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V Semester B.Sc. Degree Examination, March/April - 2023

CHEMISTRY**Physical Chemistry***(CBCS Scheme 2022 - 2023 Onwards)***Paper : V****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

1. Question paper has two sections, answer both the questions.
2. Write the chemical equations and diagrams wherever necessary.

SECTION - A

Answer any Five of the following questions. Each question carries 7 marks. (5×7=35)

1. a) Mention the regions of electromagnetic spectrum in which they appear.
b) Write the expression for rotational constant of a diatomic molecule. Mention the terms in it. (4+3)
2. a) What are fundamental and overtones bands?
b) Give the selection rule for vibrational spectra. (4+3)
3. a) State:
i) Hooke's Law
ii) Frank - Condon principle.
b) The force constant of HBr is 410 Nm^{-1} . Calculate the fundamental vibrational wave number (Given reduced mass of HBr is $1.64 \times 10^{-27} \text{ kg}$ and $C = 3 \times 10^8 \text{ ms}^{-1}$) (4+3)
4. a) In brief, explain the principle of NMR spectroscopy.
b) Give three applications of ESR spectroscopy. (4+3)
5. a) Explain briefly Stoke's lines and Antistoke's lines.
b) Give three characteristics of Raman lines. (4+3)
6. a) State Beer - Lambert's law. Give two applications.
b) Define:
i) Bioluminescence
ii) Chemiluminescence. (3+4)

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7. a) Define quantum efficiency. Discuss the mechanism of photochemical combination of H_2 and Cl_2 .
b) State Einstein's photochemical equivalence. (5+2)

SECTION - B

Answer any FIVE of the following questions. Each question carries 7 marks. (5×7=35)

8. a) Define the terms :
i) Relative error
ii) Mean deviation.
b) Calculate the standard deviation of the data obtained in an experiment 13, 17, 10, 12, and 20. (4+3)
9. a) Give the principle of TGA. Explain the estimation of magnesium in a sample by TGA.
b) Draw the titrative curve of pH metric method of titrating weak acid against strong base. (5+2)
10. a) Explain the estimation of Ni^{2+} present in a sample by solvent extraction.
b) State Nernst distribution law. What is partition coefficient? (4+3)
11. a) Describe the conductometric titration of weak acid against strong base.
b) Give three advantages of conductometric titration. (4+3)
12. a) Outline the potentiometric titration of determining the equivalence point of redox titration of dichromate ion against - ferrous ion.
b) Mention three advantages of potentiometric titrations. (4+3)
13. a) Explain the principle involved in ion-exchange chromatography.
b) Discuss determinant errors in brief. (4+3)
14. a) Explain continuous solvent extraction method.
b) Analytical data resulted from two different experiments is: (4+3)

Experiment 1	10	12	13	15	16
Experiment 2	11	14	16	13	18

Justify which method is efficient by applying F test. ($F_{tab} = 0.65$)



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V Semester B.Sc. Degree Examination, March/April - 2023

CHEMISTRY

Biochemistry

(CBCS Scheme 2022-23 onwards)

Paper : VI



Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

1. Question paper has two sections. Answer both the sections.
2. Write chemical equations and draw diagrams wherever necessary.

SECTION - A

Answer any Five of the following. Each question carries 7 marks.

(5×7=35)

1. a) Write a note on role of water in biological system.
b) Mention the contribution of
 - i. Emil fischer
 - ii. Watson and Crick to the field of Biochemistry.
- c) Give the definition of anabolism and catabolism. (3+2+2)
2. a) Differentiate between oxidative phosphorylation and substrate level phosphorylation.
b) i. Write the significance of redox potential in transfer of electrons in electron transport chain.
ii. What is P/O ratio. Give an example. (3+2+2)
3. a) Explain enzyme substrate interaction based on Koshland's model.
b) Write the chemical names for Vitamin A, Vitamin K and Vitamin D. (4+3)
4. a) Illustrate with graphical representation the effect of pH on the rate of enzymatic reactions.
b) Write Michaelis Menten equation and its significance.
c) Name the interactions which stabilize the double helical structure of DNA. (3+2+2)

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5. a) Explain the histone - nucleic acid interaction.
b) What is Chargaff's rule of base equivalence?
c) What is central dogma of molecular biology? (3+2+2)
6. a) Write the functions of helicase, topoisomerase and ligase in DNA replication.
b) What are Okazaki fragments?
c) Name the codons that specify initiation and termination in translation process. (3+2+2)
7. a) Mention the biological importance of epinephrine, thyroxine and vasopressin.
b) Explain feedback regulation with an example.
c) Name any two high energy compound other than ATP. (3+2+2)

SECTION - B

Answer any Five of the following. Each question carries 7 marks. (5×7=35)

8. a) What are amino sugars? Write the structure and one biological significance of galactosamine.
b) Write the partial structure and one biological function of cellulose. (4+3)
9. a) How is pyruvate converted to lactate and ethanol?
b) Mention the role of sugar phosphates in biological system. Name one sugar phosphate. (4+3)
10. a) What are complex and derived lipids? Give one example for each.
b) i. What is gluconeogenesis?
ii. Mention the number of ATP formed on complete oxidation of one glucose molecule. (4+3)
11. a) Write the structure of triacylglycerol. Mention any two biological importance.
b) i. Give the reaction of alkali hydrolysis of triglycerides.
ii. Denote the number of times palmitoyl CoA must undergo β - Oxidation to produce 8 molecules of Acetyl CoA. (4+3)
12. a) Outline the transport of activated fatty acyl CoA across the mitochondrial membrane.
b) What is a peptide bond? Write the structure of a dipeptide. (4+3)
13. a) What is denaturation of proteins? Mention the factors that causes denaturation.
b) How do α -amino acids react with Sanger's reagent? (5+2)
14. a) i. Give an example for the decarboxylation reaction of an amino acid. What is its importance?
ii. -Write the reaction catalyzed by the enzyme carbamoyl phosphate synthetase.
b) Represent zwitter ionic structure of an amino acid. (3+2+2)