

Instrumental Method of Analysis

B. Pharm. 7th Semester

Model Question Paper

Spectroscopy

Important Questions for Practice only

#GPAT

#NIPER

#Pharmacist

#DI

www.youtube.com/pharmacologyconceptsbyrajeshchoudhary

Section I MCQs

- Q1.** The far vacuum ultraviolet region of electromagnetic spectrum ranges from :
- (a) **10 - 200 m μ** (b) 10 - 300 m μ
(c) 50 - 150 m μ (d) None of these
- Q2.** The ultraviolet region ranges from :
- (a) 100 - 300 m μ (b) 100 - 400 m μ
(c) **200 - 400 m μ** (d) 200 - 350 m μ
- Q3.** The shift of an absorption maxima to a higher wavelength is known as :
- (a) **Bathochromic shift** (b) Hyperchromic shift
(c) Hypsochromic shift (d) Hypochromic shift
- Q4.** When absorption energy is increased, then the shift is called as :
- (a) Hypochromic shift (b) **Hyperchromic shift**
(c) Bathochromic shift (d) Hypsochromic shift
- Q5.** All of the following types of transition are possible within ligands, except :
- (a) $n - \pi^*$ (b) $n - \sigma^*$
(c) **$\sigma - \pi^*$** (d) $\pi - \pi^*$
(e) $\sigma - \sigma^*$
- Q6.** Electronic transitions in organic molecules involves :
- (a) Transitions of σ electrons. (b) Transition of n electrons
(c) Transition of π -electrons (d) **All of the above**
- Q7.** All of the following statements regarding n electrons are true except :
- (a) They are non bonding electrons.
(b) They are found in atoms such as N, O, S and halogens.
(c) **They are tightly held and the energy of UV region can not overcome this attraction.**
(d) They undergo $n - \pi^*$ and $n - \sigma^*$ types to transitions.

- Q8.** All of the following statements regarding chromophoric groups are true except :
- They are organic groups and undergoes $n - \pi^*$ and $\pi - \pi^*$ transition
 - They are colour exciting groups.
 - A molecule containing these is called as chromophore.
 - Examples includes groups like hydroxyl, amino, halogen etc.**
- Q9.** The most commonly used source for UV radiations is :
- Tungsten filament incandescent
 - Deuterium/hydrogen discharge lamp.**
 - Tungsten-iodine lamp
 - Quartz-iodine lamp
- Q10.** The commonly used detector in the UV spectrophotometer is :
- Photomultiplier tube**
 - Thermocouple
 - Bolometer
 - Littrow prisms
- Q11.** The region for infrared radiation ranges from :
- $14290 - 4000 \text{ cm}^{-1}$ ($0.7 - 2.5 \text{ }\mu\text{m}$)
 - $4000 - 666 \text{ cm}^{-1}$ ($2.5 - 15.0 \text{ }\mu\text{m}$)**
 - $700 - 200 \text{ cm}^{-1}$ ($14.3 - 50 \text{ }\mu\text{m}$)
 - None of the above
- Q12.** Bending vibration includes all of the following except :
- Stretching**
 - Twisting
 - Rocking
 - Torsional vibrations
- Q13.** According to $3n - 6$ rule, the non linear, triatomic water molecules has :
- 2 fundamental vibrations
 - 3 fundamental vibrations**
 - 4 fundamental vibrations
 - 5 fundamental vibrations.
- Q14.** For obtaining infrared radiations, Nernst filament should be heated to :
- $500 - 1000 \text{ }^\circ\text{C}$
 - $1000 - 1500 \text{ }^\circ\text{C}$
 - $1000 - 1800 \text{ }^\circ\text{C}$**
 - $1000 - 1850 \text{ }^\circ\text{C}$
- Q15.** The Nernst filament is fabricated from the oxides of :
- Zirconium
 - Thorium
 - Cerium
 - All of the above.**
- Q16.** The IR radiation source, Globar is chemically :
- Silicon carbide**
 - Silicon disulphide
 - Zirconium oxide
 - None of the above.
- Q17.** Which of the following statement is not true regarding Thermocouple :
- This is a commonly used detector in I.R. spectrophotometers.
 - The radiant energy heats one of its two bimetallic junction and an emf is produced.
 - It changes its resistance upon heating.**
 - The emf is directly proportional to the degree of heating.
- Q18.** Infrared spectra may be obtained for :
- Solids
 - Liquids
 - Gases
 - All of the above**

- Q19.** Which of the following is used as a mulling agent :
- (a) Carbon tetrachloride **(b) Nujol**
(c) Carbon disulphide (d) All of the above
- Q20.** Pressed disc technique for sample preparation in I.R. involves the use of :
- (a) Salt plates (b) Nujol
(c) KBr (d) None of the above
- Q21.** The application of I.R. spectroscopy involves.
- (a) Qualitative analysis (b) Quantitative analysis
(c) Structural diagnosis **(d) All of the above.**
- Q22.** C-H stretching absorption for alkanes ranges from :
- (a) 2962 - 2853 cm^{-1}** (b) 3040 - 3010 cm^{-1}
(c) 3095 - 3075 cm^{-1} (d) 3040 - 3010 cm^{-1}
- Q23.** C-H bending vibrations for alkanes shows absorption in the region :
- (a) $\sim 3300 \text{ cm}^{-1}$ **(b) $\sim 1340 \text{ cm}^{-1}$**
(c) 1485 - 1445 cm^{-1} (d) 1470 - 1430 cm^{-1}
- Q24.** O-H stretching vibrations in alcohols and phenols ranges from :
- (a) 3550 - 3450 cm^{-1} (b) 3400 - 3200 cm^{-1}
(c) 3650 - 3590 cm^{-1} (d) 3570 - 3450 cm^{-1}
- Q25.** O-H bending vibrations for tertiary alcohol shows absorption in the region :
- (a) $\sim 1030 \text{ cm}^{-1}$ (b) $\sim 1100 \text{ cm}^{-1}$
(c) $\sim 1200 \text{ cm}^{-1}$ **(d) $\sim 1150 \text{ cm}^{-1}$**
- Q26.** N-H bending vibrations for secondary amines shows absorption in the region :
- (a) 3500 - 3310 cm^{-1} (b) 1650 - 1590 cm^{-1}
(c) 1650 - 1550 cm^{-1} (d) 1600 - 1575 cm^{-1}
- Q.27.** Relaxation from triplet state to ground state is known as
- a) **Phosphorescence** b) Fluorescence
c) Relaxation d) all
- Q.28.** Quenching means
- a) Increase in the I_f **b) Decrease in the I_f**
b) Increase in the I_0 d) Decrease in the I_0
- Q29.** A fluorescent light collected at to the incident beam
- a) 180 **b) 90**
c) Both d) none
- Q30.** Flame photometry is based on Spectroscopy
- a) Absorption b) Adsorption
c) Emission d) all
- Q.31.** Which element can be analyzed by Flame photometry
- a) Alkali metals b) Alkali earth metals
c) Both a & b d) None
- Q32.** At which conc. Metallic element can be analysed by Atomic absorption spectroscopy
- a) ppm** b) ppb c) ng/ml **d) all**
- Q33.** Which gas is used in the hollow cathode lamp
- a) Argon** b) Neon c) Xenon **d) Both a and b**
- Q.34.** Which detector is used in AAS
- a) Refractive index detector b) PMT

- c) Electro multiplier detector d) None
- Q.35. Which is the fast process
- a) absorption of energy ($S_0 \rightarrow S_1$)**
- b) Phosphorescence ($S_1 \rightarrow T \rightarrow S_0$)
- c) Fluorescence ($S_1 \rightarrow S_0$)

Section 2. Long Question

1. Write the Basic principle, instrumentation, and application of UV Spectrophotometer
2. Discuss the various factors which affect the vibrational frequency of IR spectra
3. Write the Basic principle, instrumentation, and application of IR Spectrophotometer

Section 3. Short Questions

1. Electronic transition
2. Quenching effects
3. Fluorometry
4. Bears-Lambert Law
5. Flame Photometry
6. Atomic Absorption Spectroscopy