

Total No. of Questions : 12]

DCHE01
M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2019
(First Year)
CHEMISTRY
General Chemistry

Time : 3 Hours

Maximum Marks : 70

SECTION – A

(4 × 7½ = 30)

Answer any Four of the following Questions

- Q1)** Explain the concept of Quantization of energy in Molecular spectroscopy.
- Q2)** Write about isotopic effect in rotation spectra by taking an example in micro wave spectroscopy.
- Q3)** Explain the energy bands in UV-Visible spectroscopy.
- Q4)** By taking an example, explain the vibrational spectram of a diatomic molecule in IR spectroscopy.
- Q5)** Write about the criteria for the rejection of a data in experimental data.
- Q6)** Explain the types of errors in analysis and minimization of errors in experiments.
- Q7)** Write about the basic components and their functions of a super computer.
- Q8)** List out directed INPUT and OUTPUT statements.

SECTION – B

(4 × 10 = 40)

Answer all questions from the following choosing one from each unit.

UNIT - I

Q9) a) Describe the working principle and applications of NMR spectroscopy.

OR

b) Discuss the nature of radiation and types of molecular spectroscopy.

UNIT - II

Q10) a) Discuss the rotational fine structure of electronic vibrational transitions in UV-Visible spectroscopy giving examples.

OR

b) Explain the vibrational spectra of anharmonic oscillator with examples of IR spectroscopy.

UNIT - III

Q11) a) How do you collect gaseous and liquid samples for analysis? Write presentation methods for liquid samples for analysis.

OR

b) Explain student 'F' test and mention its significance.

UNIT - IV

Q12) a) Write a Fortran program for rate constant for a first order reaction.

OR

b) Write a Fortran Program for the application solving Van der Waal equation.



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DCHE02

M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2019

(First Year)

CHEMISTRY

Inorganic Chemistry

Time : 3 Hours

Maximum Marks : 70

SECTION – A

(4 × 7½ = 30)

Answer any Four Questions from the following.

- Q1)** Explain Compton effect.
- Q2)** Explain the atomic spectra of alkali metals.
- Q3)** Write the postulates of LCAO approach.
- Q4)** Write about valence bond approach to H₂ molecule.
- Q5)** Explain Jahn-Teller effect.
- Q6)** Define the stability of a complex and write about the factors affecting the stability of complexes.
- Q7)** Write the synthesis of Borane and explain its structure.
- Q8)** Explain the electron Transfer reaction mechanism with an example.

SECTION – B

(4 × 10 = 40)

Answer all questions choosing one from each unit.

UNIT - I

- Q9)** a) Write variation method and its application to determination of ground state energy of Hydrogen atom.

OR

- b) Explain L-S and J-J coupling schemes with examples.

UNIT - II

- Q10)** a) Write the postulates of Molecular orbital Theory. Draw and explain the M.O. diagram of oxygen molecule.

OR

- b) Explain Lattice energy and Born Hayeber cycle.

UNIT - III

- Q11)** a) How do you determine the stability constant of complexes by optical methods.

OR

- b) Explain the splitting of 'd' orbital in Tetrahedral complexes with an example.

UNIT - IV

- Q12)** a) Discuss inner and outersphere reaction mechanisms with one example each.

OR

- b) What are metal nitrosyls ? Discuss the structure and bonding in metal nitrosyls with examples.



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DCHE03

M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2019

(First Year)

CHEMISTRY

Organic Chemistry

Time : 3 Hours

Maximum Marks : 70

SECTION – A

(4 × 7½ = 30)

Answer any Four Questions.

- Q1)** Write a note on cross conjugation and resonance with examples.
- Q2)** Explain the elements of symmetry.
- Q3)** Discuss the methods of determining mechanisms isotope effect.
- Q4)** Explain the nucleophilic substitution at an allylic carbon and vinylic carbon.
- Q5)** Write a note on Gattermann-Koch reaction with examples.
- Q6)** Discuss the Hydroboration with applications.
- Q7)** Explain hydrolysis of esters and amides with examples.
- Q8)** Discuss the mechanism and orientation in pyrolytic elimination.

SECTION – B

(4 × 10 = 40)

Answer all questions.

- Q9)** a) Discuss about Aromaticity in benzenoid and non-benzenoid compounds.

OR

- b) Explain conformations of Ethane and butane.

Q10) a) Discuss the stability, generation and reactivity of carbocation, carbanion and carbenes.

OR

b) Explain the mechanism of SN^1 and SN^2 reactions.

Q11) a) Explain

i) Sandmeyer reaction.

ii) Hundsdicker reaction.

OR

b) Discuss the hydrogenation of double, triple bonds and aromatic rings with examples.

Q12) a) Explain

i) Knoevenagel.

ii) Perkin reactions.

OR

b) Discuss the E_1 , E_2 and E_{1CB} mechanism.



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DCHE04

M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2019

(First Year)

CHEMISTRY

Physical Chemistry

Time : 3 Hours

Maximum Marks : 70

SECTION – A

(4 × 7½ = 30)

Answer any Four Questions.

- Q1)** Explain Van't Hoff equation.
- Q2)** Describe thermodynamic derivation of phase rule.
- Q3)** Discuss application of radio-isotopes.
- Q4)** Explain schottky and frenkel defects.
- Q5)** Discuss about concentration cells without transference.
- Q6)** Write a note on surface tension.
- Q7)** Explain Lindmann's theory.
- Q8)** Discuss the mechanism of homogeneous catalysis.

SECTION – B

(4 × 10 = 40)

Answer all Questions

- Q9)** a) Explain chemical potential Gibbs-Duhem equation and discuss about Raoult's law.

OR

- b) Discuss entropy changes in isolated systems in reversible and irreversible process.

Q10) a) Explain

- i) Bragg's equation
- ii) Miller indices
- iii) Bravais lattices.

OR

- b) Discuss types of radioactive decay.

Q11) a) Explain Nernst equation and explain relation between electrical and chemical energies.

OR

- b) Discuss BET equation and Gibbs absorption equation.

Q12) a) Discuss the types of rate of chemical reactions and explain the effect of temperature on reaction rates.

OR

- b) Explain laws of photochemistry and discuss the types of photo physical processes.

