

# P. P. SAVANI UNIVERSITY

Fifth Semester of B.Sc. Examination

December-2021

SSCH3030-Inorganic Chemistry-VII

08.12.2021, Wednesday Time: 12:30 p.m. to 03:00 p.m Maximum Marks: 60

### Instructions:

1. The question paper comprises of two sections.
  2. Section I and II must be attempted in separate answer sheets.
  3. Make suitable assumptions and draw neat figures wherever required.
- Use of scientific calculator is allowed.

### Section-I (Total Marks - 30)

#### Q.1 Short Questions

##### 1.1 Objectives

[10]

1.1a The mass analyzer in a mass spectrometer separates the sample ions based on their \_\_\_\_\_ ratio.

[05]

- A m/z
- B q/r
- C m/r
- D q/z

1.1b The full form of ESI

- A Electricspray Ionization
- B Electronspray Ionization
- C Electro spray Ionization
- D All of the above

1.1c FAB is a type of

- A Mass analyzer
- B Detector
- C Ionization method
- D None of the above

1.1d The physical properties of organometallic compounds resemble with those of \_\_\_\_\_ compounds.

- A Organic
- B Inorganic
- C Both organic and inorganic
- D None

1.1e Resolution is defined as

- A  $M/\Delta M$
- B  $MR/\Delta M$
- C  $\Delta M/M$
- D  $M/\Delta MR$

1.1f Tetraalkyl and tetraaryl organotin compounds are stable upto

- A Metal-carbon Ionic Bonds
- B Metal-Carbon Bridge Bonding
- C Metal-Carbon Two Electron Covalent Bonds
- D Metal - Carbon Multiple bonds

1.1g Lithium is often stored in \_\_\_\_\_ before use.

- A Metal - Carbon Multiple bonds
- B Benzene
- C Toluene

- D All of the above
- 1.1h  $\text{SiMe}_4$  is stable at
- A 500°C
- B 1500°C
- C 2500°C
- D None of the above
- 1.1i Organoaluminium compounds are sensitive to
- A Air
- B Water
- C Alcohols
- D All of the above
- 1.1j In EI-MS, the samples must be volatile
- A Can's say
- B Conditional
- C False
- D True

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) [05]

- 1.2a Write the full form of SIMS.
- 1.2b Organolithium compounds form oligomers. (True/False)
- 1.2c What is the full form of GC-MS?
- 1.2d Organoaluminium compounds are sensitive to air, water, alcohols and many other compounds. (True/False)
- 1.2e Organomercury compounds are soluble in methanol. (True/False)

Q.2 Short Notes (attempt any two) [06] 06

- A Discuss sample introduction in a mass spectrometer.
- B Explain various structures adopted by Organoaluminium compounds and the bonding involved in them.
- C Discuss the applications of any three organometallic compounds.

Q.3 Explain in detail (attempt any two) [14] 14

- A Write a detailed note on Metal Carbonyls.
- B Describe Electrospray Ionization.
- C Write a detailed note on Electron Ionization.

#### Section-II (Total Marks - 30)

Q.1 Short Questions [10]

1.1 Objectives [05]

1.1a Spectroscopy deals with the interaction of electromagnetic radiation with

- A Matter
- B Sound
- C Radiation
- D Frequency

1.1b Radiation consisting of only one particular wavelength is called

- A Monochromatic
- B Dichromatic



- C Polychromatic
- D Trichromatic

1.1c Electromagnetic radiation can be regarded as stream of elementary particles called

- A photons
- B electrons
- C positrons
- D protons

1.1d The lifetime associated with the loss of excited state energy to arrive at the ground state is known as

- A Relaxation time
- B Half time
- C Excitation time
- D Impulse time

1.1e In an electromagnetic radiation, the electric and magnetic field are

- A parallel
- B perpendicular
- C Parallel and perpendicular
- D None of the above

1.1f Which of the following is the form of electromagnetic radiation?

- A Radio frequency
- B Visible light
- C Gamma rays
- D All the above

1.1g The number of waves passing through one point in one second is called

- A Frequency
- B Phase
- C Wave length
- D Wave number

1.1h When a particular atom in a molecule is replaced by its isotope it is still similar \_\_\_\_\_.

- A Chemically
- B Physically
- C Both
- D None

1.1i The velocity of light  $c$  is

- A  $3 \times 10^8$  m/s
- B  $3 \times 10^{10}$  m/s
- C  $3 \times 10^8$  cm/s
- D None of the above

1.1j The number of waves in one cm is called

- A Wavenumber
- B Amplitude
- C Phase
- D Frequency

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks)

[05]

- 1.2a The energy of a radiation increases with \_\_\_\_\_. (frequency/wavelength)
- 1.2b Define wave number.
- 1.2c Define frequency.
- 1.2d What is spectroscopy?
- 1.2e What is absorption spectra?

Q.2 Short Notes (Attempt any two)

[06]

- A Define and explain induced absorption and emission.
- B Discuss in detail about spectroscopic transitions.
- C Write a note on isotopic substitution.

Q.3 Explain in detail (Attempt any two)

[14]

- A Derive and explain Born-Oppenheimer approximation.
- B Write a detailed note on Laws of light absorption.
- C Describe the principles of Moments of Inertia.