

Dr.B.R.AMBEDKAR OPEN UNIVERSITY
FACULTY OF SCIENCE
M.Sc. – I year -CHEMISTRY (2020-21)
Course – I: Inorganic Chemistry

FIRST ASSIGNMENT

Maximum Marks – 15
Minimum Marks - 06

Section – A [1X10=10]
(Essay Type)

Answer any One question from the following Two questions

1. a. What is symmetry operation? What are symmetry elements? Explain every symmetry elements with suitable examples.
b. Discuss group defining properties.
2. State the crystal field theory and give salient features of CFT. And explain the crystal field splitting in tetragonal, square planar, trigonal bipyramidal geometry.

Section –B [1X5=5]
(Short Type)

(Answer any one question from the following two questions)

1. Give classification of the molecules into point groups? Explain molecules with Special Symmetry class with suitable examples.
2. What is an Orgel diagram? Explain the electronic spectra of d^1 , d^9 , d^2 , d^8 and d^5 weak and strong field complexes.

SECOND ASSIGNMENT

Maximum Marks – 15
Minimum Marks – 06

Section – A
(Essay Type) – [1X10=10]

(Answer any one question from the following Two questions)

1. Write a note on the following
 - a. Base hydrolysis of octahedral complexes.
 - b. Langford –Gray mechanism
 - c. Hughes-Ingold mechanism
2. Write note on the following
 - a. Polarographic method.
 - b. Bonding modes of carbon monoxide to metal
 - c. Differentiate the active site structures of Hemerythrin and hemoglobin.

Section –B
(Short Type) – [1X5=5]

(Answer any one question from the following Two questions)

1. What is Trans effect? Give applications of Trans effect.
2. Explain HSAB principle. Give its applications.

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M. Sc I Year - CHEMISTRY (2020-21)
COURSE – II: ORGANIC CHEMISTRY

FIRST ASSIGNMENT

Maximum Marks - 15

Minimum Marks – 06

SECTION --A – [1x10=10]

(Essay Type)

(Answer any One question from the following Two questions)

1. a. How are stereoisomers classified on the basis of their internal energy? What are the main characteristic features of configurational and conformational enantiomers and diastereomers.
2. Write a short note on the following.
 - a. Mechanism of SN1, SN2 and SNCB
 - b. Cross over experiments and trapping intermediates.
 - c. Addition reactions on carbon-carbon double bond

SECTION – B [1x5=5]

(Short Type)

(Answer any One question from the following Two questions)

1. Define racemic mixture, racemic modification and resolving agents. What are the characteristics of good resolving agents?
2. What is neighbouring group participation(NGP). Explain Sulphur, COO⁻, Br, I and Acetate groups involved in NGP substitution reactions.

SECOND ASSIGNMENT

Maximum Marks -- 15

Minimum Marks – 06

SECTION --A – [1x10=10]

(Essay Type)

(Answer any One question from the following Two questions)

1. Formulates any two syntheses of the following compounds.
 - a. Anthracene
 - b. Indole
 - c. Isoquinoline
 - d. Carbazole.
2. How are alkaloids classified? Give one example for each class. Discuss the determination of structure and synthesis of papaverine.

SECTION – B [1x 5 = 5]

(Short Type)

(Answer any One question from the following Two questions)

1. Explain two chemical properties of the Benzofuran Azulenes and quinolines.
2. Draw the structures of cellulose and chitin and explain the complete methylation and Hydrolysis of Amylopectin.

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COURSE – III : PHYSICAL CHEMISTRY

FIRST ASSIGNMENT

Maximum Marks-- 15

Minimum Marks – 06

SECTION --A – [1x10=10]

(Essay Type)

(Answer any One question from the following Two questions)

- 1)
 - a. Derive an equation of normalized wave function for particle in one dimensional box.
 - b. Derive wave equation for H-like atoms.
- 2) Explain the following
 - a. Hess's law
 - b. Kirchoff's equation
 - c. Gibbs Duhem equation.

SECTION – B [1x5=5]

(Short Type)

(Answer any One question from the following Two questions)

1. What is rigid rotator? Give Eigen functions of Rigid rotators. State and prove variation theorem.
2. Define term state function and path functions with suitable examples. State second law of thermodynamics in its various forms..

SECOND ASSIGNMENT

Maximum Marks -- 15

Minimum Marks – 06

SECTION -A [1x10=10]

(Essay Type)

(Answer any One question from the following Two questions)

1. a. Give an applications of polarography.
b. discuss about theories of corrosion.
2. a. Derive Debye-Huckel-onsagar equation.
b. obtain Michealis-Menten equation.

SECTION – B [1x5=5]

(Short Type)

(Answer any One question from the following Two questions)

1. What is over voltage? Explain effect of current density on over voltage..
2. a. Explain Lindamann's theory of unimolecular reactions.
b. Define quantum yield. And explain for its determination.

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M.Sc I Year – CHEMISTRY (2020-21)
COURSE – IV : Mathematics, Biology, Spectroscopy & Computers (General)

FIRST ASSIGNMENT

Maximum Marks - 15
Minimum Marks – 06

SECTION -A – [1x10=10]

(Essay Type)

(Answer any one question from the following Two questions)

For mathematics:

1. a. Find the derivative of $f(x) = \frac{x \cos x}{\sqrt{1+x^2}}$.
- b. Solve $x(x-2) \frac{dy}{dx} - 2(x-1)y = x^3(x-2)$
2. a. Explain the terms fundamental bands, over tones and hot bands.
- b. Explain the following terms: Chromophore, Auxochrome, Bathochromic Shift, Hypochromic Shift,, Hypsochromic Shift and Hyperchromic Shift.

For biology:

1. a. Give an account of the structure and functions of cell organelles.
- b. what are different levels of structural organisation of proteins? Explain with suitable examples.
2. a. Explain the terms fundamental bands, over tones and hot bands.
- b. Explain the following terms: Chromophore, Auxochrome, Bathochromic Shift, Hypochromic Shift,, Hypsochromic Shift and Hyperchromic Shift.

SECTION – B- [1x5=5]

(Short Type)

(Answer any one question from the following two questions)

For mathematics:

1. Find the inverse of the matrix $\begin{pmatrix} 2 & 10 & 9 \\ -4 & 3 & 6 \\ 11 & -12 & 10 \end{pmatrix}$
2. What is Raman effect? Explain the appearance, selection rules and applications of pure rotational Raman and vibrational Raman spectral lines.

For biology:

1. What are different types of RNA molecules? Explain their functions..
2. What is Raman effect? Explain the appearance, selection rules and applications of pure rotational Raman and vibrational Raman spectral lines.

SECOND ASSIGNMENT

(For both Mathematics and biology)

Maximum Marks - 15
Minimum Marks – 06

SECTION --A – [1x10=10]

(Essay Type)

(Answer any one question from the following Two questions)

1. Explain
 - a. Chemical shift
 - b. Spin-spin coupling
 - c. Coupling constant.
2. Discuss input and output functions in 'c' and control statements in 'C' programming.

SECTION – B [1x5=5]

(Short Type)

(Answer any one question from the following Two questions)

1. Explain Nitrogen rule, types of Peaks in mass spectra and High resolution mass spectroscopy.
2. What is an algorithm and flow chart? Draw a flow chart to find the maximum among three numbers.