

**CENTRAL FOOD TECHNOLOGICAL RESEARCH INSTITUTE  
MYSORE**

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

The question paper will contain multiple-choice questions on the following topics. There will be balanced distribution of questions from each of the subjects listed below, so that students from various streams at Graduation level will get equal opportunity to score in the examination.

Subjects covered    Basics of Physics / Chemistry / Mathematics / Botany & Zoology / Food Microbiology & Biotechnology, Biochemistry & Nutrition / Agriculture & Dairy Technology / Food Engineering / Mental Ability/ General Awareness

**Physics**

Elements of mechanics, Units and dimensions, Laws of motion, friction, work, energy, and power, systems of particles and rotational motion, Gravitation, Thermal expansion, heat transfer, Kinetic theory of gases, Simple harmonic motion, Wave motion, speed of sound, Doppler effect, Electric field, potential, and capacitance, current electricity, magnetic effects of current, Electromagnetic induction, Reflection, refraction, lenses, Wave optics: interference, diffraction, polarization, Photoelectric effect, Atomic structure, nuclear physics

**Chemistry**

Mole concept, atomic structure, Chemical bonding and molecular orbital theory, Thermodynamics and thermochemistry, Equilibrium (chemical and ionic), Redox reactions and electrochemistry, Surface chemistry and colloids, Kinetics, Periodic table and periodic properties, Chemical bonding, s-, p-, d-, f-block elements, Coordination compounds, Environmental chemistry, Hydrocarbons, alcohols, phenols, ethers, aldehydes, ketones, carboxylic acids, Amines and biomolecules (carbohydrates, proteins, vitamins, nucleic acids), Polymers and everyday chemistry, Food Chemistry: Composition of foods, minerals in foods, water activity in foods. Carbohydrates: Mono and disaccharides, reducing and non-reducing sugars, starch, cellulose, pectins, plant acids and Proteins: Primary, secondary and tertiary structure of proteins. Protein denaturation, peptide bond, amino acids.

**Mathematics**

Sets, Relations, Functions, Complex numbers, Quadratic equations, Sequences, series, Binomial theorem, Limits, Continuity, Differentiation, Integration, Applications, Differential equations (basics), Straight lines, Circles, Conic sections, 3D geometry, Vectors, Identities, Inverse trigonometric functions, Heights and distances, Mean, Median, Mode, Variance, Standard deviation, Basic probability, Random variables, Distributions

## **Botany & Zoology**

Cell structure and organelles, Mitosis and meiosis, DNA and RNA structure and function, Systematics of plants, Ecology and Evolution, Photosynthesis and respiration, Plant hormones and growth, Plant anatomy, cytology, tissue culture and biotechnology applications, Elements of genetics, Organization of animal tissues, General physiology of animals, Systematics of animals, Human anatomy and physiology (digestive, circulatory, nervous systems), Reproduction and endocrinology, Mendelian genetics, linkage and mutation, evolutionary theories.

## **Microbiology & Biotechnology**

Historical developments in microbiology, structure and classification of microorganisms, Microbial growth and control, Culture media, sterilization techniques, Food spoilage microorganisms, Food contamination, control and food safety; General principles of food preservation; Industrial Microbiology; Fermentation technology: Starter cultures, probiotics and prebiotics, Recombinant DNA technology, Genetic engineering, CRISPR, GM foods, Biosafety regulations

## **Biochemistry & Nutrition**

Carbohydrates, proteins, lipids, nucleic acids, enzyme and enzyme kinetics, Metabolic pathways (glycolysis, TCA, lipid metabolism), Vitamins and minerals, Analytical techniques (spectroscopy, chromatography), RDA and dietary guidelines, Nutritional assessment, Deficiency disorders, Nutraceuticals, Functional foods

## **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, insect pests and nematodes of crops: Agricultural Engineering; Agriculture marketing and storage; Farm management; Field crops, Plantation crops: Commercial crops, Horticultural crops; Condiments, Spices, Medicinal and Aromatic plants, Plant breeding, animal husbandry.

Dairy science: Chemistry of milk, milk standards, milk composition, pasteurization, homogenization, dairy product processing (paneer, curd, butter), Quality control in dairy, Adulteration and detection methods, animal husbandry basics

## **Food Engineering**

Units, dimensions and conservations; Fundamental of fluid flow; Pressure, energy and head relationships and their measurements; Emulsions – basics and examples; Unit operations, Basics of mixing, Equipment and applications, Separation processes; Centrifugation and filtration; Mechanical operations; Size reduction and sieve analysis; Power and steam generators; Strength of materials – Basics; Heat exchangers; Plant layout, Packaging, Cleaning-in-place (CIP), Sanitation in processing plants

## **Food Processing**

**Industrial challenges in food processing sectors (raw material variability, process inefficiencies, safety, sustainability, and regulatory issues) and their mitigation strategies including advanced processing technologies, process optimization, packaging innovations, and quality management systems**

**Principles and importance of food processing and challenges thereof, classification of food processing methods, unit operations in food processing, thermal processing including blanching, pasteurization and sterilization, canning and retort processing, refrigeration and freezing, drying and dehydration, evaporation and concentration, extrusion, baking, frying and roasting, fermentation and bioprocessing, membrane and non-thermal processing technologies, minimal and hurdle processing, processing of cereals, pulses, oilseeds, fruits and vegetables, dairy, meat, fish and poultry processing, beverage technology, sugar and confectionery processing, functional and convenience foods, food additives and ingredients, food packaging technologies, shelf-life evaluation and storage stability, quality control and quality assurance, food safety and hygiene, HACCP, GMP and GHP, plant sanitation and equipment design, waste management and by-product utilization, process optimization and scale-up, sensory evaluation of processed foods, and food standards, regulations and FSSAI guidelines.**

## **Mental Ability**

Analogy, classification, series, coding-decoding, blood relations, direction sense test, logical venn diagrams, alphabet test, sitting arrangements, mathematical operations, arithmetical reasoning, inserting the missing character, number ranking and time sequence test

## **General Awareness on health & wellness**

Sustainable Development Goals (SDG), Carbon footprint, Circular economy, Machine Learning, Food Safety and Security, Food and nutritional labelling, Quality Management Systems, Vaccine development and drug testing, R&D Institutions, Welfare schemes of Government.

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