TAMIL NADU PUBLIC SERVICE COMMISSION

SYLLABUS

LAB TECHNICIAN

(DIPLOMA STANDARD)

CODE: 450

UNIT-I : GENERAL CATEGORY

Units of Measurement and conversion

Weight – mg/gms / kg ; Volume- ml / L; Conversion of measuring units (e.g. ppm – mg and viceversa); Molarity; Normality (e.g. V1N1 = V2N2) ; Temperature conversion – Fahrenheit and Celsius ;Reference values

Preparations of solution for qualitative and quantitative analysis - Percentage solution – Standard solution

UNIT-II : LAB SAFETY

Lab safety – Personal safety (Personal protective equipment) – Safety of environment – Safe handling of food – Acid & Alkali burns ; First aid kit contents ; Fire and other natural calamities

UNIT-III : EQUIPMENTS

Instruments / Equipments for chemical analysis of Milk – Handling and calibration of Testing Equipments – Microscope – Structure of Microscope – Types of Microscope - Adjustments; Centrifuge – Principles of centrifugation – Types of Centrifuge – Techniques ; Lacto meter – Description of the instruments – Principle of measurement – Interpretation of results – Specific gravity bottles ; pH meter – Principle of measuring pH – Various methods of measurement of pH – Interpretation of pH ; Physical balance – Description and types ; Moisture balance ; Colorimeter / Semi auto analyser – Principle and measurement ; Micro meter (Screw gauge) – Measurement of thickness of package material ; Spectrophoto meter ; Micro pipettes ; Thermometer etc.,

UNIT-IV : GLASSWARE & PEST CONTROL

Glass ware - Handling and calibration – Burettes – Pipettes – Volumetric flask – Measuring cylinders – Beakers– Thermometers – Lactometers – Butyrometer etc.,

Pest control – Control of rodents – Control of cockroaches, Flies and Ants

Water analysis – Chemical and Microbiological analysis of raw water, processed water and ETP water

UNIT-V : DAIRY CHEMISTRY

Chemical composition of Milk & Milk Products

Physico-Chemical Analysis of Milk and Milk Products: Organoleptic Tests-Colour, Odour, Taste, pH ; Specific gravity ; Adulteration test other

Quality control: Chemical Examination of Milk - Fat by Gerber Method, SNF by Lactometer/Gravimetric method, Protein, Lactose, Titrable Acidity

UNIT-VI : DAIRY BIO CHEMISTRY

Nutritional quality of Milk, Milk Proteins, Enzymes in Milk and Milk Products, Fatty acids in Milk Fat, Oxidation-reduction reactions with methylene blue; Non protein nitrogenous substance – Urea (Urease test) ; Colorimeter test for products

UNIT-VII : DAIRY MICRO BIOLOGY

Microbiology of Milk & Milk Products: Morphology and classification of Dairy bacteria, Characteristics of Important Dairy microorganisms, Characteristics of Spoilage and Pathogenic micro organisms, Sources of Contamination in Milk, Hygienic Milk Production.

Microbiological Methods of Milk Testing: Qualitative & Quantitative methods of Milk testing, Dye reduction test, Direct Microscopic count, Standard Plate Count, Coliform counts in Milk, Methods for enumeration of other groups of bacteria, Enumeration of Yeast & Mould in Milk.

Equipments: Handling and calibration of testing equipments -Incubator – Hot Air Oven – Autoclave – Centrifuges – Water bath – Laminar flow – Microscope - Biosafety cabinets – ELISA – PCR – Colony counter etc., Sterilization, Disinfection of utensils, glassware, storage tanks

Lab and Environmental Safety – Preventive and safety measures for testing pathogenic and non-pathogenic organism in dairy industries –Culture media and their preparation – Psychrophilic – Mesophilic – Thermophilic organisms- Safe lab practices – Sample collection – Semi finished and finish products – Universal precautions – Personal protective equipment

Microscopy and morphology of bacteria: Identification of Microorganisms – Simple and Differential staining – Staining procedures – Antimicrobial agents – Phage typing – Serotyping

UNIT-VIII: SYSTEMIC MICROBIOLOGY

Gram positive cocci – Gram negative cocci – Gram negative bacilli – Gram positive bacilli

Microbiology of Milk: Brucella – Mycobacterium tuberculosis – Mycobacterium bovis – Salmonella - Shigella - Vibrio cholera – Escherichia coli – Campylobacter – Listeria - Cryptosporidium

Fungal contaminants: Aspergillus – Mucor – Penicillium – Rhizopus

UNIT-IX : MILK BORNE DISEASES

Sources of Pathogens, Terms used in Milk borne infections; Causes, Symptoms and prevention of Milk borne Diseases: Tuberculosis, Brucellosis, Diphtheria, Q-Fever, Enteroviruses, Poliomyelitis.

UNIT-X : BIOMEDICAL WASTE MANAGEMENT

Segregation of waste – Waste disposal – Spillage management