**Mid-Term Assignment (spring-20)**

***Course Title: Biomedical instrumentation (MLT 4TH) Instructor: Saima hadi.***

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* ***Question: 1***

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

***Answer:***

* ***Microscope:***

*The word microscope is derived from two words:*

*Micro means “small” and scope means “to look or see”.*

* *It is an instrument which is used to see objects that are too small and cannot be seen with naked eye.*
* *The most common microscope is the optical microscope which uses light to pass through a sample to produce an image.*
* ***Principle of microscope:***

*A simple microscope works on the principle that when a small object is placed within it its focus ,a erect, virtual and magnified image of the object is formed at the least distance of distinct vision from the eye held close to the lens.*

* ***Question: 2***

*Describe chromatography and also its phases?*

***Answer:***

* ***Chromatography:***
* *It is a laboratory technique which is used for separation of a mixture.*
* *Chromatography may be preparative or analytical.*
* *The purpose of preparative chromatography is to separate the mixture components for laterbuse.*
* *While analytical chromatography is done with smaller amounts of material and is for establishing the presence of relative proportions of analytes in a mixture.*
* ***Phases of chromatography:***

*There are two phases of chromatography:*

* *Mobile phase*
* *Stationary phase*
* ***Mobile phase:***

*The mixture is dissolved in a fluid called mobile phase.*

* ***Stationary phase:***

*It carries through a structure holding another material called stationary phase.*

* *The various constituents of the mixture travels at different speed, which causes them to separate.*
* *This separation is based on differential partitioning between the mobile and stationary phase.*
* *Subtle differences in a compound’s partition result in differential retention on the stationary phase and it affects the separation.*
* ***Question: 3***

*Write down the applications of Flamephotometery?*

***Answer:***

* ***Applications of flamephotometery:***
1. *With the help of flamephotometery we can detect the presence of any specific element in the given sample.*
2. *It can be applied for both qualitative and quantitative analysis of elements.*
3. *Soft drinks, juices and alcoholic beverages can also be analyzed by using flamephotometery in order to determine various metals and elements concentration.*
4. *Flamephotometery helps us to determine the presence of various alkali and alkaline earth metals in soil sample by conducting flame test and then the soil can be supplied with specific fertilizer.*
5. *The concentration of Na+ and K+ ions can be determined by diluting and aspiring blood serum sample into the flame because for metabolic functions these ions are very important in human body.*
* ***Question: 4***

*Explain the components of Centrifuge?*

***Answer:***

* ***Components of centrifuge:***

*The components of centrifuge includes:*

* *It include electric motor, shaft and a rotor head.*
* *The principle component of centrifuge is rotor which is a moving part on which the centrifuge head turns and a motor drives assembly.*
* *Rotors are fixed but can also use multiple rotors.*
* *Rotors have lid to prevent samples from flying out.*
* *If the centrifuge is refrigerated a compressor and associated components are included.*
* *The centrifuge also include hanging buckets, timer , brake, and power switch.*
* ***Question: 5***

*write note on Water bath?*

***Answer:***

* ***Water bath:***
* *It is a laboratory equipment which is made up of container and it is filled with heated water.*
* *It is used to incubate samples in water for a long period of time with constant temperature.*
* *It is also used for chemical reactions to occur at higher temperature.*
* *Depending on application different types of water bath are used.*
* *It can be used up to 99.9c for all water baths when temperature is above 100c.*
* *Most water baths have a digital or analogue interface to allow users to set a desired temperature but some water baths have their temperature controlled by a current passing through a reader.*
* ***Question: 6***

*Explain the types of centrifuge?*

***Answer:***

* ***Types of centrifuge:***

*The types of centrifuge are given below:*

***1. Small bench centrifuge:***

* *They are used to collect small amount of material that rapidly sediment like yeast cells, erythrocytes etc.*
* *They have maximum relative centrifugal field of 3000 to 7000 g.*

***2. Large capacity refrigerated centrifuge:***

* *They have refrigerated rotor chamber and have capacity to change rotor chambers for varying size.*
* *They can go up for maximum of 6500 g and use to sediment or collect the substances that sediment rapidly like yeast cells, nuclei and chloroplast.*

***3. High speed refrigerated centrifuge:***

* *They can generate speed of about 60000 g and are used to collect micro organism, cellular debris, larger cellular organelles and proteins precipitated by ammonium sulphate.*

***4. Ultra centrifuges:***

***a. Preparative ultracentrifuges:***

* *It can produce relative centrifugal force of 600000 g and its chamber is refrigerated, sealed and evacuated.*
* *It is employed for separation of macromolecules, separation of various lipoprotein fractions from plasma and deprotonisation of physiological fluids from amino acid analysis.*

***b. Analytical ultracentrifuge:***

* *It is capable of operating at 500000 g.*
* *Three kinds of optical system are available in analytical ultracentrifuge.*
* *A light absorption system.*
* *Alternative schlieren system.*
* *Rayleigh interferometric system.*
* *Both of which detect changes in the refractive index of the olution.*

***The End***