



PUBLIC SERVICE COMMISSION, WEST BENGAL

161A, S. P. Mukherjee Road, Kolkata-700026

Scheme & Syllabus for Preliminary Screening Test for recruitment to the post of Agricultural Marketing Officer (Training & Canning) under West Bengal Junior Agricultural Service (Marketing) under the Department of Agricultural Marketing, Govt. of West Bengal. ADVT. NO. 14/2019

Scheme of Examination:

Preliminary Screening Test will be objective type (MCQ) in 4 different series, viz., A, B, C & D.

- Number of questions: 100, each carrying 1 mark.
- Full marks: 100.
- Duration: 1 hour 30 minutes.

N.B.: There will be negative marking for wrong answers as per norms (1/3rd of the full mark for each wrong answer).

Syllabus for the Preliminary Screening Test (100 marks): Multiple choice objective type questions on:-

(i) Food Technology – 50%

1. **BIOCHEMISTRY AND NUTRITION**- Enzyme and coenzymes, Metabolism of carbohydrates, lipids, and proteins, Determination of food energy, Physiological fuel value of foods, calculation of energy value of foods, Physiological functions, role in metabolism and daily requirements of vitamins, Minerals, Specific role of iron, calcium, phosphorous, sodium, potassium, magnesium, chlorine, zinc, copper and iodine, Dietary interrelationship, Functional foods and Nutraceuticals.
2. **MICROBIOLOGY** - The importance of microbes in food and fermentation industries, Morphology of bacteria, Moulds and yeast, Dyes and staining techniques. Nutrition of microbes, Techniques of pure culture, Bacterial genetics. Differentiation and classification of bacteria. Bacterial viruses. Microbial respiration of proteins. Disinfection and disinfectants; Pasteurization, sterilisation and autoclaving. Energy metabolism of aerobic and anaerobic microbes. Nitrogen fixation, Bacteriology of air, water, milk and milk products, fish, fruit and vegetable.
3. **FOOD MICROBIOLOGY TECHNIC** - Preparation of nutrient broth and media with agar, gelation and special media for culture of microbes, Technique of pure culture, Determination of bacterial species. Anaerobic cultures. Effect of temperature, UV light, osmotic pressure, desiccation, pH, surface tension and oligodynamic action on growth of bacteria. Determination of thermal death and Thermal death point of bacteria. Hydrolysis of starch, liquefaction of gelatin, hydrolysis of casein and glycerides. Detection and accounting of coliform bacteria and Salmonella. Bacteriological examination of water, milk, dried fish and fish meal and canned foods.
4. **CHEMISTRY OF FOODS** – Definition of food as per FSSAI, 2011, Composition of foods, Water in foods, Carbohydrate, Proteins, Lipids, Natural pigments and flavouring agents: Chlorophyll, carotenoids, Anthocyanins, Anthoxanthins, Flavonoids, Tannins, Natural flavour constituents. Vitamins : Occurrence, chemistry, loss during storage, transport and processing of foods of pro-vitamin A & D, vitamin A, D, E, K, C, B, H niacin, pyridoxin, cyanocobalamin, folic acids p-aminobenzoic acid, biotin, choline. Perishable and non-perishable food.
5. **FOOD MICROBIOLOGY** - Development of microorganisms in Food, Role and significance of microorganisms in Foods, Parameters of Foods that affect microbial growth. Micro-organisms importance in Food Microbiology, spoilage and chemical changes of foods caused by microorganisms. Contamination, Preservation and Spoilage of different kinds of foods. Determination of the presence of microorganisms and / or their products in Foods by different techniques. Food borne infection and intoxication, Food sanitation, control and inspection.
6. **PRINCIPLES OF FOOD PRESERVATION** - General introduction to food technology. Construction of sanitary cans and testing of cans, can lacquers and can scaling compounds. Preservation by application of heat, various canning techniques, Dehydration, water activity of food, intermediate moisture food, Preservation of food by



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removal of heat, cold storage and freezing including cryogenic freezing of food, Curing, Preservation by ionization radiation use of chemical and preservatives in food preservation and preservation by fermentation.

TECHNOLOGY OF FOODS - Storage of cereals, infestation control and use of pesticide, drying of grains, Processing of rice and rice products, Milling of wheat etc and production of wheat products including flour, bread, biscuits, cakes and other confectionery products, Toxic factors in cereals, infestation control, proximate composition of legumes. Amino acid balance, inhibitors, toxic factors and processing methods, by products utilisation. Chemical composition, nutritive value and physical characteristic of milk and milk products. Pasteurization and Homogenization of milk. Manufacture and fortification of milk products and Quality control. Milk plant hygiene and sanitation. Technology of fruits, vegetables food legislations, quality control and packaging, Storage and handling of fresh fruits and vegetables. Preservation of fruits and vegetables and their product. Freezing, dehydration, Concentration of fruits and vegetables. Food additives, physiology of ripening. Physical and chemical treatment to increase post harvest life of fruits and vegetables. Role of plant growth regulators in post harvest storage. By product and their utilization. Preparation of spice powder in other miscellaneous spice and condiment products. Preparation of non alcoholic beverage. Technology of tea, coffee, cacao. Food-laws the food rules and standards, quality control of food and food products. Various types of packaging and problems in packaging of food stuff. Antioxidants and rancidity and fats in diet, nutrition and disease, Detection of adulteration, Extraction and clarification of vegetable oil, Modifications of the properties of oils and fats including chemical and biotechnological processes, Confectionery plastic fats, Preparation of various products including different shortenings, margarine, salad dressing and mayonnaise, imitation of dairy products low calorie spreads.

7. **MECHANICAL OPERATION** - Size reduction, granulation, partials separation. Crushing and grinding; Particle separation; sampling and screening, Sedimentation, flocculation, filtration Mixing of solids, liquids and slurries, material handling.
8. **WASTE TREATMENT ENGINEERING** - Environment and energy of nature, Water for food and biochemical industries, Stream pollution and measurement, Physical treatment, Chemical treatment, Drying and incineration, Industrial waste treatment, Treatment and disposal of sludge solids, Microbial flocculation and sedimentation,
9. **MICROBIAL TECHNOLOGY** - Production, recovery and control tests of the following fermentation production. Bakers' yeast, food yeast, citric acid, enzymes, vitamin B12, amino acids, Analysis of ferment gas including experiments on carbon balance.
10. **FOOD ANALYSIS** - Extraction, separation and identification, water and oil soluble dyes, detection and estimation of additives in food materials net as, boric acid, benzoates, sulphites, formaldehyde, formic acid, lactic acid, saccharine cyclamate, dulcin etc. Analysis of food stuffs with reference to the standards of quality fixed for milk, jam, jelly, squash, vinegar, cider, rice and wheat. Changes in the vitamins ascorbic acid and thiamin in canned vegetables during thermal treatment.
11. **BIOCHEMICAL ENGINEERING AND BIOTECHNOLOGY** - Improvement in processed food by the application of various biotechnological processes. Biotechnological process for manufacture of food staff and food etc. Studies on changes in colour, flavour during processing and storage of the fermented food and chances of spoilage of the products due to process defects. Evaluation and standardization of quality and safety of the fermented food products by the application of modern techniques.
12. **SEPARATION PROCESSES** - Distillation : Vapour – Liquid equilibrium, relative volatility batch and equilibrium distillation, steam distillation, molecular distillation, azeotropic and extractive distillation, Introduction to the design of humidifiers, dehumidifiers and cooling towers, Theory of drying of solids, liquids and gases, Introduction to dryer design.
13. **FOOD PROCESSING & QUALITY CONTROL** - Preparation of squash, jam, jellies, marmalade, preserved and candied fruit. Preparation of alcoholic beverages. Preparation of pickles, chutneys, sauces, fermented vegetables & tomato products. Fruit juice concentrate & powder. Preservation of fruits & vegetables, fish meat etc. by canning freezing, drying and quality assessment of the processed products. Testing of can preparation of ice cream & other frozen products. Preparation of confectionery products. Preservation of milk by heat treatment. Preparation of various milk based products. Enumeration of faecal indicator organisms, salmonella & pathogenic organism in processed food. Detection and identification of food spoilage organisms. Quality assessment of processed food. Evaluation of process time in canning, Different types of sterilizers, seaming machine and other accessories used in canning industries, pasteurizer, homogenizer, evaporators and concentrators used in food industries, Construction of cold storage and different types of freezers including plate freezers, blast freezer cryogenic freezing, Vacuum freezing, Refrigerated vans and wagons, equipment used for grading and sizing of food, emulsifiers and Food Irradiation Technology.

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| (ii) | G.K. and Current Affairs | – 15% [Madhyamik Standard] |
| (iii) | Arithmetic and Reasoning | – 15% [- Do -] |
| (iv) | English | – 20% [- Do -] |