**Name: Ijaz Ulhaq**

**ID : 14558**

**Programme: Bs(MLT) 4th semester**

**Instructor: Mam Saima Hadi**

**Subject: Bio medical Instrumentation**

**Question No 1**

**What is microscope and also explain principle of microscope?**

**Ans:-**  A microscope is a Greek word micro means small and scope means aim. Microscope is an optical instrument in which we have slide on which we put microorganism which we want to visualize such as virus , bacteria etc. So we can visualize the object with bigger image **OR** Microscope is a technique used to view small object which can not be visible with naked eyes.

**Principle**

**•**Its principle is to enlarge the object several times bigger.

**•**It is used to separate the details of two similar objects or images.

**•**With the help of microscope we can study the shape and structure of microorganism.

**•**Microscope is used in medical labs for the variety of tests.

**•**Its main principle is resolution and magnification of object.

**•**We use microscope because in our surrounding environment there are lots of microbes which we can not see with naked eyes but we can see with microscope.

**•**Principle of microscope is to visualize microorganism such as virus, bacteria etc.

**•**Use for cellular process.

**•**DNA replication.

**•**Cell division.

**•**Tissue analysis.

**•**Studying the role of protein within a cell.

**•**Have role in the study of atomic structures.

**Question No 2**

**Explain chromatography and also its phases?**

**Ans:-** It is a Greek word Chroma means colour and graph means to write. Chromatography is a technique used for the separation of components in a mixture. It is an important technique used in chemistry and biology. In the beginning it was use for colour substances. It is use to detect solute in a solution. For example we have black ink if we identify the dyes present in the ink so we use chromatography. It is also used for the detection drugs in blood and urine. For example a person smokes cigrate when nicotine enter his body we can detect nicotine in blood by using chromatography technique.

**Phases of Chromatography**

There are two phases of chromatography. Stationary phase and mobile phase.

**Stationary Phase:-** It is also called static phase which cannot move. For example paper which remains fixed in its place. Stationary phase interact with solutes that are in the mobile phase.

**Mobile Phase:-** It is also called moving or running phase which can move for example solvent mostly water. Mobile phase can move on stationary phase through gravity or pressure.

**Question No 3**

**Write down the applications of flamephotometry?**

**Ans:- •**Flamephotometry is used to determine various elements like lithium, calcium, potassium, magnesium and sodium etc.

**•**This technique is require in the field of farming and agriculture to analyse the soil.

**•**It is used in beverages industry to analyse soft drinks and juices.

**•**Flamephotometry is limited function but cost is comparatively very low.

**•** Nebulization of flamephotometry is used to convert the solution in to small fine particles.

**•**Quantitative analysis for determining the concentration of group 1 and 2 elements.

**•**Examine hard water for determining the concentration of calcium present in it.

**•**Examine urine for determining the concentration of sodium and potassium present in it.

**•**Examine hard biogas and ceramic materials for determining the concentration of calcium present in it.

**•**Quantitative analysis of elements by comparing emitted wavelength with the standards.

**Question No 4**

**Explain the components of centrifuge?**

**Ans:-** The components of centrifuge are as follow.

**Rotor:-** Which is moving around here we have tubes in which we keep sample. It separates the serum from Red blood cells. Rotor includes fixed angle rotor, swinging rotor and continuous tubular.

**Electric Motor:-** It acts like a switch which provides current to the centrifuge and through which rotor starts moving.

**Brake:-** It is used for pausing the centrifugation.

**RPM:-**  It shows the speed of centrifuge or revolution per minute.

**RPM Controller:-** It controls the speed of centrifuge.

**Timer:-** Here we can set the time that how much time is needed for sample to centrifuge.

**Lid:-** A lid is a cover or seal for a container.

**Latch:-** Is a type of mechanical fastener that joins two or more objects or surfaces.

**Question No 5**

**Write note on water bath?**

**Ans:- •**  Is a lab equipment that heat up water to a desired temperature as well as maintain it.

**•**All water bath have digital or analogue interface to allow users to set a desired temperature.

**•**It is used to incubate samples in water at a constant temperature over a long period of time.

**•**Water bath is made up of steel and covered with electro static paint.

**•**Water bath has internal panel in which the controls can be found. **• •**They also have a tank made of rust proof materials with a collection of electrical resistors mounted on their lower part.

**•** Water bath is an equipment whose maintenance is simple. Water bath is used in research laboratories, diagnostic laboratories and biotechnology laboratories.

**•** In water bath we can perform coagulation tests and blood banking etc.

**•** Available in range from 2 litres to 28 litres.

**Question No 6**

**Explain the types of centrifuge?**

**Ans:-** There are different types centrifuge.

**Small Bench Centrifuge:-** These are very simple and least expensive they have many designs. They are small and can be put any where. They are for smaller volume actually they are used to collect small amount of materials. Maximum speed is 4000 to 6000 RPM.

**Large Capacity Centrifuge:-** As it says large capacity it can take larger amount of materials or more volume of sample. Maximum speed is 6000 RPM. Their carring capacity is much higher than small bench centrifuge. Total volume is 4 to 6 litres.

**High Speed Centrifuge:-** Means they can go on a very high speed and maximum speed is approximately 25000 RPM. Its capacity is 1.5 litres. They are used to collect microorganism, cellular organelles etc.

**Continuous Flow Centrifuge:-** As the name suggest there is continuous flow of materials. It has large volume like 100 to 500 litres.

**Ultra Centrifuge:-** It has a very high speed. The maximum speed is 70000 RPM or above. They are made for both preparative and analytical applications. It is very expensive. It has two types preparative and analytical ultra centrifuge.