

No.E-12013/02/2019-HR
Food Safety and Standards Authority of India
(A Statutory Authority established under the Food Safety & Standards Act, 2006)
(HR Division)
FDA Bhavan, Kotla Road, New Delhi-110 002

The 01st November, 2019

CORRIGENDUM

Candidates may refer to advertisement for the post of Food Analyst on direct recruitment basis through post code 01 vide Advt. No. DR-03/2019 dated 16.10.2019 and may note modified revised scheme of examination and the syllabus for the written examination to be conducted for the post of Food Analyst is annexed.

2. **The last date for receiving online application for the posts of Food Analyst is hereby extended upto 15.11.2019.** Other contents of the main advertisement dated 16.10.2019 shall remain unchanged.



(Raman khanna)
Assistant Director (HR)

Copy to: IT Division- with a request to kindly upload this on FSSAI

FOOD ANALYST – WRITTEN EXAMINATION 2019
EXAMINATION PLAN

PAPER - I (Single Session - 3 hours – 10:00 PM to 1:00 PM)				
S.No	Topics	Weightage, %	Questions, No.	Marks, per Qn
A	Food Laws and Standards of India and International Food Laws	10	2	5
B	Planning Organization and setting up of Food Analysis Laboratory including NABL / ISO / IEC-17025: 2017 and laboratory safety	10	2	5
C	Physical, Chemical, Microbiological and Instrumental analysis	40	4 out of 6	10
D	Case studies for interpretation and providing opinion based on an analysis report as per FSSR 2011	40	2 out of 3	20
TOTAL		100	10	100

- All questions will be of subjective type and have to be answered in the space provided. Extra pages or booklets will not be provided.
- For a candidate to qualify, he/she needs to score at least 50% mark in each section and an aggregate of 60% overall.
- 3 candidates will be shortlisted for each position i.e., a total of 18 candidates would be selected from among the applicants who undertake the written examination subject to them meeting the criteria mentioned at point “b” above.
- Syllabus for the written test is provided below

SYLLABUS

A. Food Laws and Standards of India and International Food Laws:

- Food Safety and Standards Act of India, 2006: Provision, definitions and different sections of the Act and implementation.
- FSS Rules and Regulations (2011) as amended from time to time -
 - Licensing and registration: Central license, State license, Registration, Responsibilities of the FBO, Role of Designated officer, Food Safety Officer and Food Analyst.
 - Standards of Quality and Safety of Food & Food Products laid down in the FSS Regulations, 2011. The different food categories in the Act. The relevance of the standards (Vertical and Horizontal) quality and safety parameters to particular foods including current food safety issues.
 - Regulations of food additive: What is an additive, various groups of additives and their technological functions, INS number: food colors, antioxidants, sweeteners,

preservatives, processing aids. Food processing aids. The Indian Food Code and using the hierarchy to understand the category wise approval of Food additives.

- d) Packaging and labelling rules and regulations: List of ingredients, nutritional information, special label declarations, claims-Health, nutrition, nutrient led claims, use of words and phrases on label
- e) Regulations for Contaminants, Toxins and Residues and restriction of sales.
- f) Food Safety and Standards (Food or Health Supplements, Nutraceuticals, Foods for Special Dietary Uses, Foods for Special Medical Purpose, Functional Foods and Novel Food) Regulations, 2016 Food Safety and Standards (Food Recall Procedure) Regulation, 2017 Food Safety and Standards (Import) Regulation, 2017
- g) Food Safety and Standards (Organic Food) Regulation, 2017.
Food Safety and Standards (Fortification of Foods) Regulations, 2018
Food Safety and Standards (Alcoholic Beverages) Regulations, 2018
- h) Laboratory sampling and analysis: The role of Referral labs, FSSAI notified laboratories and State Food Laboratories and functions. Receiving legal samples, sample custody and sample custodian. Storage of sample. Required documentation and registration, storage of the sample Analyses as per FSS Rules and Regulations (2011).

III. Other National Laws and Standards

- a) Agricultural Produce Act, 1937 (Grading and Marketing)
- b) Export (Quality Control & Inspection), Act, 1963 and Rules
- c) Bureau of Indian Standards relevant to Food Safety (Water, Infant Formula etc)
- d) Legal Metrology Act

IV. International Food Control Systems/ Laws, Regulations and Standards/ Guidelines with regard to Food Safety:

- a) CODEX Alimentarius Commission: History, Members, Standard setting and Advisory mechanisms: JECFA, JEMRA, JMPR
- b) WTO agreements: SPS/TBT
- c) Role of OIE, IPPC.

B. Planning Organization and setting up of Food Analysis Laboratory including NABL / ISO / IEC-17025: 2017 and laboratory safety.

- I. Understand the requirements for setting up a laboratory for the legal defensibility of analytical data. The ideal structure design, environment, layout for chemical and microbiological testing, Air handling etc
- II. What is accreditation, Different accreditation bodies (NABL, APLAC, ILAC). Requirements for ISO/IEC 17025:2017, documentation, pre-requisites for accreditation, management requirements, technical requirements, measurement of traceability
- III. Laboratory safety: Personnel and laboratory hygiene, emergency planning, General hazards in a food laboratory, safety equipment, storage of chemicals, acids, flammables etc, handling compressed gases, centrifuge, chemical and biological spills and waste disposal.

C. Physical, Chemical, Microbiological and Instrumental analysis

- I. *Sampling and sample preparation*: Definition, types of sample, sampling plan, subsampling, designing a sampling plan, concept of sample size and representative. Sample preparations – particle size, homogeneity, dissolution technology

- and decomposition, storage of samples. Solid Phase Extraction- Introduction, sorbents, matrix solid phase dispersion and applications.
- II. *Statistics and statistical terms*: Systematic and random errors. Mean distribution. Confidence interval. Confidence limits and confidence level. Outliers. Definition and calculation of: Average, Mean, Standard deviation, Relative standard deviation, Coefficient of variation, Confidence limits of a measurement, Statistical Tests, Linear correlation and regression curve fitting, fitting of linear equations. Choosing and using statistical tests, Analysis of Variance (ANOVA),
 - III. *Methods for the Microbiological Examination of Foods*: Sampling Two-class and three-class sampling plan. Pure culture isolation: Streaking, serial dilution and plating methods; cultivation, maintenance and preservation/stocking of pure cultures; cultivation of anaerobic bacteria, and accessing non-culturable bacteria. Indicator Organisms: Direct Examination, Enumeration Methods, Plate Counts, Most Probable Number Counts, biochemical test, Rapid Methods for e Detection of Specific Organisms and Toxins, Immunological Methods, DNA/RNA Methodology
 - IV. *Basic principles of Classical Methods of food analysis*: Law of mass action, Le chateliers principle, stoichiometry, volumetric and gravimetric analysis. Preparation of standards, working standards and solutions of known concentration (percent, molar, molal, normal, ppm and ppb) and their dilution. Proximate analysis, physical methods for extraneous matter analysis
 - V. *Classical analytical techniques: Gravimetry, Titrimetry, Refractometry and Polarimetry*: Principle, Instrumentation and applications of each technique in food analysis
 - VI. *UV-Visible and Fluorescence Spectrometry*: Electromagnetic spectrum, Beer and Lambert's Law, Absorbance, Transmittance, Molar absorptivity (Molar Extinction coefficient), E 1%, λ Max. Components and functioning of an UV-vis spectrophotometer: Single beam and double beam. Components of a UV-VIS spectrum. Calibration curve and applications in food analysis.
 - VII. *Raman spectroscopy*: Principle Theory Instrumentation, techniques and Applications of Raman spectroscopy in food analysis
 - VIII. *Chromatographic techniques*: Fundamentals of chromatographic separations and their classification. The plate theory. Capacity factor and resolution factor. Chromatographic efficiency. Van Deemter's equation. Partition coefficient etc. Principles and applications of paper (Ascending, Descending, Radial, Two dimensional) Partition, Thin layer chromatography, HPTLC, size exclusion and ion exchange chromatography. Applications in food analysis
 - IX. *High Performance Liquid Chromatography (HPLC)*: Basics of liquid chromatography, HPLC columns and Stationary phases (solid, liquid) – Bonded phase supports, mobile phases, isocratic and gradient elution, Detectors: UV absorption, Fluorescence detector, RI detectors, electrochemical detectors, Photo diode array, Evaporative light scattering detector, PHRED anatomy of a chromatograms. Modes of separation Normal and Reverse Phase. Sample Preparation Techniques, Applications in quantitative food analysis of aflatoxins, vitamins, sugars, sweeteners, preservatives etc.
 - X. *Gas chromatography*: Basics of Gas chromatography, Mobile phase and criteria for its selection – Sample introduction techniques – Stationary phases– Supports for liquid stationary phases, Selection of columns. Detectors FID, TCD, FPB, ECD, TID.



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- Temperature programming in GC – Derivatization and sample preparation in GC –Fatty acid profile and quantitative analysis of fatty acids in fats and oils.
- XI. *Mass Spectrometry*: Basics of mass spectrometry, Components of a mass spectrometer, Ionization and ion sources: Electrospray, chemical, Fast Atom Bombardment, MALDI, Atmospheric Pressure Chemical ionization and other ionization methods. Mass analyzers: Quadrupole Analyzers, Ion Trap Analyzers, Electrostatic Trap or 'Orbitrap', Time-of-Flight Analyzers, Hybrid Instruments. Detectors: Photographic plate, Faraday cup Electron multipliers. Data acquisition, Data conversion, Data reduction and Library search. Tandem Mass Spectrometry and its applications.
- XII. *Hyphenated Techniques*: Mass Spectrometry and Chromatography Coupling. GC-MS/MS, LC-MS/MS, Capillary electrophoresis-MS, Isotopic Ratio mass spectrometry. Analytical Information: Mass Spectrometry Spectral Collections, high resolution, quantitative data, fragmentation and spectrum interpretation.
- XIII. *Atomic absorption Spectroscopy, Atomic emission spectroscopy, ICP-MS*: Principles- Atomization process, Atomic line widths and radiation sources for AAS, temperature gradients, cells detectors, interferences, Background correction methods and modifications in instrumentations, Atomic Emission Spectroscopy: Atomic spectra, Population distribution with temperature, Sources, spark laser microprobe for atomic emission, Spectrometers, Merits, demerits, and applications. Basic principles and instrumentation of ICP-MS; data acquisition and interpretation; applications of ICP-MS for analysis of metallic contaminants in food. Sample preparation, microwave digestion.
- XIV. *Biological Techniques (DNA/protein based)*: Fundamental principles and instrumentation of the systems; measurement techniques and result interpretations of Polymerase Chain Reaction (PCR), Real-time Polymerase Chain Reaction (PCR) technique; Enzyme Linked Immunosorbent Assay (ELISA); Radioimmunoassay (RIA). Use of PCR for detection of genetically-modified organisms (GMO); meat and fish speciation and other applications in analysis of food adulteration.
- XV. *Measurements of Rheological properties*: Instrumental Measurement of Texture of Foods, Visco Analysis, viscometer, texture analyser etc.
- XVI. *Quality assurance and Quality control*: Introduction to quality control in analytical chemistry. Terminology in analytical measurements: True value, Measured value, Accuracy, Precision, Uncertainty, Random errors. Sample traceability, Internal quality control, Certified reference materials. Spiked reference samples. Recovery studies, Method validation/verification (LOD, LOQ, specificity, selectivity, linearity, range, robustness, repeatability, reproducibility. External and internal standards, Control chart, Proficiency testing, z scores
- D. Case studies for interpretation and providing opinion based on an analysis report as per FSSR 2011**


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