

**FURTHER DETAILS REGARDING MAIN TOPICS OF  
PROGRAMME NO.03/2010**

**TECHNICAL ASSISTANT GRADE II**

**CATEGORY NO.272/2008**

**1. Carbohydrates**

Classification - constitution of glucose and fructose. Reactions of glucose and fructose - osazone formation. Mutarotation and its mechanism. Cyclic structure. Pyranose and furanose forms. Determination of ring size. Configuration of monosaccharides. Inter conversion of aldoses and ketoses. Disaccharides - Reactions and structure of sucrose. Structure and properties of starch and cellulose

**2. Aminoacids and proteins**

Classification of aminoacids. Essential and non-essential amino acids, preparation of alpha aminoacids, properties and reactions. Zwitter ions, isoelectric points - Peptide synthesis - structure determination of polypeptides - end group analysis. Proteins - Classification based on physical and chemical properties and on physiological functions. Primary and secondary structure of proteins, helical and sheet structures (elementary treatment only) Denaturation of proteins.

**3. Fats and oils**

Fatty acids, Triglycerides, Phospholipids, Sphingolipids, Sterols, Structure, Functions, Separation, Analysis and characterization, Rancidity, Hydrolytic, Oxidative, Antioxidants, Poly unsaturated fatty acids, Refining of oils and fats.

## **4. Vitamins**

Classification - Structural elucidations of- pyridoxine and ascorbic acid. Vitamin A, Deficiency disorders, Vitamin D, Specific nutritional Deficiencies, Vitamin E, Vitamin C, Vitamin B1 (Thiamin),

Vitamin B12, Biotin, Niacin, Vitamin B6.

## **5. Instruments -Basic Principles and Usage**

Analytical Balance, Parts of a balance, Weighing, pH-Meter- Basic Principle, working and application. Colorimetry, Spectrophotometry- Basic Principle, laws of absorption and absorption spectrum. UV, visible and infrared spectrophotometry and its application. Electrophoresis, Centrifugation - its application. Colorimetry, Spectrophotometry. Fluorimetry, Atomic absorption spectrophotography, Chromatographic Techniques.

## **6. Enzymes**

Introduction - chemical nature and general characterization - nomenclature, IUB system of enzyme classification, specificity, enzyme units, active site, mode of action - Lock and key theory and induced fit theory. Enzyme Kinetics - Introduction to chemical kinetics, rate and order of reactions, factors affecting the enzyme activity, derivation of Michaelis - Menton Equation. Enzyme inhibition - Competitive, non- competitive and uncompetitive inhibitions.

## **7. Basic principles of food preservation and processing**

Physical Methods, Preservation of food by removal or supply of heat, dehydration, irradiation, addition of chemicals and fermentation; Water activity and food stability. Disinfectants, preservatives, Additives.

## **8. Food Microbiology**

Microbial groupings and identification; Nutrient requirements for bacterial culture; Growth and inactivation kinetics; Harmful and beneficial effects of microbes, microbes in food industry; Food spoilage, poisoning and intoxication.

## **9. Polymers and their applications**

Monomeric Units, Polymerisation, Addition, Condensation, Classification, Natural and Synthetic, organic and Inorganic, Thermoplastic and Thermosetting, Some important polymers and their uses, Manmade Polymers, Polyethylene, Polypropylene, Polyvinyl chloride.

## **10. Nutritional Biochemistry**

Basic food groups- Energy yielding, Body building and protective foods. Basic concepts of energy expenditure, unit of energy, measurements of food stuffs by bomb calorimeter. Calorific value of proteins, carbohydrates and fats, Nutritive value of proteins, essential amino acids, biological values of proteins. Evaluation of proteins by nitrogen balance method-DC, BV and NPU of animal and plant proteins, protein sparing action of carbohydrates, single cell proteins. Protein malnutrition (Kwashiorkor) and under nutrition (marasmus) their preventive and curative measures. Composition of balanced diet for children, adolescent, adult male and female, pregnant, lactating woman and old age. Physiological role and nutritional significance of carbohydrates, lipids, vitamins (water and fat soluble) and minerals.

**NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.**