M.Sc. (Second) DEGREE EXAMINATION, MAY – 2018
Second Year
CHEMISTRY
Analytical Chemistry

Time : 3 Hours   Maximum Marks :70

SECTION - A
Answer any four of the following questions.   **(4 × 7^1/$_2$ = 30)**

Q1) State and explain Beer's Law mention its limitations.

Q2) Write the basic instrumentation, principle and applications of nephelometry.

Q3) Define Fluorescence and explain the factors influencing Fluorescence.

Q4) Write the principle and applications of flame photometry.

Q5) Draw and explain the conductometric titration curve of a strong acid and strong base.

Q6) Write the construction and working of dropping mercury electrode.

Q7) Write the criteria for the selection of solvent in solvent extraction process. Explain the factors affecting solvent extraction.

Q8) Write the principle and applications of paper chromatography and experimental procedure.

SECTION - B
Answer all of the following questions.
Choosing one from each unit.

(4 × 10 = 40)

Unit - I

Q9) a) Write the simultaneous determination of manganese and vanadium in a complex matrix by spectrophotometrically?

OR

   b) Write the theory, instrumentation and principle of infrared spectroscopy.

Unit - II

Q10) a) Write the theory, instrumentation, principle and applications of flame emission spectroscopy.

OR

b) Write the principle and applications of Fluorimetry. Make a comparison between Fluorescence and phosphorescence.

Unit - III

Q11) a) Write the basic instrumentation, principle and applications of polarography.

OR

b) Explain the principle and application of controlled potential coulometric analysis.

Unit - IV

Q12) a) Write the theory, important components principle and application of Gas Liquid Chromatography.

OR

b) Write the theory, principle, instrumentation and applications of Column Chromatography.

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M.Sc. (Second) DEGREE EXAMINATION, MAY – 2018
Second Year
CHEMISTRY
Inorganic Chemistry

Time : 3 Hours   Maximum Marks :70

SECTION - A
Answer any four of the following questions.   **(4 x 7$^1/_2$ = 30)**

Q1) Write about occurrence and synthesis of lanthanides.

Q2) Explain magnetic properties and oxidation states of lanthanides.

Q3) Write the principle and application of Raman Spectroscopy.

Q4) Write the applications of electron absorption Spectroscopy to inorganic systems.

Q5) How do you determine magnetic in susceptability of complexes by Guoy method?

Q6) Write the significance of 'g' value in ESR studies. Explain Hyperfine splitting.

Q7) Explain the mechanism of photo synthesis?

Q8) Write a note on metal ion toxicity?

SECTION - B
Answer all questions. Choosing one from each unit.

(4 x 10 = 40)

Unit - I

Q9) a) Define Lanthanide contraction and explain its consequences. Write the uses of lanthanides.

OR

b) Write the magnetic and spectral properties of actinides. What are the uses of actinides?

Unit - II

Q10) a) Write the basic instrumentation of X-ray diffraction. How do you determine single crystal structure by XRD?

OR

b) Explain the instrumentation, principle and applications of Infra Red (IR, Spectroscopy).

Unit - III

Q11) a) Write the basic instrumentation, principle and applications of NMR Spectroscopy.

OR

b) Write the basic principle of magnetic balances. Explain its applications in the study of stereochemistry, band order and structure of metal complexes.

Unit - IV

Q12) a) Explain sodium pump in detail?

OR

b) What are metallophorphyrins? Write about myoglobin and Haemoglobin?

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M.Sc. (Second) DEGREE EXAMINATION, MAY – 2018
Second Year
CHEMISTRY
Organic Chemistry

Time : 3 Hours Maximum Marks :70

SECTION - A
Answer any four questions. $(4 \times 7^{1}/_{2} = 30)$

Q1) Write a note on overtones.

Q2) Explain effect of solvent on electronic transitions.

Q3) Write a note on McLafferty rearrangement.

Q4) What is the chemical shift? Write some chemical shift values.

Q5) Explain about quantum yield.

Q6) Write a note on Electrocyclic reactions.

Q7) Describe the Isoprene rule with examples.

Q8) Explain synthesis of Quinine.

SECTION - B
Answer all questions.

$(4 \times 10 = 40)$

Q9) a) Explain the following:
  i) Fermi resonance
  ii) Effect of hydrogen bonding on vibrational frequencies.
OR
  b) Explain Fieser-Woodward rules for conjugated dienes and carbonyl compounds.

Q10) a) Write a note on Fourier transforms technique and nuclear over Hauser effect.
OR
  b) Explain about Nitrogen rule and high resolution mass spectrometry.

Q11) a) Explain FMO approach for cyclo addition reactions under thermal and photo chemical conditions?

OR

b) Describe Norrish type I and type II reactions.

Q12) a) Write the structural elucidation and synthesis of Nicotine.

OR

b) Write a note on :
    i)   Benzil Benzilic acid rearrangement.
    ii)   Beckmann rearrangement.

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M.Sc. (Second) DEGREE EXAMINATION, MAY – 2018

Second Year

CHEMISTRY

Environmental Chemistry

Time : 3 Hours   Maximum Marks :70

SECTION - A

Answer any four of the following questions.   **(4 x 7$^1/_2$ = 30)**

Q1) Write about the nomenclature in the study of environmental chemistry.

Q2) How do you determine moisture content in soil samples?

Q3) What are the atmospheric sources for Air pollution? How do you determine carbon-monoxide in Air pollution samples?

Q4) How do you determine aromatic hydrocarbans in Air samples.

Q5) Write the composition of sea water and drinking water quality parameters.

Q6) Explain the effects of soaps and detergents on water pollution?

Q7) How do you determine dissolved oxygen (DO) in water samples?

Q8) Write the principle and applications of reverse osmosis.

SECTION - B

Answer all questions. Choosing one from each unit.

(4 × 10 = 40)

Unit - I

Q9) a) Write about the formation of soil and the factors affecting soil formation.

OR

b) How do you determine total nitrogen in soil samples?

Unit - II

Q10) a) How do you analyze oxides of sulpher in Air samples?

OR

b) Suggest control methods for Air pollution due to particulate matter and radioactive substances.

Unit - III

Q11) a) Explain Hydrological cycle in detail.

OR

b) Discuss the effects of pesticides Arsenic and nitrites in drinking water.

Unit - IV

Q12) a) Explain the continuous monitoring of water pollutants. Write the principles of monitoring equipment.

OR

b) Write the primary and secondary treatment methods of water.

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