KEY to SET1

Q1. a. **alkali halide**

**b. condenser lens**

**c. 400,000X**

**d.** Rate of migration is directly proportional to current

**e. V / E**

**f. 2200-2500 RPM**

**g. Paper**

**h. Self-absorption**

i. **Carbon-13**

**j. Infra red spectroscopy**

**Q2.**

1. The Beer-Lambert law states that there is a linear relationship between the concentration and the absorbance of the solution, which enables the concentration of a solution to be calculated by measuring its absorbance.
2. Reusable quartz cuvettes were required for measurements in the ultraviolet range, because glass and most plastics absorb ultraviolet light, creating interference.
3. The chemical shift is the resonant frequency of a nucleus relative to a standard in a magnetic field.
4. Error prone PCR is a method by which random mutants maybe inserted into any piece of DNA. By carefully controlling the buffer composition the frequency of mis-incorporation of nucleotide bases,  and therefore the number of errors introduced into the sequence may be regulated. In directed evolution experiments, the substitution frequency is normally controlled at around 1 - 3 base pair substitutions per kilobase of DNA.
5. Nondenaturing PAGE, also called native-PAGE, separates proteins according to their mass/charge ratio. SDS-PAGE separates proteins primarily by mass because the ionic detergent SDS denatures and binds to proteins to make them uniformly negatively charged.
6. Ethidium bromide (or homidium bromide, chloride salt homidium chloride) is an intercalating agent commonly used as a fluorescent tag (nucleic acid stain) in molecular biology laboratories for techniques such as agarose gel electrophoresis.
7. Principle of Adsorption Chromatography involves competition of components of sample mixture for active site on adsorbent. Partition Chromatography  Definition: This form of chromatography is based on a thin film formed on the surface of a solid support by a liquid stationary phase.
8. Water absorbed on cellulose constituting the paper serves as the stationary phase and organic solvent as moving phase.
9. The isotope could be lost as a result of a metabolic oxidation
10. A radioactive isotope.

3. a. **Fluorescence** is the emission of light by a substance that has absorbed light or other electromagnetic radiation. A **fluorescence microscope** is an optical **microscope** that uses **fluorescence** instead of, or in addition to, scattering, reflection, and attenuation or absorption, to study the properties of organic or inorganic substances.

b. X-ray powder diffraction (**XRD**) is a rapid analytical technique primarily used for phase identification of a crystalline material and can provide information on unit cell dimensions. The analyzed material is finely ground, homogenized, and average bulk composition is determined.

c. **NMR spectroscopy** is a **Spectroscopy** technique used by chemists and biochemists to investigate the properties of organic molecules, although it is applicable to any kind of sample that contains nuclei possessing spin. For example, the **NMR** can quantitatively analyze mixtures containing known compounds.

d. The **hyperfine splitting** (hfs) is a special feature of ESR caused by the interaction of electron spins with the magnetic nuclei in the sample

4.a. **Blotting** is a technique by which a macromolecule such as DNA, RNA, or protein is resolved in a gel matrix, transferred to a solid support, and detected with a specific probe. These powerful techniques allow the researcher to identify and characterize specific molecules in a complex mixture of related molecules. Southern **blotting** is a laboratory technique used to detect a specific **DNA** sequence in a blood or tissue sample.

b. Isoelectric focusing (IEF) is an electrophoretic **separation** method which separates amphoteric molecules such as proteins and peptides according to their charge as defined by the pKa values of proton-accepting sites within a molecule.

c. **Southern blotting** is a laboratory technique used to detect a specific DNA sequence in a blood or tissue sample. A restriction enzyme is used to cut a sample of DNA into fragments that are separated using gel electrophoresis. The DNA fragments are transferred out of the gel to the surface of a membrane.

d. Agarose gel electrophoresis is a method of gel electrophoresis used in biochemistry, molecular biology, genetics, and clinical chemistry to separate a mixed population of macromolecules such as DNA or proteins in a matrix of agarose, one of the two main components of agar.

5. a. High Performance Liquid Chromatography (**HPLC**) is a form of column chromatography that pumps a sample mixture or analyte in a solvent (known as the mobile phase) at high pressure through a column with chromatographic packing material (stationary phase).

b. Thin-layer chromatography is a chromatography technique used to separate non-volatile mixtures. Thin-layer chromatography is performed on a sheet of an inert substrate such as glass, plastic, or aluminium foil, which is coated with a thin layer of adsorbent material, usually silica gel, aluminium oxide, or cellulose

c. It is a precursory technique used in the purification of compounds based on their hydrophobicity or polarity. In this **chromatography** process, the molecule mixture is separated depending on its differentials partitioning between a stationary phase and a mobile phase.

d. The term **reversed**-**phase** describes the **chromatography** mode that is just the opposite of **normal phase**, namely the use of a polar mobile **phase** and a non-polar [hydrophobic] stationary **phase**

**6. a.Solid and liquid scintillation** techniques are used for the detection of radio labeled isotopes in areas as diverse as biomedicine, ecology and industry. Detecting and counting alpha emitting radionuclides are routine tasks in nuclear energy and environmental monitoring.

b. Always wear protective clothing (e.g. disposable gloves, lab coat, safety glasses) when **handling radioactive** materials. In addition to this standard equipment, the following may also be used in this lab: Work in a fume hood if gas, vapor, dust, or aerosols can occur during the procedure.

c. A **Geiger counter** is an instrument used for detecting and measuring · It detects ionizing radiation.

d. **Quenching** is defined as the irreversible absorption of **decay** energy or photons during the energy transfer from the **decaying** particle to the photocathode. Chemical **quenching** prevents the energy transfer from **decay** particle to the scintillator.