

DETAILED SYLLABUS FOR THE POST OF DAIRY EXTENSION OFFICER
DAIRY DEVELOPMENT DEPARTMENT (Cat.No.: 008/2021)

Module No	Module name	Contents	Weightage
1	Market Milk	Collection and transportation of milk, Preservation at farm, Reception, Chilling, Clarification, Storage of milk in dairy plants. Unit operations- pasteurization and its types, homogenization, cream separation, bacto-fugation, thermization, sterilization. Special milks- toned, double toned, skimmed, reconstituted, recombined, flavoured, homogenized, vitaminized, sterilized, acidophilus milk. UHT processing of milk, Aseptic packaging, Shelf life and nutritive value of milk. Cleaning and sanitization of dairy equipment - CIP, Detergents and Sanitizers used.	15
2	Milk Products	Preparation, Types, Shelf life, Sensory evaluation, Defects, Packaging and Standards of the following Milk products: Khoa and khoa based products, Channa and channa based products, Cheese and fermented milk products, Fat rich dairy products, Condensed milk and dried milks, Frozen milk products, Milk by-products and other Traditional milk sweets.	15
3	Dairy Engineering	Basic principles, operation, construction & maintenance of dairy equipment at reception dock (milk pump, cream separator, can washer, chiller etc.), Pasteuriser, Homogeniser, Boiler, Hot water generator, Refrigeration systems, Sterilisers, Packing Machines, CIP and Aseptic Packaging Systems. Requirements for construction of dairy plants, including their design and layout.	5
4	Chemistry of milk and milk products	Definition and structure of milk, factors affecting composition of milk, Nomenclature and classification of milk proteins, Hydrolysis and denaturation of milk proteins under different physical and chemical environments, Estimation of milk proteins using different physical and chemical methods, Milk carbohydrates their status and importance. Processing related degradation of lactose, Definition, general composition and classification of milk lipids. Milk phospholipids and their role in milk products, Milk Salts: Minerals in milk, Natural inhibitors of milk, Heat induced changes in milk. Chemical composition and legal standards of milk products. Physico-chemical changes during preparation and storage of different milk products.	10
5	Microbiology of milk and milk products	Microbial contaminants in raw milk, their sources during various stages of production - milking, chilling, storage and transportation with special reference to psychotropic microorganisms and their preventive measures. Types of microbial spoilage - souring, curdling, bitter cream, proteolysis, lipolysis, abnormal flavours and discoloration. Mastitis milk - types of mastitis, causative microflora of mastitis, compositional and microbiological changes during	10

		<p>mastitis infection, their processing and public health. Cleaning and sanitation practices in dairy farms and plants. Microflora of aseptically drawn milk and its natural antimicrobial systems. Microbiological aspects of pasteurization, boiling, sterilization, ultra-high temperature (UHT) pasteurization, non-thermal (pulsed field) micro-filtration, bactofugation, standardization and homogenization. Significance of heat resistant and post processing contaminants in milk and milk products. Milk-borne diseases, food infection, intoxication and toxic-infection caused by pathogenic microorganisms. Microbiological grading and legal standards of raw/processed milk and milk products.</p>	
6	Quality assurance of milk and milk products	<p>Role of national and international food regulatory systems and standards with respect to quality and safety of milk and milk products: FSSAI, PFA, AGMARK, BIS ISO, IDF, Codex, etc., Application of food safety management systems (ISO standards). Hazard analysis and critical control points (HACCP) system and its application in dairy industry. Introduction to food acts laws and standards. National food safety and standard act (FSSAI). Consumer protection act. Food Quality Management, Characteristics of quality, Introduction to Food Safety and Hygiene, Food hygiene, Factors affecting food safety. Food spoilage, Food handling, Special requirements for high-risk foods, Safe food cooking temperature and storage techniques; Cleaning and disinfection, Personal hygiene, Pest control, Waste disposal. Testing methods for the detection of adulterants, preservatives and neutralizers in milk and milk products. Environmental contaminates such as pesticides, antibiotics, heavy metals in milk and milk products and their chemical testing methods. Importance of milk contact surfaces, metallic contamination in dairy industry. Chemical quality of water in dairy industry.</p>	10
7	Milk production management and dairy development	<p>Indian and exotic breeds of dairy animals (cattle and buffalo), Systems of breeding and methods of selection of dairy animals, General dairy farm practices, Care of animals at calving and management of neonates, Management of lactating and dry cows and buffaloes, Milking procedure and practices for quality milk production, Dairy farm records and their maintenance, Systems of housing dairy animals and maintenance of hygiene and sanitation at dairy farm premises, Clean Milk Production, Common disease problems in dairy animals, their prevention and control. Feed nutrients required for the animal body. Feed resources for milk production and their nutritive values. Digestive system of ruminants and digestion process, Nutrient requirements for growth and milk production. Feeding standards, Structure and function of mammary system, Milk secretion and milk let-down.</p>	10
8	Fodder production and management	<p>Forages and fodder, Importance of forages in animal nutrition, Problems of fodder cultivation in Kerala and present fodder production scenario, Forage from food crops, plantation crops, fallow lands, rice fields, cover crops, border trees, marshy lands,</p>	10

		crop wastes, straw etc. Classification of forage crops. Soil and climatic requirements, plant characteristics, cultivation, propagation, land preparation and planting, manures and fertilizers, weeding and inter-culture, irrigation, harvesting, yield, quality, toxicities, utilization, seed production etc. of the following fodder grasses and legumes: Hybrid Napier, Guinea grass, Seteria grass, Para grass, Congo signal, Fodder maize, Fodder sorghum, Stylosanthes, fodder cowpea, Subabul, Glyricidia and Agathi, Forage preservation techniques like silage and hay and their preparation and utilization.	
9	Dairy Co-operative Management	History of co-operative movement, ICA, principles of co-operation, co-operative form of organization, its difference from other forms of business organizations, Dairy co-operatives – traditional and Anand pattern; their development under Five Year Plans, Dairy development programmes of NDDDB. Organizational pattern of dairy co-operatives in India; constitution and mode of operation, Growth and development of co-operative dairying in Kerala, Problems effecting operational efficiency of dairy co-operatives, Management and administration of dairy co-operatives; model byelaw, Kerala State Co-operative Societies Act 1969; supervision of co-operatives including inspection and audit. Role of NCDFI, NCUI, State co-operative Union, NCDC and NABARD.	5
10	Fundamentals of Dairy Extension	History, need, definition, philosophy, principles, approaches and objectives of Extension Education. Dairy development programmes in India. Extension Teaching Methods, classification and selection of teaching methods. Importance of Audio-Visual-Aids. Identification of rural leaders and their training, Principle of working with group and their mobilisation. Need, principle and steps of programme planning. Evaluation of extension programmes. Diffusion of innovations and categories of farmers. New developments in extension including farmer to farmer extension, social media extension and market led extension. Problems of different stake holders in dairy development. PRA, ATMA, ATIC, T and V System etc. Statistics related to dairy animal population and milk production of Kerala.	10

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.

