UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program / Seventh Semester – Spring 2023

Roll No. .....

Paper: Analytical Chemistry (Sp. Theory-II) Course Code: CHEM-413 **Time: 3 Hrs. Marks: 60**

THE ANSWERS MUST BE ATTEMPTED ON THE ANSWER SHEET PROVIDED

Q.1. Answer the following short questions: (15x2=30)

1. What is the principle of UV-Visible spectroscopy?
2. What is the Beer-Lambert law and what is its significance?
3. What are the applications of UV-Visible spectroscopy in pharmaceutical analysis?
4. Define molar absorptivity.
5. What is fluorescence quenching and how is it used in analytical chemistry?
6. What is the difference between atomic absorption spectroscopy and atomic emission spectroscopy?
7. What is the purpose of a monochromator in a spectrophotometer?
8. What is the difference between electronic energy levels and vibrational energy levels?
9. What are the components of a typical atomic fluorescence spectrometer?
10. What is the role of plasma in inductively coupled plasma optical emission spectroscopy (ICP-OES)?
11. What is the principle behind Raman spectroscopy?
12. What is the difference between a laser and a lamp as a light source for spectroscopy?
13. What is the role of a sample cell in UV-Visible spectroscopy?
14. What is the difference between a prism and a grating as a wavelength selector in a spectrophotometer?
15. What is the difference between a spectrophotometer and a spectrometer?

Answer the following questions.

Q.2. a) Explain the components of an FTIR spectrometer. 05

b) Discuss the applications of FTIR spectroscopy in materials science. 05

Q.3. a) What is molecular fluorescence and how is it used in analytical chemistry? 05

b) Discuss the instrumentation and applications of fluorescence spectroscopy. 05

Q. 4. a) Explain the principle of mass spectrometry. 05

b) Discuss the applications of mass spectrometry in analytical chemistry. 05