Dear Students go through this questions and answers in addition to module wise questions and answers already given to you.

1. Write a note on electronic Nose.

An electronic nose is also known as e-nose. It is an analytical instrument that imitates the human sense of smell.

The e- nose consists of a sensor array that is capable of detecting and quantifying different volatile organic compounds based on their chemical composition.

e- nose works by measuring the electrical properties of sensor array when exposed to a sample. Each sensor in the array is sensitive to specific volatile Organic compound and together they can provide a comprehensive profile of the odor of the sample.

e- nose has several applications in various fields, including food science, environmental monitoring, medical diagnosis and in food science.

e-nose can be used to analyze the flavor of food products

To detect food spoiling of contamination

e-nose can be used to detect pollutants and to monitor air quality.

In medical field e- nose is used to early detection of diseases such as lung cancer.

2.What is protein? Explain the role of protein in food production.

Proteins are the biomolecules that are essential for the structure, function and regulations of cell, tissues and organs in living systems.

Protein is found in wide range of foods, including meat, poultry, fish, eggs, dairy products nuts and seeds. Proteins are very important for maintaining muscle, mass and strength. Proteins are helpful in reducing appetite. Whey protein, Meat protein, and plant proteins are the three types of dietary proteins.

1.Whey proteins : This type of protein is derived from milk. This protein contains all the amino acids that the body needs. Whey protein is digested

quickly hence It is commonly used as a dietary supplement and is often consumed by athletes and body builders to support and maintain muscle growth and repair.

2.Meat Protein : This protein is derived from animal sources such as beef, poultry , pork, and fish This is good source of nutrients such as Iron, Zinc, and Vitamin B_{12}. Meat protein digest slowly and provide sustained release of amino acids to support muscle growth and repair. Thus, whey and meat proteins provide balanced diet.

3.Plant based Proteins: Plant-based proteins are derived from plants, such as grains, legumes. nuts, seeds and vegetables. These proteins are alternative to meat proteins. The people who follow a vegetarian or vegan diet or people who simply want to incorporate plant-based foods in to their diet.

3. Importance of lipids in biodiesel production.

Lipids are the group of biomolecules which are insoluble in water and soluble in organic solvents.

Lipids can be a source for biodiesel. Biodiesel is a renewable and environmentally friendly alternative to petroleum-based diesel fuel and can be produced from a variety of sources like vegetable oils, animal fats and recycled cooking oils

The production of biodiesel involves the following steps.

(a)Feedstock Preparation: Feedstock is typically vegetable oil, animal fat or recycled cooking oil. The feedstock must be cleaned and dried to remove impurities and water.

(b) Trans-esterification: The cleaned feedstock is reacted using methanal and a catalyst such as sodium hydroxide into fatty acid. The reaction breaks down

the triglycerides in feedstock into fatty acid alkyl esters and glycerol. The fatty acid alkyl esters are the main component of biodiesel.

(c)Seperation: The fatty acid alkyl esters and glycerol are then separated using a settling tank. In settling tank the heavier glycerol sinks at the bottom and lighter bodies floated on the top. The lighter glycerol can be removed.

(d) Washing: Using water the biodiesel is washed to remove any impurities. Using centrifuge the biodiesel is separated using centrifuge.

(e) Drying : By vacuum or desiccator biodiesel is dried to remove any remaining water. The resulting biodiesel can be used as a fuel in diesel engines.

4. Explain lipids as detergents.

Lipids can act as a detergent due to their amphipathic nature. Phospholipids are the major component of cell membranes. Phospholipids have hydrophilic heads and hydrophobic tails, which allow them to form a bilayer in water with the hydrophilic heads facing outwards and hydrophobic tails facing inwards .Which means they have both hydrophobic (water repelling) and hydrophilic (water attracting) regions. This allows them to interact with both water and oil making them effective at removing dirt, grease and other substances from the surface. Thus lipids can be used as cleaning products such as dish soaps laundry detergents.

5. Explain how enzymes are useful in biosensor fabrication

.In the medical field glucose oxidase is used to measure glucose levels in blood.. The enzyme reaction with glucose in a blood sample producing hydrogen peroxide which is then detected by a colour change.

The biosensor consists of a test strip that contains a small amount of glucose oxidase and other chemicals including a mediator and stabilizer. The test s current proportional to the amount of glucose present in the blood. The glucose

level is displayed on the meter’s screen. Which suggests the user to monitor their blood glucose level and adjust their insulin dose or diet as needed.