

Duration: 3 Hours

Total marks 70

- N.B (1) All questions are compulsory  
 (2) Figures to the right indicate full marks  
 (3) Answer all sub questions together  
 (4) Draw neat labeled diagrams wherever necessary
- Q.1 A) Answer the following (any SEVEN) 7M
- i. Name two types of burners used in flame photometry
  - ii. Enlist bending vibrations in IR spectroscopy
  - iii. Name two sources used in IR spectrometer.
  - iv. Name the material used for making sample cell windows in IR Spectroscopy
  - v. Define Wavelength maxima
  - vi. Define the unit Becquerel used in radiochemistry
  - vii. Calculate the absorbance of solution giving transmittance of 10 %
  - viii. Name two types of filters used in colorimeter
- Q.1 B) Answer the following (any FOUR) 8M
- i. Explain the term excited Triplet state
  - ii. What is Cut off wavelength of the solvent? Give its significance
  - iii. Fluorimetric analysis is more specific as compared to UV Visible spectroscopic analysis. State whether true or false. Justify your answer.
  - iv. What are cationic interference in flame photometry?
  - v. Explain the terms Sievert and Gray with reference to radiochemistry
- Q2 A) Answer the following (any TWO) 8M
- i. With the help of suitable diagram explain working of photon multiplier tube detector.
  - ii. Enlist any four applications of X ray diffraction
  - iii. Draw block diagram of Raman Spectrometer. Give any two applications of Raman Spectroscopy.
- Q2 B) Define the term Radionuclidic purity. Give one example of radionuclidic impurity and the instrument used to detect the same. 3M
- Q3 A) Answer the following (any TWO) 08M
- i. Discuss any four factors affecting the TG curve
  - ii. Write a note on FTIR spectrophotometer
  - iii. Differentiate between AAS and AES based on the principle involved .Give one advantage , one disadvantage and one application of AAS
- Q3 B) Enlist factors influencing vibrational frequencies in IR spectroscopy. 03M

- Q4** A) Answer the following (any TWO) **08M**
- i. When is chemical derivatization employed in UV-Visible and fluorescence spectroscopy? Name one derivatizing agent in each of these spectroscopic techniques with its application.
  - ii. In assay of streptomycin by colorimetric method following results were obtained. Perform linear regression to determine slope and intercept of calibration line with the data

Concentration of Streptomycin (mg/ml)	Absorbance at 530 nm
5	0.19
10	0.40
15	0.58
20	0.81
25	1.01

- iii. In standardization of 0.1 N NaOH, burette readings obtained were as follows

Day 1	15.6	15.5	15.7	15.9	15.3
Day2	15.0	15.5	15.4	16.4	-

Was the variance on day 1 significantly different from day 2 at 95% confidence level [Tabulated F value is 6.59]

- Q4** B) With the help of an example explain thermo gravimetric curve. **03M**

- Q5** A) Answer the following (any TWO) **08M**
- i. Define fluorescence. Discuss any three factors affecting fluorescence intensity.
  - ii. Explain the term overtones with reference to Near IR spectroscopy with suitable diagram. Give one pharmaceutical application of Near IR spectroscopy.
  - iii. Enlist three methods for used in quantitative UV spectrophotometric assay of single component formulation. Explain any one in detail

- Q5** B) Derive Bragg's Law in X ray diffraction **03M**

- Q6** A) Answer the following (any two) **08M**
- i. Discuss the UV spectrophotometric method for determination of equilibrium constant
  - ii. Draw block diagram of Spectrofluorimeter. Explain role of each of its components in brief.
  - iii. Discuss attenuated total reflectance technique for sample handling in IR spectroscopic analysis of sample.

- Q6** B) A (1%, 1cm) of a drug at its wavelength maxima ( $\lambda_{max}$ ) is 714. When 1 ml of the injection containing drug was diluted to 1000 ml, the solution gave an absorbance of 0.728 at  $\lambda_{max}$  when measured in 1 cm cell. Calculate the concentration of drug in the injection in mg/ml. **03M**