

Roll No. _____

[Total No. of Pages : 2

PG2S-052-B-22
M.Sc. II Semester (CBCS) Degree Examination
CHEMISTRY
Essential of Physical Chemistry
Paper : OET 2.2

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. Answer all the questions.
2. All questions carries equal marks.

Answer any EIGHT questions.

(8×2=16)

1.
 - a) Define mean activity coefficient.
 - b) Calculate pH of 0.2N NaOH aqueous solution.
 - c) What is ionic strength.
 - d) Define chemical potential.
 - e) What are non-ideal solutions?
 - f) State any two laws of chemical thermodynamics.
 - g) Give any two commercial applications of polymers.
 - h) What are branched and linear polymers.
 - i) Define energy of activation.
 - j) Define order of reaction and rate of reaction.
2.
 - a) Discuss how buffer solutions are prepared.
 - b) State the laws of Debye-Huckel limiting law.
 - c) Explain preparation of acidic and basic buffer solutions.

(OR)

- c) Explain i) Ionic strength ii) pH scale. iii) Buffer action.

(5+5+6=16)

3. a) Derive Duhem-Margulus equation
b) What are Maxwell's relations? Give their importance.
c) Derive Gibb's-Duhem equation.

(OR)

- c) Explain ideal and non-ideal solutions in brief. (5+5+6=16)

4. a) Discuss number average and weight average molecular weights of polymer.
b) Explain osmotic pressure method of determining polymer molecular weight.
c) Give the commercial uses of polymers.

(OR)

- c) Explain i) Degree of polymerization ii) Network and copolymer. (5+5+6=16)

5. a) Discuss the collision theory of reaction rate.
b) Explain relaxation method of studying fast reactions.
c) Give the comparison between transition state theory and collision state theory.

(OR)

- c) Derive Arrhenius equation. (5+5+6=16)

Roll No. _____

[Total No. of Pages : 2

PG2S-051-B-22
M.Sc. II Semester (CBCS) Degree Examination
CHEMISTRY
Applied Physical Chemistry - II
Paper : SCT - 2.2

Time : 3 Hours

Maximum Marks : 80

Instructions to Candidates:

1. Answer *all* the questions.
2. All questions carries equal marks.

1. Answer any EIGHT of the following. (8×2=16)

- a) What are complex reactions? Give examples.
- b) What do you mean by free radicals?
- c) Explain primary salt effect.
- d) What are the limitations of Hammett equation?
- e) Give examples of Light emitting diode.
- f) What are quantum dots?
- g) Why triplets are more stable than singlets?
- h) What is term symbol?
- i) How carbon nanotubes are different from graphene.
- j) What is BET theory?

- 2.**
- a) Discuss kinetics of decomposition of CH_3CHO .
 - b) Explain kinetics of branching chain reactions.
 - c) Derive the rate expression for decomposition of N_2O_5 .

(OR)

- c) Discuss kinetics of condensation polymerization. **(5+5+6=16)**

- 3.**
- a) Explain effect of pH and inhibition on enzyme catalyzed reactions.
 - b) Explain the basic feature of Freundlich and Langmuir adsorption isotherms.

PG2S-051-B-22/2022

(1)

[Contd...]

c) Derive the equation for Michaelis-Menten equation for enzyme catalysis.

(OR)

c) Discuss symmetry operators and symmetry elements. (5+5+6=16)

4. a) Explain the principles of sol-gel methods of nanoparticle synthesis.

b) Give an account on physical and chemical properties of nanomaterials with an example.

c) Explain organic charge-transfer complexes.

(OR)

c) What are key factors of solid-state reaction?

(5+5+6=16)

5. a) Explain the theoretical aspects of doublet structure in the spectra of sodium atom.

b) Explain Zeeman effect.

c) Discuss simple and compound triplet structure of alkali metals.

(OR)

c) Give an account Stern-Gerlach experiment.

(5+5+6=16)