



RM-6421

B. E. - II (Sem. IV) (Chemical) Examination

May / June - 2010

Engineering Chemistry - III

Time : Hours]

[Total Marks : 100

Instructions :

(1)

नीचे दृश्यादिब निशानीवाणी विगतो उत्तरवडी पर अवश्य लखवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
B. E. - 2 (Sem. 4) (Chemical)

Name of the Subject :
Engineering Chemistry - 3

Subject Code No. : 6 4 2 1 Section No. (1, 2,.....): 1&2

Seat No. :

Student's Signature

- (2) Give reactions and neat diagrams whenever necessary.
 (3) Use separate answer book for each section.
 (4) Question-1 and 4 are compulsory and carries 20 marks each.
 (5) Question-2, 3 and 5, 6 are of 15 marks each.

SECTION - I

- 1 (a) Fill in the blanks : 5
- (1) A saturated solution of NaCl has one degree of freedom. It is _____.
- (2) The reaction which are caused by heat and in absence of light are called _____.
- (3) The rate law relates the rate of a chemical reaction to _____.
- (4) The human kidney purifies the blood by _____ through natural membrane.
- (5) in ${}_5B^{10}$, the n/p ratio is _____.
- (b) Match the following : 5

1	Milk	A	2
2	$2N_2O_5 \rightarrow 4NO_2 + O_2$, order of reaction is	B	Emulsion
3	Silica	C	1
4	Starch	D	Non-elastic gel
5	$2NO_2 \rightarrow 2NO + O_2$, order of reaction is	E	Elastic gel

- (c) Write in brief : 10
- (1) State distribution law
 - (2) Phosphorescence
 - (3) Adsorption and Absorption
 - (4) Tyndall effect
 - (5) Pseudo order reaction.

2 Attempt any five : 15

- (1) How many phases are present in each of following system ?
 - (i) a drop of water placed in a stoppered bottle,
 - (ii) A piece of molten ice placed in a beaker covered with a watch glass,
 - (iii) Mixture of N_2, H_2 and O_2 .
- (2) Explain Aston's mass spectrograph.
- (3) A system is irradiated for 20 minutes and is found to absorb 4×10^{18} quantum per sec. If the amount decomposed in 3×10^{-3} mole and $N = 6.023 \times 10^{23}$, calculate the quantum efficiency of the reaction.
- (4) Write a note on Homogenous and Heterogeneous catalysis.
- (5) What is electrophoresis ? How do these phenomenons provide information about the sign of charge on particles ?
- (6) Describe the graphical method for the determination of order of reaction.
- (7) A first order reaction is 1/5 completed in 40 minutes, calculate the time required for 100% completion.

3 Attempt any three : 15

- (1) Draw a well labeled phased diagram of water system and discuss its salient features.
- (2) State and explain Stark Einstein law and Grothus draper law.
- (3) Discuss coagulation in detail.
- (4) Derive integrated rate equation for second order reaction.
- (5) The optical rotation of Sucrose in 0.9 N HCl at various time interval is given in the table below :

Time(Min.)	0	7.18	18	∞
Rotation(degree)	24.09	21.7	17.7	-10.74

Show that it is a first order reaction.

SECTION - II

- 4 (a) Fill in the blanks : 10
- (1) The attractive force between atoms created by sharing of _____.
 - (2) Ionic bond is conductor of _____.
 - (3) Covalent bond formed by sharing of electrons between _____.
 - (4) A process which proceeds of its _____ is spontaneous process.
 - (5) $\text{pH} = \text{pK}_a + \text{_____}$.
 - (6) The free energy function, _____ = $H - TS$.
 - (7) Phenolphthalein exists in double form which is _____ and _____.
 - (8) _____ = $-\log [\text{OH}^+]$.
 - (9) The greater the difference of electro negativity between two atoms, greater the _____.
- (b) Give definition of : 10
- (1) Degree of hydrolysis
 - (2) Enthalpy
 - (3) Entropy
 - (4) Types of Spectra
 - (5) Heat of Formation.
- 5 Attempt any three : 15
- (1) Explain Molar Volume and Molar fraction in detail.
 - (2) What is pH ? Discuss Glass electrode.
 - (3) What is proton concept of acid and base ? Give note on pH metric titration.
 - (4) Explain theory of indicators.
- 6 Attempt any five : 15
- (1) Give note on covalent and co-ordination bond.
 - (2) Discuss Dipole moment in detail.
 - (3) What is thermodynamics ? Explain Clapeyreon-Claussius equation in detail.
 - (4) Discuss Hess's law of heat of summation.
 - (5) What is heat of reaction and heat of combustion ?
 - (6) Discuss free energy and maximum work function in detail.
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