

BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI

First Semester 2022-2023

Mid-Semester Examination (Closed Book)

Course Name: Instrumental Methods of Analysis

Course No: PHA F313

Total Marks: 30

Date: 05-11-2022

Duration: 90 (min)

Note: Answer for all questions precisely with appropriate illustrations if required.

Give the answer for all sub-parts together in one place.

1) a) Draw a neat schematic representation of double beam UV-Visible spectrophotometer, label its various components and mention their purpose briefly. **(2x3=6)**

b) Write a note on pharmaceutical quantitative applications of UV-Visible spectrophotometer.

2) a) Calculate the number of vibrational modes for phosphorus oxychloride, Sulphur dioxide and beryllium hydride. **(2x3=6)**

b) Write the principle involved in IR spectroscopy. Write a brief account on various liquid sampling techniques in IR spectrophotometer.

3) a) Write a note on quantum numbers. Discuss about various deactivation processes associated with spectrofluorimeter. **(2x3=6)**

b) Write the effect of following w.r.t fluorimetric analysis. Justify

i) Electron donating groups

ii) Molecular rigidity

iii) Viscosity

4) a) Draw a neat diagram of nicol prism, lippich prism. Explain the construction and working principle of the same. **(2x3=6)**

b) The specific rotation of (*S*)-Tartaric acid is $+17.49^\circ$. Determine the % composition of a mixture of (*R*) and (*S*)-Tartaric acid if the specific rotation of the mixture is -5.27° .

5) a) Write the principle and various processes involved in FES. Applications of FES in Pharmacy. **(2x3=6)**

b) Write about various burners used in FES. Explain about the burner which is free from explosion hazards.
