

DETAILED SYLLABUS FOR THE POST OF TECHNICAL ASSISTANT GR.II

{Food Safety}

(CAT.NO. : 26/2021)

(Total Marks- 100)

Section	Topic	Mark
1	Food Chemistry	10
2	Food Microbiology	10
3	Food Technology	10
4	Food Engineering	10
5	Food safety and standards	25
6	Laboratory ecosystem of FSSAI	10
7	Food quality Analysis	15
8	General aptitude and general knowledge	10

1. Food chemistry

- Chemical composition of food, structure and functions of macro and micronutrients, roles of macro and micronutrients in human nutrition – carbohydrates, protein, lipids, vitamins, minerals and pigments, RDA
- Molecular biology, an overview of enzymes in food processing
- Food analysis – moisture content, fat, ash, carbohydrates, protein, lipids, crude fibre and minerals
- Food adulteration – common adulterants, analytical techniques used to check adulteration – spectroscopy (IR, MS and AAS), chromatography (column, paper, TLC, HPLC, and GC)
- Food Additives: Definition, types and their technological functions, INS number, Food Colours, Antioxidants, Sweeteners, preservatives, emulsifiers, thickeners, etc.
- Overview of anti-nutritional factors and their removal
- Food fortification

2. Food microbiology

- General microbiology – microscopy, staining, culture techniques, microbial growth curve
- Microbial spoilage of different commodities
- Food borne diseases – food intoxication, food infection and food poisoning

- Over view of beneficial microorganisms and their role in food processing and human nutrition

3. Food Technology

- Principles and techniques of food preservation – thermal processing. Pasteurization, canning, chemical preservatives, dehydration, drying, freezing, cooling, irradiation, HPP and other non-thermal techniques
- Food packaging – types of packaging, packaging material, and novel methods of packaging
- Food additives
- Cereals and pulse processing – cleaning, grading, milling, parboiling, processing of paddy, wheat, corn and pulses
- Fruits and vegetable processing – jam, jelly, marmalade, squash, pickles, RTS, minimal processing and other value-added products
- Basic aspects of meat, poultry, and fish processing
- Dairy technology
- Beverages

4. Food engineering

- Basic food processing unit operations – cleaning, grading, size reduction, mixing, filtration, evaporation, centrifugation, membrane separation and sedimentation
- Heat and mass transfer in food processing

5. Food safety and standards

- Food Safety and Standards Act of India, 2006: Provision, definitions, and different sections of the Act and implementation.
- FSS Rules and Regulation
- Genesis and Evolution of FSSAI
- Structure, Role, Functions, and initiatives of FSSAI
- Salient features of a) Food or Health supplements, Nutraceuticals, Foods for special dietary uses, Foods for Special Medical purposes, Functional Foods and Novel food Regulations, 2016 b) Food Safety and Standards (Food Recall Procedure) Regulations, 2017, c) Food Safety and Standards (Import) Regulations, 2017, (d) Food Safety and Standards (Organic Food)

Regulations 2017, (e) Food Safety And Standards (Fortification of Foods) Regulations 2018, (f) Food Safety and Standards (Alcoholic Beverages) Regulations 2018

- Salient features of a) Standards of Quality and Safety of Food & Food products laid down in the FSS regulations, 2011, (b) Food Safety and Standards (Packaging and Labelling) Regulations, 2011, (c) Food Safety and Standards (Packaging) Regulations, 2018, (d) Food Safety and Standards (Labelling and Display) Regulations, 2020, (e) Regulations for Food Additives, (f) Regulations for contaminants, Toxins, and Residues; Prohibition and Restriction for sales.
- Overview of national and international regulations, and standard bodies (APEDA, BIS, MPEDA, CODEX Alimentarius, ISO, HACCP, GMP, GAP, GHP, AGMARK, JECFA, JEMRA and JMPRA, etc.)
- Overview of national laws and standards related to Food Safety and Standards (a) Prevention of Food Adulteration Act, 1954, (b) Essential Commodities Act, 1955 (c) Agricultural Produce Act, 1937 (Grading and Marketing) (d) Fruit Products Order, 1955, (e) Vegetable and Oil (Control) Order, 1947, (f) Export (Quality control & Inspection) Act 1963, (g) Milk and Milk Products, 1992, etc.

6. Laboratory ecosystem of FSSAI

- Laboratory ecosystem of FSSAI; classification of laboratories, the role of Primary, Referral and national Reference laboratories, FSSAI notified laboratories, State Food laboratories, and functions
- Setting up a Basic Food Testing and Analysis Laboratory, site selection, ideal storage structure design, environment, layout for chemical and microbiological testing, air handling, accreditation bodies (NABL, APLAC, ILAC), Requirements for ISO/IEC 17025, Documentation, pre-requisites for accreditation, management requirements, technical requirements, measurement of traceability
- Laboratory organization structure, Analytical process for regulatory compliance, receiving legal sample, sample custody, sample custodian, storage of sample, required documentation and registration, analysis of sample, Food Import Clearance System (FICS) implemented by FSSAI
- Laboratory safety: personnel and laboratory hygiene, emergency planning, general hazards in food laboratory, safety equipment, storage of chemicals, acids flammables etc. handling of compressed gases and chemicals, waste disposal

7. Food quality Analysis

- Sampling and sample preparation, types of sample, sampling plan, designing a sampling plan, concept of sample size, particle size, homogeneity, dissolution technology and decomposition, storage of samples.
- Law of mass action, Le chateliers principle, Stoichiometry, Volumetric and gravimetric analysis, concepts of percentage, molar, molal, normal, ppm and ppb, proximate analysis, physical methods of food analysis
- Classical methods of food analysis: Gravimetry, Titrimetry, Refractometry and Polarimetry.

Spectroscopic methods for food analysis: Visible, UV and Fluorescence spectrometry, Beer Lamberts Law, Raman spectroscopy

- Chromatographic techniques: The plate theory, Paper Chromatography, Thin Layer chromatography, Ion exchange chromatography, High-Performance Liquid Chromatography, Gas Chromatography, Chromatograms, mobile phase, stationary phase
- Hyphenated Techniques: Mass spectrometry, Electrophoresis, Atomic Absorption Spectroscopy, Atomic Emission Spectroscopy etc.
- Measurement of Rheological Properties: instrumental measurement of texture of food, Types of viscometers, Rheometer, Texture analyzer
- Biological techniques: Polymerase Chain reaction (PCR), Enzyme-Linked Immunosorbent Assay (ELISA), RadioImmuno Assay (RID) etc.

8. General aptitude and general knowledge

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