

(A-2) Seat NO: _____

No. of Printed Pages ; 3

SC

SARDAR PATEL UNIVERSITY
B.Sc EXAMINATION (NC)
SEMESTER - VTH

Physical Chemistry (US05CCHE06)

Date : 16/05/2016
Day : Monday

Time : 10:30 A.M. TO 01:30 P.M.
Maximum Mark : 70

Q.1 Choose the correct option for each of the following.

[10]

- (1) The curve representing the equilibrium between solid ice and vapour at different temperature is called.
(a) Fusion Curve (b) Transition Curve
(c) Vapour Pressure curve (d) Sublimation curve
- (2) Which of the following is reduced phase rule equation ?
(a) $F = C - P + 1$ (b) $F = C - P + 2$
(c) $F = C + P - 1$ (d) $F = C = F - P + 2$
- (3) The Phenomenon in which Polymorphic form can undergo reversible transformation in to one another is called.
(a) Enantiotropy (b) Monotropy
(c) Allotropy (d) None of these
- (4) How many layers are adsorbed in physical adsorption?
(a) Zero (b) One
(c) Two (d) Many
- (5) Freundlich Isotherm is not applicable at
(a) Low pressure (b) High pressure
(c) Intermediate pressure (d) None of These
- (6) In Physical adsorption the forces of attraction are
(a) Ionic (b) Covalent
(c) Vander Waal's (d) H - bonding
- (7) Increases in the number of theoretical plates and Hence the efficiency can increase with.
(a) Decrease of column length (b) Increase with column length
(c) Decrease of column diameter (d) both (b) & (c)
- (8) In GLC the qualitative determination can be done by
(a) Area of peak (b) Position of peak
(c) Number of Peak (d) None of these
- (9) Which one of the following is used to remove dissolved oxygen in cell Solution .
(a) H₂ gas (b) KCl
(c) N₂ gas (d) Gelatin
- (10) In ILKOVIC EQUATION the unit of diffusion Coefficient (D) is .
(a) Drop / sec (b) Cm² / sec
(c) Time / sec (d) Cm / sec

Q.2 Attempt the following [any ten]

[20]

(1) Define the term :

- (a) Phase (b) Component

(P.T.O)

(01)

- (2) For the following systems determine the number of components.
 CaCl_2 , $6\text{H}_2\text{O}_{(s)}$, $\text{Ca}^{+2}_{(aq)}$, $\text{Cl}^{-1}_{(aq)}$, $\text{H}_2\text{O}_{(l)}$, $\text{H}_2\text{O}_{(g)}$
- (3) Distinguish between : Triple point and Freezing point.
- (4) Explain :
 Adsorption Isotherm and Adsorption Isobar
- (5) Enlist the types of forces responsible for physisorption.
- (6) What is effect of temperature and pressure on adsorption of gas by solid surface ?
- (7) Define :
 (a) Specific Retention volume and Relative Retention.
- (8) What is meant by conditioning of column in gas chromatography ?
- (9) Write the method of packing of column in GLC .
- (10) Explain Kinetic current in Polarography.
- (11) What are the disadvantages of Dropping mercury electrode ?
- (12) Write the role of supporting electrolyte in a polarographic cell .

Q.3 Attempt the following .

- (a) Derive the Gibb's phase rule thermodynamically . [05]
- (b) Discuss the phase diagram in which two components forms a compound with congruent melting point. [05]

OR

Q.3 Attempt the following

- (a) Draw and discuss the phase diagram of lead silver system. [05]
- (b) The specific volumes of ice and water at 0° are 1.0907 cm^3 and 1.0001 cm^3 Respectively . what would be the change in melting point of ice per atm increase of pressure? Heat of fusion of ice is 80 cal gm^{-1} .
 given ;

$$1 \text{ atm} = 1.01325 \text{ Nm}^{-2} \quad \text{Molar mass of H}_2\text{O} = 18 \text{ gm mol}^{-1} .$$

Q.4 Attempt the following ;

- (a) Differentiate : [05]
 Physisorption and Chemisorption
- (b) Write a note on : [05]
 Adsorption Indicator .

OR

Q.4 Attempt the following.

- (a) Derive and explain Langmuir adsorption isotherm equation and give its limitations. [05]
- (b) Write a note on : [05]
 Applications of adsorption .

Q.5 Attempt the following.

- (a) Discuss Temperature programming in GC. And discuss the factors affecting chromatographic separation efficiencies. [10]

OR

Q.5 Attempt the following .

- (a) Enlist general requirements of detector in GC. Discuss any two detectors in detail . [10]

Q.6 Attempt the following .

- (a) Define half wave potential's . Show that ions can be identified from the measurements of half wave potential polarographically. [06]
- (b) Exactly 25 ml of the unknown solution which give a diffusion current of $39.5 \mu\text{A}$. As we transfer to the polarography cell to the soln is added exactly 5 ml of 0.0125 m cd^{+2} soln. The corrected diffusion current is $99 \mu\text{A}$. Calculate the concentration of cd^{+2} in unknown soln. [04]

OR

Q.6 Attempt the following

- (a) What is polarography? Sketch and describe working of polarographic cell. [06]
- (b) The diffusion current of a 2 mM soln of lead ion in 0.1 m KCl measured with a capillary for which $m^{2/3} t^{1/6}$ is 2.5 . i_d is $20 \mu\text{A}$. if the lead ion is reduce to the metallic state. Calculate the diffusion Coefficient of lead in this medium. [04]

— X —
(3)