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DETAILED SYLLABUS FOR THE POST OF LABORATORY ASSISTANT(DAIRY/CFP)

KERALA CO-OPERATIVE MILK MARKETING FEDERATION LIMITED

(Cat.No.402/2021)

PART I -BASIC CHEMISTRY (13 Marks)

Acids, bases, buffers, pH. Concentration units- normality, molality, molarity. Centrifugation. Surface tension. Viscosity. Colligative properties. Colloids. Chemical equilibrium. Electrochemistry. Spectroscopy- IR, UV-VIS, NMR, Raman and EPR. Chromatography- column, paper, TLC and LC. Thermodynamics. Chemical equilibrium.

PART II - CHEMICAL ANALYSIS (12 Marks)

Physical properties and composition of milk, tests for milk quality, detection of impurities, detection of adulterants- water, antibiotics, pesticide residues, preservatives, colour additives, metals etc., determination of specific gravity, total solids, freezing point, titrable acidity, citric acid, lactic acid and SNF. Cattle feed analysis - moisture content, ash, fat, carbohydrate, crude fibre, crude protein, sodium, potassium, calcium, and phosphates.

PART III - BASIC BIOCHEMISTRY (13 Marks)

Carbohydrates- glucose, galactose, disaccharides, polysaccharides – structure, properties, reactions and functions**.** Lipids- simple fat – fatty acids, triacylglycerols, phospholipids, cholesterol and complex lipids – glycoproteins, lipoproteins, chromoproteins - structure, properties and function. Amino acids and proteins- structure and properties, levels of structural organization of proteins, functional properties. Enzymes. Vitamins – fat soluble and water soluble, sources, functions. deficiency and symptoms. Minerals and salts. Digestion and absorption, intermediary metabolism. Nutritional aspects of micro and macromolecules.

PART IV - BIOCHEMICAL ANALYSIS (12 Marks)

Qualitative and quantitative analysis of milk - Estimation of lactose, phosphorus, lactalbumin. Casein-preparation and estimation, total solids, calcium. Determination of ash, nitrogen, non-nitrogen, protein nitrogen, protein, fat. Fat extraction- hot and cold method. Antigens, antibodies, antigen- antibody interactions, ELISA, RIA, Immunofluorescence techniques, Western blotting.

PART V - BASIC MICROBIOLOGY & TECHNIQUES (13 Marks)

History of Microbiology, techniques in Microbiology- microscopy- types of microscopes, advanced techniques in microscopy, specimen preparation for electron microscopy, staining techniques- types and applications, sterilization techniques, culture media and culture methods. Tests for identification of bacteria. API system, Culture preservation techniques. Anatomy of microorganisms- prokaryotes and eukaryotes, structure of bacteria, fungi, algae and protozoans. Genetic materials in microorganisms, plasmids, reproduction in microorganisms. Viruses- morphological forms, classification, replication, major groups of animal viruses, viral cultivation methods, cytopathic effects, detection and assay of viral growth.

PART VI - FOOD MICROBIOLOGY AND MICROBIOLOGICAL ANALYSIS (12 Marks)

Microorganisms in food materials- sources of microorganisms in food, extrinsic and intrinsic factors influencing microbial growth in food, different types of food spoilage, food infections and food intoxications, mycotoxins- types and detection in food materials, microbiological analysis of water and food materials, fermented food products. Milk and dairy products- sources of microorganisms in milk, milk borne pathogens, microbial spoilage of milk and dairy products, microbiological analysis of milk and dairy products, techniques for preservation of milk- pasteurization, fermented milk products. Applications of antigen-antibody interaction for detection of microbes.

PART VII - BASIC BIOTECHNOLOGY (13 Marks)

Nucleic acids- structure, types. Replication, transcription, translation. Genetically modified crops – status and prospects. Environment pollution and control measures. Beneficial soil organisms. Bio-pesticides and biocontrol agents in integrated pest management. Single cell proteins. Therapeutic proteins - antibodies, enzymes, hormones, growth factors and vaccines. Application of enzymes in food industry. Intellectual property rights. Regulations for laboratory animal care and ethical requirements. Genomics, proteomics, metabolomics.

PART VIII - ANALYTICAL TECHNIQUES IN BIOTECHNOLOGY (12 Marks)

Isolation and quantification of nucleic acids and proteins. Agarose gel electrophoresis - detection of nucleic acids on gels, staining techniques. Gel documentation. Polymerase chain reaction. Molecular Markers. Assessment of pesticide residues in milk, milk products, and animal fodder. Recombinant DNA technology- basic aspects. Commercial vaccine production. Nucleic acid probes and antibodies in detection of microbes and adulterants. Northern and Southern blotting techniques. Biosafety rules and regulations.

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 appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.