

SYLLABUS FOR ENTRANCE TEST FOR M.Sc. (FOOD TECHNOLOGY)

The question paper will contain 100 multiple choice type questions on the following topics carrying equal marks.

Subjects covered: Physics/Chemistry/Mathematics/Biology/Microbiology/Biochemistry & nutrition/Agriculture & Dairy Technology/Engineering

Max. Marks: 100

Time: 1 h & 30 min

Physics: Elements of mechanics, colligative properties, Laws of Thermodynamics: Mode of heat transfer: Electrostatics, magnetism, and electrodynamics: Outlines in optics and sound: Electro-magnetic radiation: Radioactivity and elements in quantum physics

Chemistry: The gas laws, properties of gases, electrolytes, thermo-chemistry, chemical equilibrium, chemical kinetics, concept of pH and buffer, molecular orbital theory, chemical bonds, and the forces involved therein: periodic table; Aliphatic and aromatic hydrocarbons, Organic substitution reactions, electrophilic and nucleophilic reactions; Isomerism: structural and optical isomers. Food chemistry: Composition of foods, minerals, and water activity. Carbohydrates: Mono and disaccharides, reducing and non-reducing sugars, mutarotation, starch, cellulose, pectin, and plant acids. Proteins: Primary, secondary, and tertiary structure, denaturation, peptide bonds, and amino acids.

Mathematics: Theory of quadratic equations; Binomial theorem; uses of natural and common logarithms. Exponential series: differentiation, successive differentiation, maxima, minima. Differential equations: First order, and linear. Integration and integral equations. Trigonometry; Ratios and their relation, Matrices, vector, determinants

Biology: Botany: systematics of plants, ecology, cytology, and physiology of plants. Economic botany. Plant Physiology: Secondary metabolites and Stress Physiology, Photosynthesis, Sensory photobiology, Nitrogen metabolism, Solute transport, photoassimilate translocation, Respiration, and photorespiration, and Plant hormones. Plant water relations, mechanisms of uptake and transport of water, ions, solutes from soil to plants, apoplastic and symplastic transport mechanisms. Mechanism of stomatal movements, nitrogen metabolism, photosynthesis; C₃, C₄ and CAM cycles, photorespiration, respiration: glycolysis, TCA cycle and electron transport chain. Plant responses and mechanisms of abiotic stresses including drought, salinity, freezing and heat stress, metal toxicity; role of abscisic acid in abiotic stresses. Structure and function of biomolecules (proteins, carbohydrates, lipids, nucleic acid), enzyme. Structure and biosynthesis of major plant secondary metabolites (alkaloids, terpenes, phenylpropanoids, flavonoids). Biosynthesis, mechanism of action and physiological effects of auxin, cytokinin, gibberellic acids, ethylene, abscisic acid, salicylic acid. Senescence and programmed cell death. Zoology: Molecular basis of life, nucleic acids and their role in life, and elements of genetics. organization of animal tissues. Elements in human physiology, endocrine glands, digestion, absorption, and respiration. General physiology of animals, systematics of animals

Microbiology: Historical development in microbiology, morphology, cytology: reproduction and genetics of bacteria, yeasts and moulds. Culture identification: stains and staining techniques, growth, Nutrition, and physiology of microorganisms. Economic importance of bacteria, yeasts and moulds; Food contamination, control and food safety; General principles

of food preservation, Microbiological standards. Pure culture techniques; Principles of microbial nutrition; Enrichment culture techniques for isolation of microorganisms; antigen and antibody detection methods for microbial diagnosis; Light-, phase contrast-, fluorescence- and electron-microscopy; PCR, real-time PCR for quantitation of microbes;

Biochemistry & Nutrition: Enzymes, coenzymes and cofactor, elements of carbohydrates, fat and protein metabolism; elements of photosynthesis; vitamins and their function in the body, minerals and their function in the body: elements in protein biosynthesis, Nucleic acids, and their importance. compounds: nitrogen fixation, amino acids and nucleotides. Photosynthesis: Calvin cycle. Biochemical separation techniques: ion exchange, size exclusion and affinity chromatography, Characterization of biomolecules by electrophoresis, UV-visible and fluorescence spectroscopy and Mass spectrometry. Cell structure and organelles; Biological membranes; Transport across membranes; Signal transduction; Hormones and neurotransmitters.

Agriculture and Dairy Technology: Agriculture: Weather and crops, soil and water resources, soil and water conservation, soil fertility and fertilizer use, Cropping patterns and weed control. Diseases, pests and nematodes of crops; Agriculture Engineering: Agriculture marketing and storage management, field crops, plantation crops; commercial crops; Horticulture crops; foliage crops. Grasses; Condiments; spices, Medicinal and aromatic plants. Dairy science: Dairy cattle management, diseases of cattle, Chemistry of milk, microbiology of milk and milk products, milk standards

Engineering: Units, dimensions and conversions; fundamentals of fluid flow, Pressure, energy and their relationships and measurements, emulsions-basics and examples. Basics of mixing, Equipments and applications, Separation processes, Centrifugation and filtration. Mechanical operations; size reduction and sieve analysis. Power and steam generators. Strength of materials. Basics of heat exchangers.