

# **ALL - INDIA CADRE OF SAFE FOOD BUSINESS PROFESSIONALS** **(Syllabus for the Competition – Objective and Subjective Tests)**

**Objective type Questions:** This online test will be in two test modules: Technical and Non-Technical, starting with Non-Technical subjects for one hour and Technical subjects for two hours with a 15 minutes comfort break in between the two modules. In each module, questions (*MCQs, Direct, Fill-in the blanks, Abbreviations, True / False, Visuals*) will pop up on a random basis across the subjects starting with Level-1 (easiest) questions and will move up to Level-4 for that subject as the questions get successfully answered. Level-1 questions will carry one mark and Level-4 questions will carry four marks. There is no limit to the number of questions that can be attempted within the time frame.

**Subjective type Questions:** This online test will be for three hours and both modules will be combined into one examination. Some questions will be in case-study format in which, the case needs to be analysed and then solution(s) have to be proposed in the answer.

## **A. TECHNICAL SUBJECTS (75% weightage)**

### **1. FOOD TECHNOLOGY**

Technology of processing and preservation of foods; Cereals, Legume and Pulses; Bakery and Confectionery; Fruits and Vegetable; Dairy; Meat, poultry and Fish; Oils / Fats; Spices and Oleoresins; Food packaging; Technology of plantation products; Food quality, New Product Development; Sensory evaluation; Food additives and processing aids; Food beverages; Unit operations in food processing.

### **2. FOOD CHEMISTRY**

Introduction to Food Chemistry; Water: structure, water activity and shelf-life; Classification, structure and properties of macromolecules (*carbohydrates, proteins, lipids, food enzymes, vitamins*); Flavours– definition and basic tastes, flavour enhancers; Emulsion– definition, theory, Emulsifiers– properties; Food Additives– characteristics and classification of food additives; Biological changes in foods; Deficiencies associated with macromolecules; NCDs; Allergens.

### **3. FOOD MICROBIOLOGY**

Biological, chemical and physical hazards to safety of food; General characteristics and identification of bacteria, fungi and viruses; Growth of microorganisms and factors affecting microbial growth; Application of micro-organisms in food production; Food fermentations: important fermented foods, starter cultures used in different types of fermented foods etc.; Food contamination and spoilage of cereals & cereal products, fruits & vegetables, meat, poultry and their products, fish & fishery products, milk & milk Products, other foods; Control of Microorganisms in Foods– principles and methods of preservation, Thermal death concept– Z value, F value, D value, 12D concept; Food borne pathogens, microbial toxins in foods and illnesses; Investigations of food borne disease outbreaks; Food plant sanitation, personal hygiene, detergents and sanitizers used for hygiene of food facilities; Food Control agencies (*National & International*), Microbiological specifications for different foods.

#### 4. NUTRITION AND DIETETICS

Food constituents: Role of macronutrients and micro nutrients- sources, functions, deficiency, toxicity of nutrients; Diet and nutrition during lifecycle; Recommended Dietary Allowances (RDA); Nutritional needs of women and children; Digestion and metabolism; foods and their nutritive aspects; bioavailability of nutrients; Assessment of nutritional status; Eating disorders; National / international food logos; Calorimetry; Diet and chronic diseases of heart, liver, kidney, lifestyle diseases; Role of Ministry of Health & Family Welfare; Governmental regulations of food and nutrition labeling.

#### 5. BIOCHEMISTRY

Essential Molecules of Life, structures, characterization and metabolism– Carbohydrates, proteins, lipids, amino acids, nucleic acids, vitamins; Metabolic disorders and diseases; Cell Biology, Membrane Biology and Bioenergetics– Cell biology, Cell cycle, cell death and cell renewal. Membrane structure and its functions, Introduction to bioenergetics and phosphorylation; Human Physiology– Cardiovascular / gastro-intestinal / renal / hepatic physiology, respiration, musculo-skeletal system, reproductive physiology; Introduction to endocrinology; Gene Organization– Structure, replication and recombination of DNA, genes and genomic organization, mutations.

#### 6. FOOD SAFETY AND FOOD HYGIENE

Cleaning and sanitation of food processing equipment; risk analysis; Food additives and preservatives; Food adulteration, contamination and Traceability/food recall; Food borne infection and intoxication; FSSAI regulations and initiatives; Food trade policy and exports; Food choices and issues; Sampling and analytical techniques in food safety; Best practices and FSMS (*GAP, GHP, GAqP, HACCP etc.*); ISO and private standards; General principles of hygienic design of food processing premises and equipment; Acronyms, abbreviations, symbols and logos of associations / institutes / organizations dealing with food safety; Contamination in food supply chain (*residues- insecticides, pesticides, veterinary drug residues and radio nuclides and metallic contaminants, Naturally occurring contaminants and toxicants (unintentional) from plant, animals and anti nutritional substances, substances from food /feed chain, environmental contaminants*); Food adulteration, types of adulterants; Microbiological safety of food; Management of food safety in the value chain.

#### 7. RISK ANALYSIS

Food safety, risks and hazards; concept and components of risk analysis; Risk assessment methodology; Role of National and International organizations in controlling food risk- FSSAI, Codex Alimentarius, INFOSAN, EFSA, ICMSF.

#### 8. FOOD SAMPLING AND ANALYSIS

Food testing principles, apparatuses and equipment's used; Methods for food analysis for different matrices; Spoilage indicators; Sampling, sampling techniques and sample preparation; Classical analytical techniques; Hyphenated techniques; DNA / protein-based techniques; Chromatographic techniques; Electrophoretic techniques; Spectroscopy; Adulterants, Contaminants, Allergens, Pigments and Nutrients and their detection; Statistical applications.

#### 9. QUALITY MANAGEMENT SYSTEM

Principles of Quality Management, Main Quality Management Systems, FSMS, Kaizen, ISO 9001, six sigma etc.; Managerial functions and processes; Management of innovation; Organisational theory, behaviour, design and processes; Knowledge based enterprise; Production and operations management; Production control; Supply chain management; Statistical process control; Project management concepts; R&D management; Waste management; Management Information System; Systems development management life-cycle; Managing data resources; Evaluation of information systems.

## 10. PUBLIC HEALTH

Principles and practice of Public Health; Population science; Basic epidemiology; Communicable and non-communicable diseases and their control programmes; Zoonotic diseases; Public health and nutrition; Maternal and child health; Biostatistics; Principles of social research methods; Financial management and budgeting; Health programmes, policy and planning; Law and ethics in public health; Environment and occupational health; Relevant international Organizations and their Role (WHO, WFP, UNESCO, FAO).

## 11. ORGANIC FOODS

General principles of organic farming; Standards for organic production of edible and non-edible products, processing, handling and labeling requirements (*crop standards, livestock standards, aquaculture, standards, mushrooms, sea-weeds, cosmetics and textiles*); Regulatory and private standards; International reference standards (*Codex and IFOAM*) ISO standards for accreditation / certification bodies (*ISO-17065, ISO-17011*); Group certification; Global organic market, major players in terms of area, production and trade; International organic trade fairs and trade organisations, certification bodies; organic trade associations; Harmonisation of standards; and international alliances.

## 12. NATIONAL AND GLOBAL FOOD REGULATIONS

Understanding of food laws- (South Asian Region, in particular India / ASEAN countries / EU / USA (USDA, USFDA) / Canada / Japan / Australia / New Zealand / CIS / China) including but not limited to: regulations of South Asian countries in detail, their scope, roles and responsibilities; Regulatory structure and general awareness about main regulations (vertical and horizontal); Testing and certification authorities; National Standards Bodies in South Asian countries; Export Promotion Bodies in India, AGMARK, BIS, EIC; Codex Focal Points; Agencies/authorities responsible for risk assessment; Overall understanding of food standards framework, proprietary foods, novel foods, dietary supplements/health supplements in their legislations; Broad overview of labeling requirements; Regulations concerning Imports/Export; Logos of major authorities; Certification marks and logos used to characterize food products (*for example- logo for organic food products*); Mandatory quality and safety certification requirements for foods; WTO, SPS / TBT / TFA / Codex, OIE / IPPC; FTAs and Trade Agreements - EU, SAFTA, SAARC, BIMSTEC, ASEAN, GCC, Mercosur, FSANZ.

## 13. FOOD BIOTECHNOLOGY

Concept of biotechnology and different branches; Biotechnology applications and its uses in food sciences; Recombinant DNA technology (*principles, methods, selection and screening*); Genetically engineered food crops, animals and microorganisms and their benefits; Biotech products in daily life - fermented food products and process development; Biotechnological interventions in food waste utilization; Ethical and regulatory issues with genetically engineered foods; major Biotech industries.

## 14. FOOD ENGINEERING

Classification, importance and application of engineering properties of agricultural Produce, Thermal properties, Newtonian and Non-Newtonian liquid, Electrical properties; Unit operations, equipments and methods of processing; kinetics of microbial growth; Concepts of material specifications for process equipments, modes of heat transfer, thermal conductivity of materials, insulation materials; Energy efficiency; Newton's law of cooling, types of heat exchangers; Laminar forced convection; By-products utilization; Packaging material and selection; Smart / active packaging, edible films, antioxidant and anti microbial packaging; Safety standards in handling, packaging and transport of agricultural produce.

## **B. NON - TECHNICAL SUBJECTS (25% weightage)**

### **15. GENERAL KNOWLEDGE AND CURRENT AFFAIRS**

Social and other activities, politics; History, monuments; Nobel prizes; Persons and personalities; Sports and literature; Rivers, mountains, forests, etc.; Currencies; Countries and capitals, flags; International Days; Abbreviations; Books and authors; Current affairs; General biology, physics, chemistry; Medical science and technology.

### **16. ARITHMETIC REASONING**

Decimals; Fractions; Averages; Ratio and Proportions, Series; Inequalities; Basic Reasoning; LCM / HCF; Percentage: time and work; distance; speed; profit & loss; cost & selling price, discount; income, expenditure & savings; simple / compound interest; Basic Statistics; bar graphs; pie charts; histograms; Geometry, Mensuration; Tables / Charts; Arithmetic progression; Permutations / Combinations; Probability; Word problem on linear equations; Logical matching; Calendars / Clocks.

### **17. ANALYTICAL SKILLS**

Series; Coding-Decoding; analogy; Puzzles; Images; odd one out figures; missing characters; Paper folding, cutting, unfolding and dot situation; Data sufficiency; alphabet tests; Statement-assumption / conclusions; Statement-conclusion; Cubes and dice; Machine input; Blood relationships.

### **18. ENGLISH VOCABULARY AND COMMUNICATION**

Understanding of Word Usage / analogies (*Text completion*); Understanding of Synonyms and Antonyms; English Grammar; Word / Sentence Correction / Comprehension; Cloze Passage; Jumbled paragraphs; Reading Comprehension / inferences.

### **19. COMPUTERS AND INFORMATION TECHNOLOGY**

Introduction to computers– evolution, types of data, input-output devices, data transfer, troubleshooting; Computer Memory– units of memory, types of memory; Microprocessor– evolution, features including memory size, word size, clock speed; Software– types of softwares and their classification; Operating System– introduction and its user interface; Concept of Internet and E-mail– basics of internet, internet browsers and internet connectivity, web browsing softwares, search engines URL, domain name, IP address and types of computer networks; Introduction to MS Office– introduction, features and functions of MS Office Suite; Basics of Number System.

### **20. BUSINESS MANAGEMENT AND ETHICS**

Basics of Business Management and Organizational Behaviour; Basics of Economics; Marketing Management & Allied issues; Basics of Financial Management; Social Responsibility of Business and Business Ethics; Human Resource Management; Corporate Governance.

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