

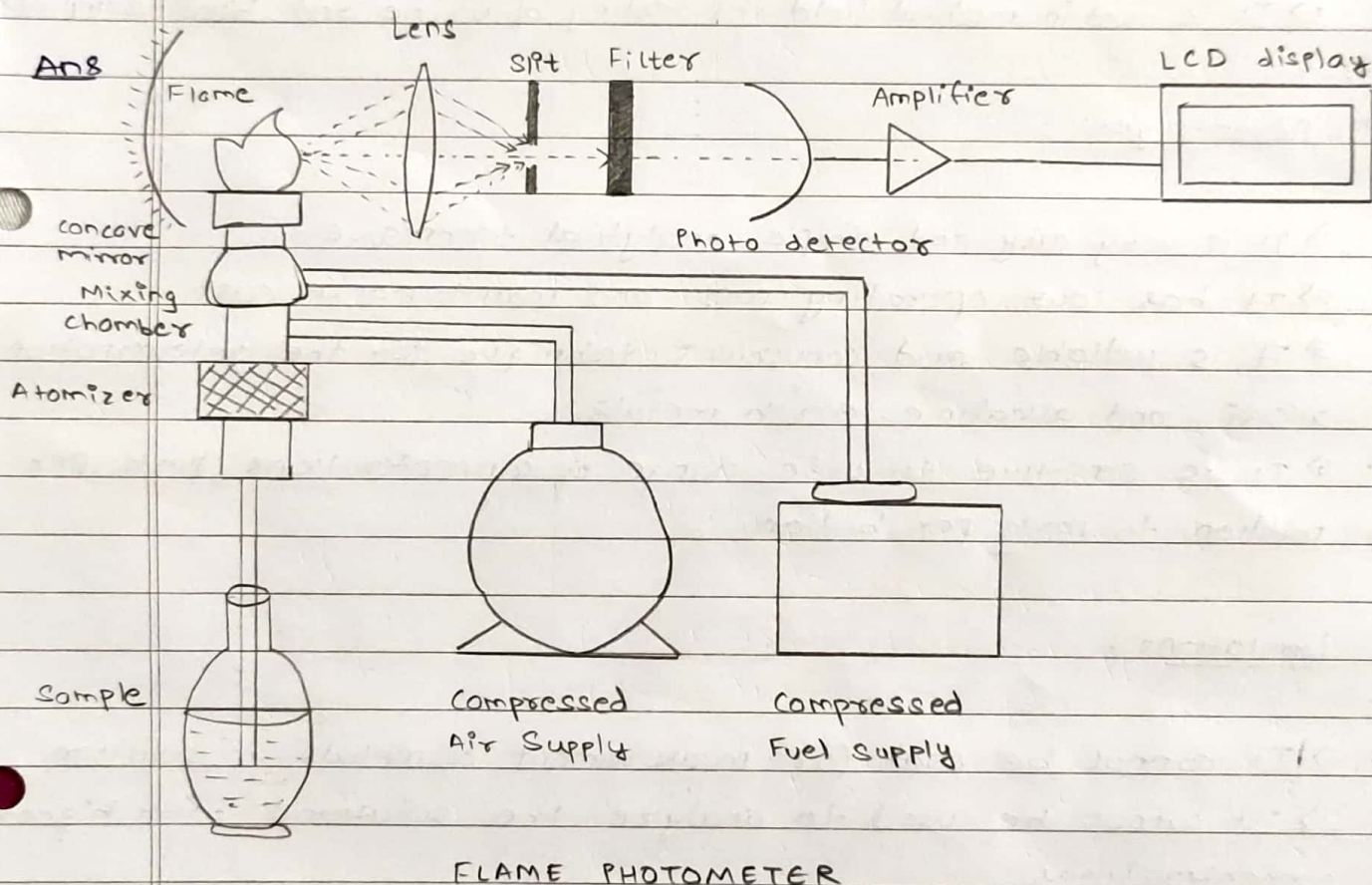
Name - Agush Jain
SAP ID - 60004200132
Div - J1

17/08/2021

Engineering Chemistry-2

Spectroscopy - Tutorial 2

Q. 1) Draw neat and labelled diagram of flame photometer. Give its applications, advantages and limitations.



→ Applications:

- 1) It is primarily used for the analysis of those element which have an easily excited flame spectrum of sufficient intensity for detection of photocell. For example, for the analysis of sodium, potassium, calcium and lithium.
- 2) It is extensively used in the analysis of biological fluid and tissues.

- 3) It is used in agriculture field for the analysis of water, soil and plant products.
- 4) The flame test analysis of soil samples helps in choosing an appropriate fertilizer for soil cultivation.
- 5) It is used in medical field for testing of urine and blood samples.

→ Advantages:

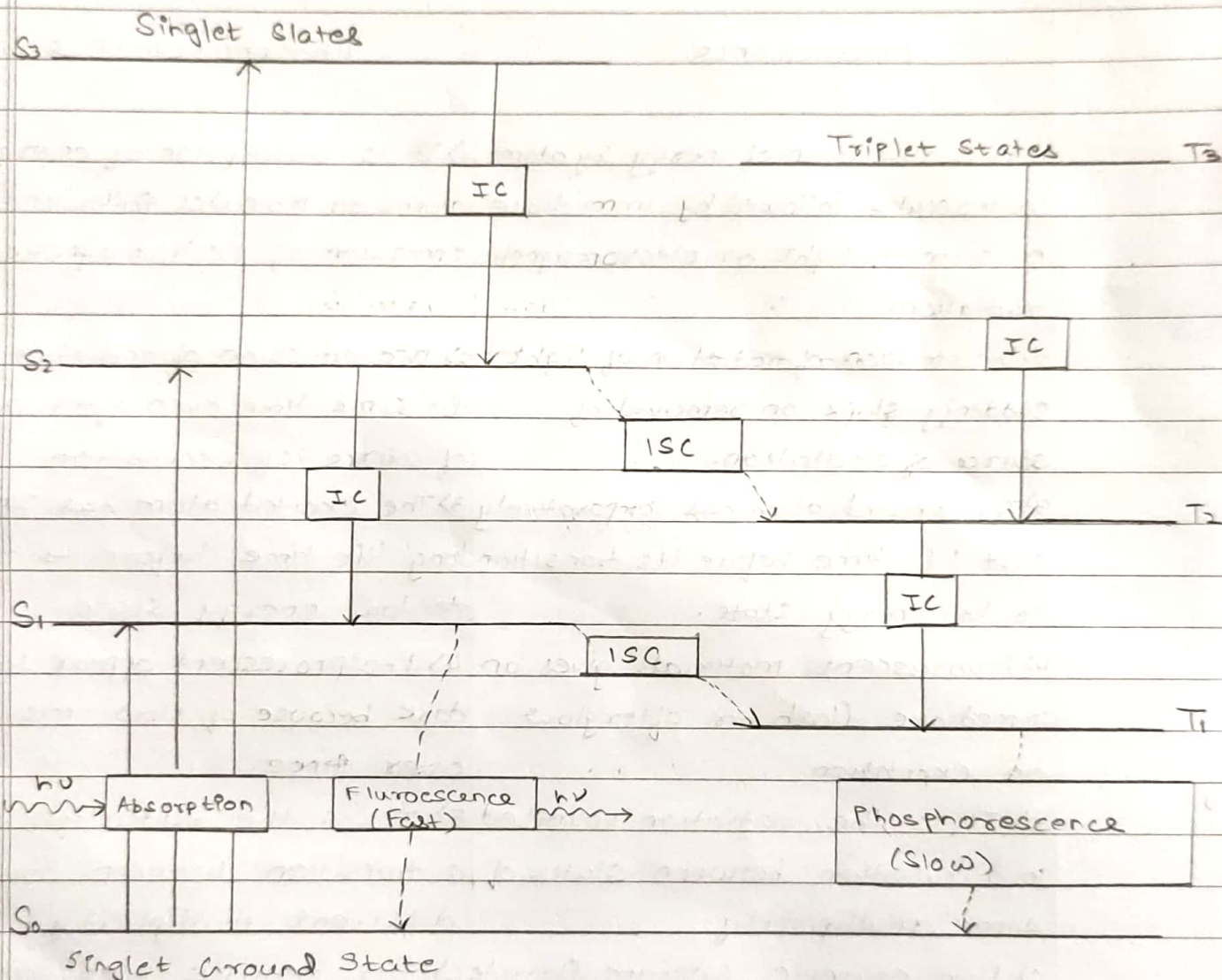
- 1) It is very easy and simple analytical technique.
- 2) It has low operating cost and maintenance cost.
- 3) It is reliable and convenient technique for the determination of alkali and alkaline earth metals.
- 4) It is sensitive to wide range of concentrations, parts per million to parts per billion.

→ Limitations:

- 1) It cannot be used for measurement of metals in solution.
- 2) It cannot be used to analyze the solutions with higher concentrations.
- 3) It cannot be used to detect non-metals such as carbide and halides.
- 4) It cannot be used for the analysis of those metals which have tendency for incomplete vaporisation.
- 5) A standard solution with known concentration is required to analyze the emission results.

Q. 2> Draw a neat and labelled Jablonski diagram.

Ans



IC - Internal Conversion
ISC - Intersystem Crossing

Jablonski Diagram

Q. 3 Distinguish between Fluorescence and Phosphorescence.

Fluorescence	Phosphorescence
1) It is absorption of energy by atoms or molecules followed by immediate emission of light or electromagnetic radiation.	1) It is absorption of energy by atoms or molecules followed by delayed emission of electromagnetic radiation.
2) The emission of radiation of light suddenly stops on removal of source of excitation.	2) The emission of radiation remains for some time even after the removal of source of excitation.
3) The excited atom has comparatively short life time before its transition to low energy state.	3) The excited atom has comparatively long life time before its transition to low energy state.
4) Fluorescent materials gives an immediate flash or afterglow on excitation.	4) Phosphorescent appears to glow in dark because of slow emission of light over time.
5) It is the radiation emitted in a transition between states of same multiplicity.	5) It is the radiation emitted in a transition between states of different multiplicity.
6) For example, calcium fluoride, sodium, iodine and mercury vapours.	6) For example, zinc sulphide, calcium sulphide, barium sulphide and strontium sulphide.