug contained 500 units per ml when prepared. It was analyzed after a period of 40 day and was found to contain 300 units per ml. Decomposition of the drug follows first order. At what time drug will decompose to one half its original concentration.  
4 + 7 + 4

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