

(DCHE01)

Total No. of Questions : 12]

[Total No. of Pages : 02

M.Sc. (Previous) DEGREE EXAMINATION, DECEMBER - 2018

(First Year)

CHEMISTRY

General Chemistry

Time : 3 Hours

Maximum Marks : 70

SECTION – A

$(4 \times 7\frac{1}{2} = 30)$

Answer any Four questions from the following

- Q1)** Write about Quantization of energy of molecules in molecular spectroscopy.
- Q2)** Explain the spectrum of a rigid rotor in microwave spectroscopy.
- Q3)** Write the sources and detectors used in UV and visible spectroscopy.
- Q4)** By taking a suitable example, explain the vibrational spectrum of a diatomic molecule.
- Q5)** Explain student 'F' test.
- Q6)** How do you collect different types of solid samples for analysis?
- Q7)** Explain INPUT and OUTPUT statements in MS-Fortran.
- Q8)** Explain the components and functions of a main frame computer.

SECTION – B

$(4 \times 10 = 40)$

Answer All questions. Choosing one from each unit

Unit - I

- Q9)** a) Write the principle of Microwave Spectroscopy. Explain the isotopic effects in rotation spectra by taking examples.
- OR
- b) Write the important components, working principle and applications of NMR spectroscopy.

Unit - II

Q10) a) Explain the rotational fine structure of electronic vibration transitions in UV-visible spectroscopy with examples.

OR

b) Write the principle and applications of Infra Red (IR) spectroscopy.

Unit - III

Q11) a) Explain the theory of sampling techniques and general methods for the storage and preservation of samples.

OR

b) Explain regression analysis.

Unit - IV

Q12) a) Write a program for Beer's law by least squares method.

OR

b) Explain control statements in fortran.



(DCHE02)

Total No. of Questions : 12]

[Total No. of Pages : 02

M.Sc. (Previous) DEGREE EXAMINATION, DECEMBER - 2018

(First Year)

CHEMISTRY

Inorganic Chemistry

Time : 3 Hours

Maximum Marks : 70

Part – A

(4 × 7½ = 30)

Answer any Four questions from the following

- Q1)** Explain Compton effect.
- Q2)** Write about term symbols and spectroscopic states.
- Q3)** Draw and explain the Molecular orbital diagram of H₂ molecule.
- Q4)** Write about Fajan's rules and Lattice theory.
- Q5)** Explain splitting of 'd' orbitals in octahedral complexes.
- Q6)** Define stability of complexes and explain Chelate effect on the stability of complexes with an example.
- Q7)** Explain SN¹ ligand substitution reaction mechanism with an example.
- Q8)** By taking examples, explain structure and bonding in intercalation compounds.

Part – B

(4 × 10 = 40)

Answer All questions. Choosing one from each unit

Unit - I

- Q9)** a) Discuss wave equation for Hydrogen like atom.
- OR
- b) Explain variation method and its applications.

Unit - II

Q10) a) Write the postulates of Molecular Orbital Theory. Make a comparison of M.O and V.B Theories.

OR

b) How do you explain shapes of molecules according to VSEPR Theory? Add a note on hydrogen bonding.

Unit - III

Q11) a) How do you determine the stability constants of complexes by optical method?

OR

b) Explain John-Teller effect and its applications.

Unit - IV

Q12) a) Write the synthesis, properties and structure of silicates.

OR

b) Explain the mechanism of electron transfer reactions by giving suitable examples.



(DCHE03)

Total No. of Questions : 12]

[Total No. of Pages : 02

M.Sc. (Previous) DEGREE EXAMINATION, DECEMBER - 2018

First Year

CHEMISTRY

Organic Chemistry

Time : 3 Hours

Maximum Marks : 70

SECTION – A

$(4 \times 7\frac{1}{2} = 30)$

Answer any Four questions

- Q1)** Explain about Anti-Aromaticity and Homoaromaticity.
- Q2)** Write a note on Asymmetric synthesis.
- Q3)** Describe the stability and reactivity of Nitrenes.
- Q4)** Explain SN¹ and SN² mechanisms.
- Q5)** Write a note on Diazonium coupling.
- Q6)** Explain about Hydroboration.
- Q7)** Write the mechanism of condensation reactions involving enolates-Aldol reaction.
- Q8)** Explain orientation in pyrolytic elimination.

SECTION – B

(4 x 10 = 40)

Answer All questions

Q9) a) Describe the Aromaticity in benzenoid and non-benzenoid compounds.

OR

b) Write a note on :

- i) Biphenyl compounds.
- ii) Allenes.

Q10) a) Describe structure, stability and reactivity of carbocation and carbanions.

OR

b) Explain classical and nonclassical carbocations and phenonium ions.

Q11) a) Explain the following:

- i) Gattermann-Koch reaction.
- ii) Sandmeyer reaction.

OR

b) Explain Allylic halogenation and auto-oxidation.

Q12) a) Explain the following:

- i) Benzoin reaction.
- ii) Stobbe reaction.

OR

b) Write a note on E_1 , E_2 and E_{1CB} mechanism.



(DCHE04)

Total No. of Questions : 12]

[Total No. of Pages : 02

M.Sc. (Previous) DEGREE EXAMINATION, DECEMBER - 2018

(First Year)

CHEMISTRY

Physical Chemistry

Time : 3 Hours

Maximum Marks : 70

SECTION – A

$(4 \times 7\frac{1}{2} = 30)$

Answer any Four questions from the following

Q1) State and explain second law of Thermodynamics and write its applications.

Q2) State and explain Gibbs-Helmholtz equation.

Q3) Explain theory of gamma decay.

Q4) Write the principle and applications of radiocarbon dating.

Q5) Explain transport number and its determination of an electrolyte.

Q6) Draw and explain Langmuir adsorption iso-therm.

Q7) Draw and explain Jablonsky diagram.

Q8) Explain acid base catalysis reaction mechanism with examples.

SECTION – B

(4 x 10 = 40)

Answer All questions, Choosing one from each unit

Unit - I

Q9) a) Explain Maxwell's thermodynamic relations.

OR

b) Write about free energy and free energy changes in ideal gases.

Unit - II

Q10) a) Write the properties and applications of semiconductors and conductors.

OR

b) Explain Bragg's equation and Bravais lattices.

Unit - III

Q11) a) How do you determine the cell concentration without transference.

OR

b) Explain BET equation and write the determination of surface area by BET method.

Unit - IV

Q12) a) Explain Collision theory of reaction rates.

OR

b) Explain primary and secondary salt effects on reaction rates. What are parallel reactions? Give examples.

