SSR DEGREE AND PG COLLEGE NIZAMABAD

FACULTY OF SCIENCE

DEPARTMENT OF CHEMISTRY

SEM-5 INTERNAL ASSESSMENT-I QUESTION BANK 2026

Part – A: Multiple Choice Questions (MCQs)

1. Spectroscopy is the study of the interaction between:
   - A) Matter and heat
   - B) Matter and electromagnetic radiation
   - C) Matter and pressure
   - D) Matter and sound
2. The wavelength of electromagnetic radiation is commonly expressed in:
   - A) Joule
   - B) Newton
   - C) Nanometre
   - D) Pascal
3. The energy of electromagnetic radiation is given by:
   - A) $E = mc^2$
   - B) $E = h\nu$
   - C) $E = mv^2$
   - D) $E = RT$
4. The region of electromagnetic spectrum used in UV spectroscopy is approximately:
   - A) 10–100 nm
   - B) 200–400 nm
   - C) 400–800 nm
   - D) 800–2500 nm
5. The absorption of UV-visible radiation generally causes:
   - A) Rotational transition
   - B) Vibrational transition
   - C) Electronic transition
   - D) Nuclear transition
6. Beer-Lambert law is expressed as:
   - A) $A = \varepsilon bc$
   - B) $A = mc^2$
   - C) $A = h\nu$
   - D) $A = PV$
7. In UV-Visible spectroscopy, the term λmax refers to:
   - A) Minimum wavelength
   - B) Maximum wavelength absorbed
   - C) Maximum absorbance wavelength
   - D) Maximum frequency
8. Which of the following is commonly used as a solvent in UV spectroscopy?

- A) Water
- B) Sodium chloride
- C) Potassium bromide
- D) Mercury

9. Infrared spectroscopy is mainly used to study:
   - A) Electronic transitions
   - B) Vibrational transitions
   - C) Nuclear transitions
   - D) Ionization processes
10. The commonly used unit of IR frequency is:

- A) cm^{-1}
- B) nm
- C) Hz only
- D) mL

11. The functional group region of an IR spectrum is approximately:

- A) 4000–2500 cm^{-1}
- B) 4000–1500 cm^{-1}
- C) 1500–500 cm^{-1}
- D) 500–100 cm^{-1}

12. The fingerprint region in IR spectroscopy is approximately:

- A) 4000–2500 cm^{-1}
- B) 2500–2000 cm^{-1}
- C) 2000–1500 cm^{-1}
- D) 1500–500 cm^{-1}

13. The IR absorption band of a carbonyl group (C=O) generally occurs near:

- A) 1000 cm^{-1}
- B) 1700 cm^{-1}
- C) 2200 cm^{-1}
- D) 3500 cm^{-1}

14. Which source is commonly used in IR spectroscopy?

- A) Globar source
- B) Hydrogen lamp
- C) Deuterium lamp
- D) Sodium lamp

Q.No.	Answer
1	**B) Matter and electromagnetic radiation**
2	**C) Nanometre**
3	**B) $E = h\nu$**
4	**B) 200–400 nm**
5	**C) Electronic transition**
6	**A) $A = \varepsilon bc$**
7	**C) Maximum absorbance wavelength**
8	**A) Water**
9	**B) Vibrational transitions**
10	**A) cm^{-1}**
11	**B) 4000–1500 cm^{-1}**
12	**D) 1500–500 cm^{-1}**
13	**B) 1700 cm^{-1}**
14	**A) Globar source**

Part – B: Fill in the Blanks

1. The study of the interaction of electromagnetic radiation with matter is called **Spectroscopy**.
2. The energy of a photon is given by the equation **$E = h\nu$**.
3. The SI unit of frequency is **Hertz (Hz)**.
4. The visible region of electromagnetic spectrum lies approximately between **400 nm** and **800 nm**.
5. UV-Visible spectroscopy mainly involves **electronic** transitions.
6. Beer-Lambert law is represented by the equation **$A = \varepsilon bc$**.
7. The molar absorptivity is represented by the symbol **ε (epsilon)**.
8. The wavelength corresponding to maximum absorption is called **λmax (lambda max)**.
9. IR spectroscopy mainly involves **vibrational** transitions.
10. The unit commonly used for IR frequency is **cm^{-1} (reciprocal centimetre)**.
11. The region below 1500 cm^{-1} in an IR spectrum is called the **fingerprint** region.
12. The absorption near 1700 cm^{-1} is generally characteristic of the **carbonyl (C=O)** group.
13. A commonly used IR source is the **Globar** source.
14. NMR stands for **Nuclear Magnetic Resonance**.

Part – C: One-Mark Questions

1. What is spectroscopy?
2. Define electromagnetic radiation.
3. Define frequency of electromagnetic radiation.
4. Define chromophore.
5. What is an auxochrome?
6. Define λmax.
7. State Beer-Lambert law.
8. What is molar absorptivity?
9. What is infrared spectroscopy?
10. What is meant by molecular vibration?
11. Define stretching vibration.
12. Define bending vibration.
13. What is the fingerprint region in IR spectroscopy?
14. Mention any two applications of UV-Visible spectroscopy.
15. Mention any two applications of IR spectroscopy.