Test Structure, Syllabus and Model Questions for

Master's Entrance Test

(MET)

2025-2026

PUNJAB AGRICULTURAL UNIVERSITY

LUDHIANA

CONTENTS

MET - AGRICULTURE

For admission to M.Sc./M.Tech. programmes in Agricultural Economics, Agricultural Extension Education, Agricultural Meteorology, Agronomy, Entomology, Food Processing Technology, Forestry (Silviculture and Agroforestry), Genetics & Plant Breeding, Horticulture (Floriculture & Landscaping), Horticulture (Fruit Science), Horticulture (Vegetable Science), Molecular Biology & Biotechnology, Plant Pathology, Soil Science.

1. Test Structure

(a) The question paper shall have two SECTIONS:

SECTION-I: General Agriculture, which will be compulsory for all the candidates.

SECTION-II: A candidate has to opt for at least one discipline out of the following. However, a maximum of two disciplines can be selected as per candidate's eligibility:

1. Agricultural Economics
2. Agricultural Extension Education
3. Agronomy / Agricultural Meteorology
4. Entomology
5. Food Processing Technology
6. Forestry (Silviculture and Agroforestry)
7. Genetics & Plant Breeding
8. Horticulture (Floriculture & Landscaping / Fruit Science / Vegetable Science)
9. Molecular Biology and Biotechnology
10. Plant Pathology
11. Soil Science

Any change in choice of discipline will not be allowed after the submission of application form.

(b) There will be 150 multiple choice type questions **(SECTION-I: 90; SECTION-II: 60)** each carrying one mark which are to be attempted by the candidates in the allotted time of **2 hours 10 minutes.**

For Agricultural Economics, weightage will be 50% for SECTION-I and 50% for SECTION-II.

(c) Candidates appearing for two disciplines will be required to sit for **additional SECTION-II** paper chosen by him/her consisting of **60 questions** which is to be attempted in additional allotted time of **50 minutes**.

(c) Each correct answer will carry one mark whereas ¼ mark will be deducted for every wrong answer.

(d) Minimum percentage of marks required in the Entrance Test to be called for Counselling is 20%.

2. Syllabus

SECTION - I:

General Agriculture

Issues facing modern day agriculture in Punjab. Principles of crop production. Improved varieties, cultural practices, major pests and diseases (and their control) of wheat, rice, cotton, sugarcane, pulses, oilseeds and important vegetables, fruits and ornamentals of Punjab. Importance, status and scope of fruit industry in Punjab. Importance and classification of vegetable crops in Punjab. Breeding methods of self-pollinated, cross pollinated and vegetatively propagated crops. Seed certification. Principles of agroforestry. Scope of floriculture and landscaping in Punjab. Functions and deficiency symptoms of micro and macronutrients. Problematic soils, their characteristics and management. Improved irrigation practices in field and horticultural crops. Water resources of Punjab state. Organic manures, inorganic and biofertilizers. Handling, processing and preservation of foods of plant and animal origin. Fundamentals of agricultural business and marketing. Extension education in relation to rural development and precision farming. World trade in agriculture, commodities, quarantine, SPS measures and IPRs.

SECTION - II:

Agricultural Economics

Micro Economics: consumption, production, costs, demand and supply & factors affecting them. Forms of market structure and price determination under perfect competition and monopoly, factors of production. Macro Economics: Basic concepts, national income accounting. Monetary and fiscal policies, inflation-types, causes and remedies. Population theories, price index. Farm Management: Typical decisions and principles of farm management, Farm records and business accounting, farm planning and budgeting. Factor-factor, factor-product and product-product relationships. Risk and uncertainty in agriculture, externalities in agriculture, agricultural insurance. Agricultural marketing: Types of markets, methods of sale, market functions and institutions, market functionaries, producer surplus. Role of public sector institutions in agricultural marketing, agricultural price policy, international trade and WTO. Agricultural credit: Need and classification of credit, importance of credit institutions. Three R's of credit. Role of economic liberalization in agriculture. Importance of agriculture in Indian economy, comparison with other countries. Economic problems in Indian agriculture relating to agricultural production and productivity, credit, marketing and labour. Principles and role of agricultural cooperatives & cooperative institutions.

Agricultural Extension Education

Extension Education- concept, objectives, principles and philosophy. Extension systems in India- extension efforts in pre and post-independence era. Various extension/ agricultural development programmes of ICAR and Govt. of India (CDP, Panchayati Raj, IADP, IAAP, HYVP, KVK, IVLP, ORP, ND, NATP, NAIP, NHM, NFSM, etc). Models, barriers and feedback in communication. Communication skills for effective transfer of technology. Audio-visual aids-selection, preparation, use and evaluation. Role of information and communication technology in TOT (new and social media), media mix strategies in agriculture and rural development. Diffusion and adoption of innovations– concept, meaning, elements, process and stages of adoption, adopter categories, factors affecting diffusion and adoption process. Extension teaching methods- meaning, classification, individual, group and mass contact methods, factors influencing their selection and use. Extension administration– meaning, concept, principles and functions. Extension Programme Planning- meaning, process, principles and steps. Monitoring and evaluation of extension programmes. Transfer of technology– concept, models and capacity building of extension personnel. Rural development- past strategies and current approaches. Scope and importance of journalism in agriculture. Teaching-Learning process. Principles of learning and their implications for teaching. Importance and types of inter-personal perception, human interaction and social behavior. Barriers in human resource development and establishing good human relations. New trends in agricultural extension- privatization of extension, cyber extension/e-extension, market-led extension, farmer- led extension, expert systems, broad based extension. Problem solving skills. Group dynamics. Group behavior and conflict management. Decision making process. Leadership, different methods of identification of leaders and their training. Importance and scope of rural sociology and educational psychology in agricultural extension. Social groups, social stratification, social organizations, social control, social change and their factors.

Agronomy / Agricultural Meteorology

Crop density and geometry. Crop nutrition, manures and fertilizers, nutrient use efficiency. Water resources. Soil-plant-water relationship, crop water requirement, water use efficiency. Irrigation- scheduling criteria and methods, quality of irrigation water, water logging. Water management in important *kharif* and *rabi* crops. Weeds-importance, classification, crop weed competition. Principles and practices of weed management; weed management in important field crops and non-cropped areas. Herbicides – classification, selectivity and resistance, formulations, mode of action and compatibility with other agro-chemicals. Allelopathy. Growth and development of crops. Crop rotation, cropping pattern, cropping system, farming system, cropping scheme and crop plan. Sustainable and conservation agriculture. Plant ideotypes. Origin, distribution, economic importance, soil, climatic requirements, varieties and agronomic practices of important *kharif* and *rabi* crops. Organic farming: Introduction, concept, organic production requirements, use of biocontrol agents & quality consideration. Crop management technologies in problematic areas.

General climatology, Weather and climate, Structure and composition of atmosphere. Effects of environmental factors on crop growth and development. Agrometeorology, definition, branches and practical utility. Temperature,

inversion, lapse rate. Vertical distribution of temperature and pressure. Atmospheric weather, variables. Dew, fog, mist frost, cloud formation and classification. Elements and factors of weather and climate. Atmospheric pressure, winds, cyclones and anticyclones land and sea breezes. Solar radiation: solar constant, short and long wave radiation, thermal radiation, albedo. Weather forecasting – types and applications. Artificial rainmaking. Monsoon – mechanism and Importance in agriculture. Weather hazards, microclimatic modifications, climate change; climatic variability and its impacts on agriculture. Agro-climatic zones of India. Climatic normals for crops and livestock production.

Entomology

Body regions and segmentation in insects. General morphology and anatomy of insects, physiology and mechanism of digestion, circulation, respiration, excretion, reproduction, secretion, and nerve impulse transmission in insects. Insect metabolism and energy transfer, biochemical and molecular regulation. Integument, moulting and metamorphosis. Modifications of mouth parts and other body appendages. Sense organs. Diapause. Types of immature stages in insect orders and reproduction. Taxonomic categories. Binomial nomenclature. Classification of insects into orders, sub-orders and families of economic importance. Molecular systematics, DNA barcoding, karyological and biochemical approaches in taxonomy. Organization of the biological world, biodiversity hotspots, characteristics, status at global and national level. Basic principles of abiotic factors and their generalized action in insects, basic concepts of abundance-model vs real world, life tables and their application to insect biology, survivorship curves, biotic factors, nutritional and community ecology. Biotic potential. Resistance to biotic and abiotic stresses. Population dynamics. Pest surveillance and forecasting. Concept of economic threshold. Integrated Pest Management (IPM), tools of IPM - physical, mechanical, cultural, biological (parasites and predators, microbial agents), host plant resistance, botanical, chemical, biorational and biotechnological approaches. Integration of different IPM tactics. Distribution, host range, life history, nature and extent of damage and control of insect-pests of field, vegetable, plantation and fiber crops, fruit and forest trees, ornamental plants and stored grains. Post harvest entomology, insect vectors of plant pathogens, principles of acarology, vertebrate pest management, edible and therapeutic insects, medical and veterinary entomology, techniques in plant protection, plant quarantine, bio-safety and bio-security. Honey bees, life cycle, division of labour, hive and appliances, seasonal management, swarming, queen rearing, diseases and enemies, hive products, use in crop pollination. Silk worms, rearing and management. Lac insect management. Pesticides - classification, mode of action and toxicity, formulations, compatibility, synergism, antidotes, bioassay, insecticide metabolism, resistance, residues, their significance and environmental implications.

Food Processing Technology

Definition, scope and current trends in food science and technology. Status of food industry in India. Food groups, nutrients and balanced diet. Food chemistry - composition, structure, and properties of food components (carbohydrates, proteins, fats, vitamins, minerals, nutraceuticals, antinutritional factors). Composition and processing technologies for cereals, pulses, oilseeds, fruits, vegetables, dairy, poultry, meat, marine foods, spices, condiments, beverages, and their quality specifications. Bakery and confectionery products – preparation and quality assessment. Utilization of food industry by-products. Packaging of food – classification, requirements, function. Food analysis – sampling and techniques of food analysis and testing, instrumental and sensory evaluation. Sanitation and waste management in food industry. Food quality, safety standards and certification. Unit operations in food processing. Food microbiology – microorganisms in food, foodborne pathogens. Food business management and entrepreneurship.

Forestry (Silviculture and Agroforestry)

Status of forests in India and their role. Forestry organisations both national and international. Distribution of forests and their classification. Locality factors. Tending operations. Importance of superior phenotypes and their use in plantations. Forest regeneration. Choice of species w.r.t. site/economic uses. Rehabilitation of degraded/ waste lands through afforestation and dendroremediation. Forest policies and laws. Agroforestry, farm forestry and social forestry, Agro forestry models/ systems. Silvicultural aspects of tree species of economic importance: *Tectona grandis, Dalbergia sissoo, Acacia nilotica, Melia* spp., *Eucalyptus* spp., *Populus deltoides, Dendrocalamus strictus, Azadirachta indica.* Forest management: growing stock, normal forest, sustained yield and rotation. Measurement of tree height, diameter, girth, bark thickness, increment, age, volume and biomass Climate change and forests. Short

rotation intensive management of forest plantations. Trees outside forests and energy/industrial plantation. Forest fire management. Forestry extension: participatory rural appraisal and joint forest management. Forest utilization and marketing of forestry produce. Export and import of timber and non- timber forest products.

Genetics & Plant Breeding

Mendelian inheritance. Cell division and cell cycle. Chromosome structure and function. Chromosome aberrations. Genetic recombination. Epistatic interactions. Linkage and its estimation. Nature, structure and replication of genetic material, Transcription and translational mechanism of genetic material. Gene concept - gene structure, function and regulation, *Lac* and *Trp* operons. Quantitative inheritance. Heritability and response to selection. Gene frequency and Hardy-Weinberg equilibrium. History and achievements of plant breeding. Modes of reproduction. Germplasm resources - their origin, conservation and utilization. Centres of origin/diversity. Breeding methods in self-pollinated (pure line and mass selection, pedigree, bulk, SSD and backcross method); cross pollinated (population improvement methods, recurrent selection techniques) and vegetatively propagated crops. Development of inbred lines, hybrids, composites and synthetics. Male sterility, self-incompatibility, mutation and polyploidy in plant breeding. Heterosis and its exploitation. Ideotype breeding. Breeding of wheat, rice, cotton, maize, sugarcane, oilseeds and pulse crops. Breeding for diseases and insect-pest resistance in crop plants. Plant Breeders' and Farmers' Rights. Different classes of seed. Foundation and certified seed production of important crops. DUS testing. Seed certification - phases, procedure and field inspection. Seed laws and its enforcement. Molecular markers (RFLP, RAPD, AFLP, SSR, SNP). PCR. Mapping of quantitative and qualitative traits. Marker-assisted selection. Speed breeding in cereals.

Horticulture

Floriculture and Landscaping: Production technology of tuberose, rose, chrysanthemum, gladiolus, carnation, marigold, gerbera, lilium, orchid, jasmine . Post-harvest handling of cut flowers. Flower seed production. Characteristics of different types of gardens. Art principles of landscaping. Principal groups of plants (trees, shrubs, climbers, shade loving plants, ground covers), their analysis and use in landscape composition. Landscape planning for homes and farm complexes. Rock, water and terrace gardens.

Fruit Science: Seed dormancy and germination. Stock scion relationship, Dwarfing rootstocks, different methods of propagation, containers, media, mixture, propagation structure, Nursery act, quarantine and certification. Ecophysiological requirement, varieties, Horti-agro techniques, plant protection measures, cultivation practices, special problems, maturity indices, ripening, harvesting, transportation, quality improvement, processing and packaging technologies of major fruits such as citrus, mango, guava, apple, ber, grapes, papaya, pineapple, banana, pomegranate, sapota, litchi, pear, peach and plum.

Vegetable Science: Role of soil, climate and agronomic factors in potato, tomato, chilli, brinjal, cauliflower, cabbage, radish, carrot, onion, garlic, peas, beans, methi, spinach, muskmelon, pumpkin, bittergourd, bottlegourd and okra. Vegetable forcing. Nursery management. Post-harvest handling, storage and marketing of vegetables. Breeding methods for vegetable crops. Production of nucleus, breeder, foundation, certified and F1 hybrid seeds. Seed harvesting, processing and storage.

Molecular Biology and Biotechnology

Mendel's laws. Nature, structure and replication of genetic material. Chromatin and chromosome structure. Cell division. Concepts and history of Plant Biotechnology, Various aspects of plant tissue culture, somatic embryogenesis, meristem culture, micropropagation, somaclonal variation, anther and pollen culture, embryo/ovule/ovary and endosperm culture, protoplast culture and somatic hybridization, cryopreservation of germplasm, recombinant DNA technology, gene cloning approaches, methods of genetic transformation, genetic engineering, southern, northern and western hybridization, polymerase chain reaction and its variants, hybridization and PCR based DNA markers, gene and QTL mapping, marker assisted selection for precision plant breeding, application of marker assisted selection in commercial agriculture, bioinformatics tools and techniques.

Plant Pathology

Plant Pathology-concepts, terms, scope, objectives, causes and importance of plant diseases. History of plant

pathology with special reference to Indian work. Pathogenesis, disease triangle, tetrahedron. Classification of plant diseases. Plant pathogens- Fungi, bacteria, fastidious vascular bacteria, nematodes, phytoplasmas, spiroplasmas, viruses, viroids, algae, protozoa and phanerogamic parasites with examples of diseases caused by them. Symptoms due to diseases and abiotic stresses. Fungi- Definition, characters, somatic structers, type of thalli, fungal tissues, modifications of thallus, reproduction. Nomenclature- Bionomial system and rules. Classification of fungi-Key to divisions, sub-divisions, orders and classes. Bacteria and molliutes- morphological characters, methods of classification and reproduction. Viruses- Nature, structure, replication and transmission. Phanerogamic plant parasites. Nematodes- Morphology, reproduction, classification, symptoms and nature of damage. Growth and reproduction of plant pathogens. Liberation/ dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens. Role of enzymes/toxins and growth regulators in disease development. Defense mechanisms in plants. Epidemiology and factors affecting disease development. Survey, surveillance and forecasting of diseases. Principles and methods of plant disease management. Fungicides/antibiotics- Formulations, classification, mode of action, resistance development and management. Integrated Disease Management. Safety issues in pesticide usage. Distribution, symptoms, etiology, predisposing factors, perpetuation and management of important diseases of field crops (rice, wheat, barley, maize, finger millet, sorghum, bajra, cotton, sugarcane, groundnut, mustard, sunflower, soybean, gram, lentil, pea, pigeonpea, black & green gram, barseem, castor, tobacco) , vegetables & spices (brinjal, potato, tomato, cruciferous vegetables, cucurbits, onion, garlic, chillies, coriander, okra, beans, colocasia ginger, turmeric), fruits (mango, citrus, grape vine, apple, peach, strawberry, guava, banana, papaya, pomegranate), ornamentals (marigold, rose, gladiolus) and plantation crops (coffee, tea, coconut).

Soil Science

Weathering of minerals and rocks. Factors of soil formation and their dynamics. Pedogenic processes, soil survey and mapping. Soil taxonomy. Land suitability evaluation for agriculture. Soils of India. Soil colloids. Cation and anion exchange. Soil reaction. Saline and sodic soils - characterization and amelioration. Plant nutrients - functions, deficiency symptoms, transformation and availability. Soil fertility evaluation and maintenance. Fertilizer recommendation approaches. Fertilizers and their use efficiency. Concept of integrated nutrient management. Soil testing - importance and problems. Principles in the determination of available nitrogen, phosphorous, potassium, sulphur and zinc in soils. Analysis of fertilizers and irrigation water. Micro- and macro-organisms in soils and their role in biochemical decomposition of organic manures, farm wastes and nutrient transformations. Biochemistry of humus formation and biogas production. Soil water, forces of water retention, saturated and unsaturated water movement, infiltration and redistribution. Soil chemical properties - soil pH and EC. Soil physical properties - soil texture, soil structure, soil consistence, soil temperature and soil aeration. Use of Geo-informatics in precision agriculture. Soil and water pollution.

3. Model questions

General Agriculture

1. NAARM is located at :
   (A) New Delhi (B) Hyderabad
   (C) Karnal (D) Cuttack
2. Percentage of net sown area in India which is irrigated is :
   (A) 62 (B) 38
   (C) 65 (D) 35

Agricultural Economics

1. Consumption function studies the relationship between consumption and :
   (A) Saving (B) Investment
   (C) Income (D) None

2. Inflation is due to:
   (A) Increase in demand (B) Decrease in money supply
   (C) Increase in commodities supply (D) All the above

Agricultural Extension Education

1. Gestures, postures, facial expressions etc. are components of which form of communication?
   (A) Media (B) Non-verbal
   (C)Purposive (D) Verbal
2. Plan of activities to be undertaken in a particular time sequence is called:
   (A) Plan of Work (B) Calendar of work
   (C) Programme Planning (D) Plan of action

Agronomy / Agricultural Meteorology

1. _____herbicides are sprayed before emergence of crop and weeds.
   (A) Pre-emergence (B) Pre-plant
   (C) Post emergence (D) None of these
2. Sulphur is preferably applied to following crops:
   (A) Cereals (B) Oilseeds
   (C) Pulses (D) Fodder crops

Entomology

1. Whole of the sugarcane plant above attacked point dries up due to attack of:
   (A) Top borer (B) Shoot borer
   (C) Root borer (D) Gurdaspur borer
2. The digestion and absorption of food in insects take place in:
   (A) Proctodaeum (B) Stomodaeum
   (C) Mesentron (D) Proventriculus

Food Processing Technology

1. Which food preservation method involves storing food in an airtight container and heating it to a specific temperature to destroy harmful microorganisms?
   (A) Freezing (B) Canning
   (C) Dehydration (D) Pickling
2. Problem that can occur in jam due to lower addition of invert sugar:
   (A) Crystallization (B) Syrupy or gummy jam
   (C) Shrinkage (D) Premature setting

Forestry (Silviculture and Agroforestry)

1. Main component in wood is:
   (A) Cellulose (B) Hemicellulose
   (C) Lignin (D) Extractives
2. Lignotubers are found in:
   (A) Kikar (B) Poplar
   (C) Eucalyptus (D) Neem

Genetics & Plant Breeding

1. The most abundant type of RNA in the cell is:
   (A) mRNA (B) rRNA
   (C) miRNA (D) siRNA

2. Mass selection is more effective if heritability is:
   (A) High (B) Low
   (C) Zero (D) Negative

Horticulture (Floriculture & Landscaping / Fruit Science / Vegetable Science)

1. The nutrient which improve fruit quality:
   (A) Zinc (B) Calcium
   (C) Nitrogen (D) Potassium
2. Buttoning is a physiological disorder in:
   (A) Cauliflower (B) Cabbage
   (C) Tomato (D) Onion

Molecular Biology and Biotechnology

1. Which aspect of plant tissue is exploited commercially:
   (A) Somatic embryogenesis (B) Micropropagation
   (C) Somatic hybridization (D) None of the above
2. The first *Bt* cotton was developed by:
   (A) Monsanto in early 1990's (B) Brazil in early 1990's
   (C) USA in early 1980's (D) None of the above

Plant Pathology

1. Which of the following is an exclusively seed-borne disease:
   (A) Loose smut of wheat (B) Bakanae disease of rice
   (C) Karnal bunt of wheat (D) Downy mildew of pearl millet
2. The peritrichous type of flagellation is present in:
   (A) *Pseudomonas* (B) *Xanthomonas*
   (C) *Erwinia* (D) *Streptomyces*

Soil Science

1. What is the unit of Oxygen Diffusion Rate (ODR)?
   (A) $g/cm^2/min$ (B) cm/g/min
   (C) min/cm/g (D) None
2. Which of the following has wide C : N ratio:
   (A) Legumes (B) Paddy straw
   (C) FYM (D) Micro-organisms

MET - MBB

(For admission to M.Sc. Molecular Biology and Biotechnology programme)

1. Test Structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) Each correct answer will **carry one mark** whereas **¼ mark** will be **deducted** for every wrong answer.

(c) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Syllabus

Biotechnology and its applications. Mendel's laws. Nature, structure and replication of genetic material. Chromatin and chromosome structure. Cell division. Structure and organization of prokaryotic and eukaryotic genome. Chromosomal aberrations. Polyploidy and aneuploidy. Gene structure, function and regulation. Spontaneous and induced mutations. Fluorescent *in situ* hybridization.

Plant tissue culture and its applications. Somatic cell culture. Somatic embryogenesis. Meristem culture. *In vitro* grafting. Micropropagation. Anther and pollen culture. Embryo/ovule/ovary culture. Protoplast culture and somatic hybridization. Production of secondary metabolites through tissue culture. Recombinant DNA technology: restriction endonucleases and cloning vectors. Gene cloning, Southern, Northern and Western blotting. Genetic transformation in plants and bacterial cells. Commercial applications of transgenics, Biosafety, bioethics and intellectual property rights in biotechnology.

Genomic and cDNA libraries. PCR: principles and applications. Molecular markers: SSR, RFLP, AFLP, STS and SNP markers, DNA fingerprinting. Mapping populations and linkage maps, Methods of gene mapping. DNA sequencing: Sanger and Next generation sequencing. Introductory genomics, transcriptomics and proteomics. Bioinformatics tools and techniques, biological databases. Nanobiotechnology.

3. Model questions

1. A segment of a eukaryotic gene that codes for a specific protein segment is called:
   (A) An intron (B) An exon
   (C) A promoter (D) An enhancer
2. Which one is the natural auxin?
   (A) 2,4 D (B) NAA
   (C) IAA (D) IBA
3. Hybrids are generally superior to parents because of:
   (A) Homozygosity (B) Hybrid vigor
   (C) Parents are generally weak (D) None of these
4. The preferred organism for lactic acid production is:
   (A) *Streptococcus lactis* (B) *Lactobacillus bulgaricus*
   (C) *Lactobacillus delbrueekii* (D) *Lactobacillus casei*
5. How many nucleotides in DNA code for one amino acid in the protein:
   (A) Two (B) Three
   (C) Four (D) Five

MET - AE

(For admission to M.Tech. programmes in Farm Machinery & Power Engineering, Processing & Food Engineering, Soil & Water Conservation Engineering, Irrigation and Drainage Engineering)

1. Test Structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) There will be 60 questions each from Farm Machinery & Power Engineering, Processing & Food Engineering; Soil & Water Conservation Engineering, Irrigation & Drainage Engineering and 20 questions from Mathematics & Statistics.

(c) Each correct answer will **carry one mark** whereas ¼ **mark** will be **deducted** for every wrong answer.

(d) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Syllabus

Farm Machinery & Power Engineering:

Status of farm mechanisation, unit operations in crop production, sources of farm power, conventional & nonconventional energy sources, Review of thermodynamic principles of IC engines. Study of engine systems, components - their mechanisms, operating principles, functions and requirements, detonation and knocking in IC engines. Study of properties and requirements of lubricants, coolants and their additives. Tractor systems - transmission, steering, brake, hydraulics and power outlets. Traction theory principles. Tractor chassis mechanics and tractor stability. Objectives of farm mechanization. Principles of operation and selection of machines used for crop production. Field capacities & economics. Study of primary and secondary tillage equipment. Forces acting on tillage tools. Sowing, planting and transplanting equipment, components, working principles and calibration. Plant protection and fertilizer application equipment. Crop harvesting and threshing machinery, combines, their economics and losses. Testing of farm machinery and importance. Selection and management of farm machines. Procedures for developments in farm machinery, tractors and their components. Mechanics of tillage. Traction mechanics. Human factors in tractor design. Human factors in system development, performance reliability and human performance. Hydraulic circuits, tractor hydraulics. Need and functional requirements of precision agriculture, equipment for precision agriculture. Use of GPS-based navigators and sensors in Agriculture. Cost analysis of farm machinery. Machinery for crop residue and fodder management.

Processing & Food Engineering:

Engineering properties of biological materials; material and energy balances in unit operations; particle size analysis; size separation and screening; centrifugal separation; fluidization of granular solids. Thermal process calculations; Principles of food preservation ; psychrometry; conditioning and drying of food grains; concentration and dehydration of foods; evaporators, tray, drum and spray dryers; processes and machines for processing of cereals pulses and oil seeds. Grain conveying and handling equipments-operation and maintenance. Planning and design of farmstead, livestock and animal housing; poultry shed; animal feed handling and waste disposal system; storage of fruit vegetable and other perishable products, estimating and cost analysis of farm buildings.

Soil & Water Conservation Engineering, Irrigation & Drainage Engineering:

Water resources in India, efficiency in water use, irrigation systems and equipment. Water conveyances and associated efficiencies, soil-water-plant relationship, estimation of evaporation and water requirements of a crop, surveying and land leveling, land shaping and grading equipment, ground water development, wells and pumping equipments, hydraulic structures, drainage of irrigated and humid areas, command area development, salt balance and reclamation of saline and alkaline soils, protected cultivation, precision agriculture. Water shed hydrology, hydrological cycle, soil erosion and its control soil and water conservation structures and their design, farm ponds and reservoir and watershed management , water harvesting and use, land use capability classification.

Mathematics & Statistics:

Introduction to mathematical statistics. Differential and integral calculus. Matrices and Fourier series; differential equations; vector algebra & vector calculus; elementary numerical analysis.

3. Model Questions

Farm Machinery & Power Engineering:

1. If D1 and D2 be the diameters of the driver and driven pulleys, then belt speed is proportional to:
   (A) D2/D1 (B) D1/D2
   (C) D1 - D2 (D) D1
2. Drones can be used in agriculture for:
   (A) Chemical spraying (B) Crop health monitoring and surveillance
   (C) Mapping (D) All of the above
3. Net traction coefficient is the ratio of net pull produced to the
   (A) Normal load (B) Dynamic normal load
   (C) Weight transfer (D) Total soil reaction
4. Which of the following is a deep tillage implement
   (A) Mould-board plough (B) Disc plough
   (C) Chisel plough (D) Rotary plough

Processing & Food Engineering:

1. In Cryogenic freezer, the most commonly refrigerant (Cryogen) used is :
   (A) Ammonia (B) Helium
   (C) Oxygen (D) Liquid nitorgen and liquid carbon dioxide
2. Which of the following is not a processing operation ?
   (A) Winnowing (B) Size reduction
   (C) Dehusking (D) Digestion
3. The equipment used for size reduction in roller flour milling of wheat is
   (A) Reduction roll (B) Hammer mill
   (C) Rubber roll (D) Attrition mill
4. The most efficient oil extraction process is :
   (A) Hydraulic Press (B) Mechanical Expression
   (C) Solvent Extraction (D) None of the above

Soil & Water Conservation Engineering, Irrigation & Drainage Engineering:

1. At drop of less than 3 m, which of the following structures is recommended ?
   (A) Drop spillway (B) Chute spillway
   (C) Pipe spillway (D) Temporary check dam
2. When the speed of a centrifugal pump is changed, the head varies as :
   (A) Square of the speed (B) Square root of the speed
   (C) Cube of the speed (D) None of these
3. The natural grassed waterways are generally found in the shape of
   (A) Square (B) Triangular
   (C) Parabolic (D) Rectangular

4. In underground pipeline system the line terminates at

(A) Air vent (B) End plug

(C) Riser valve (D) Pump stand

Mathematics & Statistics:

1. The particular integral of the differential equation $y''-2y'=e^{x}+^{x}$ is

(A) x^2e^x (B) $2x+x^2e^x$

(C) $2+x+\frac{1}{2}x^2e^x$ (D) xe^x+4

MET - Artificial Intelligence and Data Science in Agriculture

(for admission to M.Tech. Artificial Intelligence and Data Science in Agriculture)

1. Test Structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) Each correct answer will **carry one mark** whereas **¼ mark** will be **deducted** for every wrong answer.

(c) Minimum 20% marks are required in the Entrance Test to be called for Counseling/Interview.

2. Syllabus

- **Computer Fundamentals and Programming (20%):** Computer fundamentals, number systems, representation of integers fixed and floating point numbers, character representation, Logic Gates and circuits. Functional units of computer, I/O devices, primary and secondary memories. Programming fundamentals with C/C++, loops, etc.
- **Data structures and Algorithms (20%):** Programming design and development. Algorithms, programming constructs algorithm complexity, big O notation, and concept of recursion. Arrays and matrices, stack, stack insertion and deletion, queue, circular queues, priority queues, link list, Representation and processing of linear linked lists, bubble sort, selection sort, insertion sort, radix sort, merge sort algorithm, quick sort, heap sort, shell sort.
- **Database Management System (20%):** Overview of DBMS, basic DBMS terminology, advantages and disadvantages of DBMS, file approach and its limitations, DBMS approach, advantages of DBMS, DBMS components. Design, logical and physical data independence, three level architecture of DBMS, entities and types of entities, relationships, entity relationship models. Relational model, network model, hierarchical model, comparison of data models. Relational model, Functional relational query language, SQL commands. PL/SQL, variables, control structures, decisions and loops, functions and procedures, cursors and triggers.
- **Internet and Web Technologies (15%):** Fundamentals of networking, overview of network topologies, classifications of networks. Advantages and disadvantages of internet, electronic mail. Introduction to HTML/ DHTML Java script introduction, variables, control statements, JavaScript arrays, methods client side validations, embedding JavaScript, future of JavaScript. Server side scripting.
- **Basics of Artificial Intelligence (15%):** Searching-Searching for solutions, uninformed search strategies: Breadth first search, depth first Search, Knowledge representation issues, predicate logic. Expert systems, basic concepts, structure of expert systems.
- **Basics of Data Science (10%):** Fundamental concepts of data science, Venn diagram, Types of Data- Structured versus Unstructured data, Data Visualization: Introduction – Types of Data, visualization –Technologies for visualization, Data Science Tools: Working with Excel and python.

3. Model Questions

1. Which machine learning technique is used to group data without predefined labels?
   (A) Supervised
   (B) Unsupervised
   (C) Reinforcement
   (D) Semi-supervised
2. In Python, which library is commonly used for data manipulation and analysis?
   (A) NumPy
   (B) Pandas
   (C) Matplotlib
   (D) Scikit-learn
3. What is the purpose of a smoothing filter in image processing?
   (A) Enhance edges
   (B) Reduce noise
   (C) Increase contrast
   (D) Sharpen details

4. What is the goal of Artificial Intelligence?

   (A) To solve artificial problems
   (B) To explain various sorts of Intelligence
   (C) To extract scientific causes
   (D) To solve real-world problems

5. Which of the following is one of the key data science skills?

   (A) Data Visualization
   (B) Statistics
   (C) Machine Learning
   (D) All of these

MET - CE

(For admission to M.Tech. programme in Civil Engineering)

1. Test structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) Each correct answer will **carry one mark** whereas ¼ **mark** will be **deducted** for every wrong answer,

(c) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Syllabus

Force, moment, equilibrium, friction, moment of inertia, Simple stresses and strains, strain energy, shear force and bending moment, Direct and bending stresses, deflection, fixed and continuous beams, torsion, principal stresses and strains, thick and thin cylinders, columns and struts, rolling loads and influence lines, Design of various RCC and steel structural members. Laminar and turbulent flow, open channel flow, flow measurement, dimensional analysis. Hydrological cycle, hydrographs, stream flow, flood estimation, reservoir and channel routing. Duty, delta, evapo-transpiration, canals, waterways, head works, dams and spillways, irrigation methods. Index and engineering properties, consolidation, compaction, sub soil exploration, foundations. Surface and subsurface water resources, demand for water standards for potable water. Intake of water, Water treatment, storage and distribution. Domestic and industrial wastes, flow through sewers, sewer appurtenances, plumbing. Sewage characterization, standards of disposal, sewage treatment, recycling of waste water.

3. Model Questions

1. The loss of head due to sudden expansion in a pipe flow is given by
   (A) $f LV^2/(2gd)$ (B) $(V^2_2-V^2_1)/2g$
   (C) $(V_1-V_2)^2/2g$ (D) None of the above
2. For the upstream slope of an earth dam, the most critical condition is
   (A) Sudden draw down condition (B) Steady seepage condition
   (C) Neither sudden draw down nor steady (D) During construction when reservoir is allowed seepage to be filled
3. Garnett's diagrams are used for graphical solution of design equations of a canal by
   (A) Lacey's theory (B) Kennedy's theory
   (C) Gibb's theory (D) Lindlay Theory
4. The characteristic strength of concrete is defined as that compressive strength below which not more than
   (A) 10% of results fall (B) 5% of results fall
   (C) 2% of results fall (D) None of the above
5. Temporary hardness in water is caused by the presence of
   (A) Bicarbonates of Ca and Mg (B) Sulphates of Ca and Mg
   (C) Chlorides of Ca and Mg (D) Nitrates of Ca and Mg

MET - CSE

(For admission to M.Tech. programme in Computer Science and Engineering)

1. Test Structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) Each correct answer will **carry one mark** whereas ¼ **mark** will be **deducted** for every wrong answer.

(c) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Syllabus

Computer Fundamentals and Programming: Computer fundamentals, number systems, representation of integers, fixed and floating point numbers, character representation, Logic Gates and circuits. Functional units of computer, I/O devices, primary and secondary memories. Programming fundamentals with C/C++, loops, etc.

Operating System: Operating system overview, Operating system architecture. Process, process model, process scheduling, operations on process, inter process communication. Process synchronization, critical section problem, producer consumer problem, bounded buffer problem, CPU scheduling, long term schedulers, middle term schedulers, short term schedulers, basic concepts, scheduling criteria, scheduling algorithms, first come first serve, shortest job first, priority scheduling, round robin, multilevel queue, multilevel feedback, deadlocks, system model, race condition, deadlock prevention, deadlock avoidance, deadlock detection.

Data Structures and Algorithms: Programming design and development. Algorithms, programming constructs algorithm complexity, big O notation, and concept of recursion. Arrays and matrices, stack, stack insertion and deletion, queue, circular queues, priority queues, link list, Representation and processing of linear linked lists, bubble sort, selection sort, insertion sort, radix sort, merge sort algorithm, quick sort, heap sort, shell sort.

Data Base Management System: Overview of DBMS, basic DBMS terminology, advantages and disadvantages of DBMS, file approach and its limitations, DBMS approach, advantages of DBMS, DBMS components. Design, logical and physical data independence, three level architecture of DBMS, entities and types of entities, relationships, entity relationship model. Data models, relational model, network model, hierarchical model, comparison of data models. Relational model, Functional relational query language, SQL commands. PL/SQL, variables, control structures, decisions and loops, functions and procedures, cursors and triggers.

Internet and Web Technologies: Fundamentals of networking, overview of network topologies, classifications of networks. Advantages and disadvantages of internet, electronic mail, Introduction to HTML/DHTML Java script introduction, variables, control statements, JavaScript arrays, methods, client side validations, embedding JavaScript, future of JavaScript. Server side scripting.

3. Model Questions

1. Applying DeMorgan's theorem to the expression (A'B') C', we get
   (A) (A+B) + (C) (B) A (B+C)
   (C) Both A & B (D) None of the above
2. Express the decimal number 57 in binary
   (A) 100101 (B) 111010
   (C) 110010 (D) 111001
3. An organization has a class B network and wishes to form subnets for 64 departments. The subnet mask would be
   (A) 255.255.0.0 (B) 255.255.64.0
   (C) 255.255.128.0 (D) 255.255.252.0

4. The best data structure to check whether an arithmetic expression has balanced parentheses is a

   (A) Queue (B) Stack

   (C) Tree (D) List

5. How many sizes of headers are available in HTML by default?

   (A) 5 (B) 1

   (C) 3 (D) 6

MET - AGRI - BUSINESS MANAGEMENT

(For admission to MBA (Agribusiness) programme)

1. Test Structure

(a) The objective of this test is to measure the development of mental abilities and aptitude for studies in Agri-Business Management.

(b) There will be 300 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(c) There will be two parts of the Question Paper. Part-I will contain 60 questions each from Written Communication Ability, Numerical Ability and Management Aptitude, and Part-II will contain 120 questions of General Knowledge. Each section will carry equal weightage i.e. 25%.

(d) Each correct answer will **carry one mark** whereas **¼ mark** will be **deducted** for every wrong answer.

(e) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Model Questions

PART-I:

Written Communication Ability: The questions for the Written Communication Ability Test attempt to measure the communication skills of the students. This may include comprehension, vocabulary test, English usage, English structure, word usage, synonyms and antonyms etc. Some examples are given below:

1. Choose the word that has nearly the same meaning of the word given:

   METAMORPHOSIS

   (A) Transformation (B) Catharsis

   (C) Fossils (D) Violent explosion

2. Choose the word that has an opposite meaning of the word given:

   VILIFY

   (A) Sing the praise of (B) Show satisfaction with

   (C) Regard with distrust (D) Welcome with glee

3. Fill in the blanks:

   He managed to ..... several times, but was finally ..... by the police.

   (A) Absconded Kidnapped (B) Deceive Cheated

   (C) Cheat Robbed (D) Escape Arrested

Numerical Ability: The questions relating to Numerical Ability are to test student's proficiency in using the various numerical techniques. For example:

1. One metre is equal to:

   (A) 3.281 ft. (B) 3.126 ft.

   (C) 3.250 ft. (D) None of these

2. The cost of cultivating a square field at the rate of Rs. 160 per hectare is Rs. 1440/-. The cost of putting a fence around it at 75 paise per meter is:

   (A) Rs. 900/- (B) Rs. 18/-

   (C) Rs. 360/- (D) Rs. 810/-

Management Aptitude: It includes general aptitude of the candidate towards Agri-Business Management. For example:

1. NABARD is a/an

   (A) Manufacturing company
   (B) Export house
   (C) Financial institution
   (D) Teak Department

2. The term 'future and option' trading is associated with:

   (A) Capital market
   (B) Home furnishing market
   (C) Restaurant
   (D) Hotels

PART-II:

General Knowledge: It tests general awareness of the candidate from diversified areas such as Agriculture and allied sciences, Social Sciences, National and International Current Affairs. For example:

1. ICAR stands for

   (A) International Center for Agricultural Research
   (B) Institute for Central Agricultural Research
   (C) Indian Council of Agricultural Research
   (D) Indian Commodity of Agricultural Research

2. Which is the biggest oil consuming country in the world:

   (A) USA
   (B) UK
   (C) France
   (D) India

MET - BASIC SCIENCES

{For admission to M.Sc. programmes in Biochemistry, Botany, Microbiology, Zoology)

1. Test structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) Each correct answer will **carry one mark** whereas **¼ mark** will be **deducted** for every wrong answer.

(c) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Syllabus

Morphology and life history of important genera of algae, fungi, bacteria, viruses, lichens, bryophytes, pteridophytes and gymnosperms. Basic knowledge of anatomy, embryology and systematics of angiosperms. Economically important plants. Thermodynamics of plant water relationships, mineral nutrition, photosynthesis, nitrogen metabolism, translocation of photoassimilates, growth and growth hormones, photoperiodism, vernalization, senescence and aging, morphogenesis, dormancy, fruit growth and fruit ripening, abiotic stresses in plants. Cell structure and function Community structure and dynamics, ecosystem, biogeochemical cycles, pollution (air, water and soil), bioindicators, conservation and management of natural resources. Respiration and Reproduction in higher plants.

Animal classification and biosystematics. Comparative anatomy and physiology of invertebrates and vertebrates, Various aspects of developmental biology. Evolution, animal behaviour and ecology, Parasites and Parasitism. Pests and their management. Conservation and management of fishery resources. Fish culture practices, induced breeding, fish diseases and their control, fish by-products and their use. Ecosystem and Biodiversity conservation.

Heredity and variation. Principles of inheritance. Gene interaction, Multiple allelism. Sex-linked, sex-influenced and sex-limited inheritance. Linkage, crossing over and chromosome mapping. Nature, structure and replication of genetic material. Gene structure, gene expression, genetic code and gene regulation. Quantitative inheritance. Genes in populations. Speciation. Genetic engineering and biotechnology. Genetic disorders in man. Tissue culture and its applications.

Introduction and historical developments of Microbiology. General account of prokaryotic and eukaryotic environment cells, their physiology and genetics. Microbial nutrition. Biology of viruses. Microbial interactions. Role of microbes in agriculture, food, dairy, environment, pharmaceutical and other fermentation industries. Important microbial diseases of human.

Importance of Biochemistry; Concept of buffers in living system; Cell structure and function of biomolecules; structural organization of proteins and their sequencing, enzymes their general mechanism of action, classification, kinetics and regulation; concept of bioenergetics and respiratory chain, Concepts of intermediary metabolism and major pathways. Role of vitamins. Principles of centrifugation, chromatographic, electrophoretic, spectrophotometric, immunological and radioisotopic techniques.

3. Model questions

1. The two heavy chains of immunoglobulins are joined by how many disulfide linkages
   (A) One (B) Three (C) Two (D) Four
2. Cells of aleurone layer contain
   (A) Fats (B) Starch
   (C) Protein (D) Sugars
3. Which phase of bacterial cell cycle is productive?
   (A) Log phase (B) Lag phase
   (C) Stationary phase (D) Death phase
4. Nitrogen fixation is a process that require
   (A) *Energy* (B) *Anaerobic conditions*
   (C) *Aerobic conditions* (D) *Both A and B*
5. The skeletal ossicles of starfish arise from
   (A) Ectoderm (B) Mesoderm
   (C) Endoderm (D) None of these

MET - CHEMISTRY

(For admission to M.Sc. programme in Chemistry)

1. Test structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) Each correct answer will **carry one mark** whereas ¼ **mark** will be **deducted** for every wrong answer

(c) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Syllabus

Organic Chemistry - Aromatic, antiaromatic and non-aromatic compounds. Nucleophilic and electrophilic substitution in aromatic and aliphatic compounds. Chemistry of various functional groups. Carbonyl compounds: Physical and chemical properties, Wittig, Perkin, Knovenaegel Cannizaros, Reformatsky reactions. Amines: Basicity of aromatic and aliphatic amines and their general physical and chemical properties. Amino acids and proteins.

Spectroscopy: Application of IR, NMR, UV spectroscopy and mass spectrometry in structure elucidation of simple organic compounds. Reaction mechanism involving reactive intermediates; carbanions, carbocations, free radicals and benzynes. Heterocyclics: Chemistry and reactions of five and six membered heterocyclics with one hetero atom., Natural Products: General introduction and chemistry of terpenoids, steroids, carbohydrates and alkaloids.

Inorganic Chemistry - Acids and Bases: Bronsted and Lewis concept of acids and bases. Molecular orbital approach: Linear combination of atomic orbitals, molecular orbital electronic configurations. p-Block elements, Chemistry of boron and aluminum compounds. Discovery and chemistry of noble gases. Transition metal chemistry: definition, d and f block transition elements, electronic configuration and general characteristics, comparison of the properties of metals of first transition series with 2nd and 3rd transition series. Origin of paramagnetism and diamagnetism. Magnetic susceptibility and Gouy's method. Ferromagnetism and anti ferromagnetism. Magnetic behavior of first row transition metal compounds. Qualitative idea of quenching of orbital contribution Spectral properties of transition metal compounds. Terms, symbols, coupling scheme (L-S), determination of energy states of d 2 configuration only. The electrostatic crystal field theory. CFSE, spectrochemcial series. Selection rules of electronic spectra. Nature of electronic transition in complexes with d^1-d^9 configurations in octahedral and tetrahedral fields (simple energy level orgel diagrams only). Metal carbonyls.

Physical Chemistry - Kinetic theory of gases, limitations, modifications and its applications. Chemical and ionic equilibria and its applications. Arrhenius and Debye Huckel theories. Adsorption theories and their applications. Classical and thermodynamic treatment of properties of pure liquids and solutions. Basic principles of kinetics of simple and complex reactions. Basic principles and applications of molecular spectroscopy viz. IR, NMR, UV, Microwave. Statistical mechanics and partition function. Basic concepts of quantum mechanics and its applications.

3. Model questions

1. Hoffmann's Bromamide reaction involves the intermediate

   (A) Carbene (B) Carbanion

   (C) Nitrene (D) Carbocation

2. Which of the following is most acidic in nature

   (A) Ethyl alcohol (B) Phenol

   (C) Ethane (D) Formaldehyde

3. The ground state of O_2 molecule is

   (A) Diamagnetic (B) Paramagnetic

   (C) Triple state (D) None of these

4. $Ni(CO)_4$ is

(A) Paramagnetic (B) Diamagnetic

(C) Ferromagnetic (D) Antiferromagnetic

5. How many layers are absorbed in chemisorption?

(A) Many (B) Two

(C) Zero (D) One

MET - JOURNALISM

(For admission to Master of Journalism and Mass Communication)

1. Test structure

(a) The objective of this test is to check general awareness, mental ability, English language and familiarity with the latest in the news.

(b) There will be 100 multiple choice questions each of one mark to be attempted in allotted time of one hour.

(c) There will be 4 parts in the question paper viz. Part I - General Awareness, Part II - Mental Ability, Part III - English, Part IV - Journalism. Each part will contain 25 questions.

(d) Each correct answer will **carry one mark** whereas ¼ **mark** will be **deducted** for every wrong answer

(e) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Model Questions

Part I - General Awareness

1. Who is the Agriculture Minister of Punjab?
   (A) Gurmeet Singh Khudian (B) Harpal Singh Cheema
   (C) Harjot Singh Bains (D) None of these
2. Which of the following UN programmes concentrates its assistance on development activities for improving the quality of life of children and mothers in developing countries?
   (A) UNEP (B) UNIDO
   (C) UNICEF (D) UNHCR

Part II - Mental Ability

1. 1,4,?,16,25,36. Determine the number after 4.
   (A) 6 (B) 9
   (C) 7 (D) 10
2. Taj Mahal : India : Leaning Tower of Pisa : ?
   (A) USA (B) Italy
   (C) Australia (D) Denmark

Part III - English

1. The most appropriate synonym of POLITY is ….
   (A) Courtesy (B) Trickery
   (C) Methods of government (D) Freedom
2. Choose an antonym of AMPLIFY:
   (A) Decrease (B) Multiply
   (C) Deceive (D) Bless

Part IV - Journalism

1. Legal protection for an intellectual work is called….
   (A) Cheesecake (B) Copyright
   (C) Centre Spread (D) Credit Line
2. Choose the full form of TRAI
   (A) Telephone Regularity Authority of India (B) Telephone Regulatory Association of India
   (C) Telecom Regulatory Appellate of India (D) Telecom Regulatory Authority of India

MET - MBA

(For admission to MBA programme)

1. Test Structure

(a) The objective of this test is to measure the development of mental ability and aptitude for studies in Business Management.

(b) There will be 300 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(c) The paper will be divided into four sections consisting of 60 questions each from Verbal Ability, Numerical Ability, Management Aptitude and 120 questions from General Knowledge. Each section will carry equal weightage i.e. 25%.

(d) Each correct answer will **carry one mark** whereas **¼ mark** will be **deducted** for every wrong answer

(e) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Model Questions

Verbal Ability: The questions for the Verbal Ability Test attempt to measure the communication skills of the students. This may include comprehension, vocabulary test, English usage, English structure, word usage, synonyms and antonyms etc. Some examples are given below:

1. Choose the best option to complete the conversation

   When can we meet again?

   (A) When you are free (B) It was two days ago

   (C) Can you help me (D) None of these

2. Choose the word that has an opposite meaning of the word given below:

   VILIFY

   (A) Sing the praise of (B) Show satisfaction with

   (C) Regard with distrust (D) Welcome with glee

Numerical Ability: The questions relating to Numerical Ability are to test student's proficiency in using the various numerical techniques. For example:

1. The simplification of $(2^{-1} – 3^{-1})$ is:

   (A) 1/6 (B) 6

   (C) 1 (D) 3

2. Two boys A and B start at the same time to ride from Delhi to Meerut 60 km away. A travels 4 km/hour slower than B. B reaches Meerut and at the same time turns back meeting A at a distance of 12 km away from Meerut. The speed of A was:

   (A) 4 km/hour (B) 8 km/hour

   (C) 12 km/hour (D) 16 km/hour

Management Aptitude: It includes general aptitude of the candidate towards Agri-Business Management. For example:

1. SEBI is;

   (A) A manufacturing organization (B) Regulatory body

   (C) Export house (D) Financial institution

2. The term 'interest rate futures' is associated with:

   (A) Capital markets (B) Home furnishing market

   (C) Hotels (D) Spot trade

General Knowledge: It tests general awareness of the candidate from diversified areas such as Agriculture and allied sciences, Social Sciences, National and International Current Affairs. For example:

1. UGC stands for

   (A) Universal grants commission (B) University grants commission

   (C) Undergraduate grants commission (D) University generals commission

2. Which is the biggest Oil producing country?

   (A) USA (B) Russia

   (C) Saudi Arabia (D) Iran

MET-MATHEMATICS

(For admission to M.Sc. Programme in Mathematics)

1. Test Structure

(a) There will be 75 multiple choice questions each of two mark to be attempted in allotted time of 3 hours.

(b) Each correct answer will **carry two marks** whereas **½ mark** will be **deducted** for every wrong answer.

(c) Minimum 20% marks are required in entrance test to be called for counseling/interview.

2. Syllabus

Countable and uncountable sets. Riemann integral, Integrability of continuous and monotonic functions, Properties of integrable functions, The fundamental theorem of integral calculus, Mean value theorems of integral calculus. Beta and Gamma functions. Improper integrals and their convergence, Double Integral over A Rectangle, Repeated Integrals in R^2 , Double Integrals over Bounded Non-rectangular Regions, Area of Bounded Regions in Plane, Double Integrals as Volumes, Change of Variables in Double Integrals, Change to Polar Coordinates, Area in Polar Coordinates, Triple Integral in Rectangular Coordinates, Triple Integrals over General Regions in R^3, Repeated Integrals in R^3 , Volume of a Region in R^3 , Change of Variables in a Triple Integral to Cylindrical and Spherical Coordinates Vector Line, Surface and Volume integration. Gauss divergence theorem, Stokes' theorem, Green's theorem. Riemann integration, uniform convergence and differentiation, Weierstrass approximation theorem, Abel's and Taylor's theorems for power series.

Groups, Subgroups, Lagrange's Theorem, Normal subgroups and Quotient Groups, Homomorphisms, Isomorphism Theorems, Conjugate elements, Class equation, Permutation Groups, Alternating groups, Rings, Integral domains, Subrings and Ideals, Characteristic of a ring, Quotient Rings, Prime and Maximal Ideals, Homomorphisms, Isomorphism Theorems, Polynomial rings. Vector Space: Definition and Examples of Vector Spaces, Subspaces, Algebra of subspaces, Linear span, Linear dependence and independence of vectors, Basis and dimension of a vector space, Basis and dimension of subspace, Direct sums and complements.

3. Model Questions

1. The value of '*c*' for $f(x) = x(x\text{-}2)$ in [1,2] using Lagrange value theorem is

   (A) 3/2 (B) 2 (C) 1 (D) 1/2

2. $1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \cdots$ is expansion of

   (A) cos *x* (B) sin *x* (C) tan *x* (D) cot *x*

3. $\int_2^3 x^2\, dx =$

   (A) $\frac{1}{6}$ (B) $\frac{19}{6}$ (C) $\frac{1}{3}$ (D) $\frac{19}{3}$

4. Degree of differential equation $y = \sin \frac{dy}{dx}$ is

   (A) 1 (B) 2 (C) 3 (D) None of these

5. $Mdx + Ndy = 0$ is exact if

   (A) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial x}$ (B) $\frac{\partial M}{\partial x} = \frac{\partial N}{\partial y}$ (C) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial x}$ (D) $\frac{\partial M}{\partial y} = \frac{\partial N}{\partial y}$

MET - PHYSICS

(For admission to M.Sc. programme in Physics)

1. Test structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) Each correct answer will **carry one mark** whereas ¼ **mark** will be **deducted** for every wrong answer.

(c) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Syllabus

Quantum mechanics: Origin of quantum mechanics; Wave functions and the ScrÖdinger equation, group velocity, Uncertainty principle; Operators, Eigen values and Eigen functions-Gaussian wave packet, Ehrenfest theorem; Solutions of time independent ScrÖdinger equation, one dimensional box, step potential, potential barrier, harmonic oscillator, Hydrogen atom; Atoms with one and many electrons, Fine structure of hydrogen and sodium, electron spin, angular momentum, SG experiment.

Electricity & Magnetism: Vector algebra; Coulomb's law and electric field; Gauss's law and its applications; Electric potential and current; Fields of moving charges; Magnetic field; Electromagnetic induction; Electric field in dielectric; Magnetic field in matter; Wave motion; Electromagnetic waves.

Electronics: Junction diode, zener diode, Tumnnel diode; LED, LCD; Rectification-Half and full wave rectifier; Filter circuits, voltage regulation; Junction transistor, structure and working; Characteristics of JFET; Transistor biasing, working of common emitter amplifier; Analysis using h-parameters; FET amplifier; Feedback amplifiers; Oscillators-LC and RC oscillators.

Statistical Physics: Basic Ideas; Maxwell-Boltzmann Statistics, law of distribution of molecular speeds; B-E and F-D statistics. Wein's displacement law and Stefen's law; Statistical interpretation of entropy and Carnot's cycle, equation of state; Maxwell's thermodynamic relations and their applications.

Mechanics: Co-ordinate systems and motion of a particle; Relationship of space time symmetries and conservation laws; Relativity: Special theory of relativity, Lorentz transformations, simultaneity principle, length contraction and time dilation, relativistic addition of velocities, mass energy equivalence, Minskowski space; Elastic and Inelastic collisions; Frames of references; Hamilton's principle.

Nuclear Physics: Constituents of nucleus and their intrinsic properties. Properties of nuclear forces, Liquid drop model, Nuclear shell model, Radioactive decays, alpha, electron, positron and gamma ray emission; Nuclear reactions; Interaction of gamma rays with matter; Cyclotron; Betatron; Linear accelerator; Ionization chamber; proportional Counter; GM counter; Scintillation counter; elementary particles-classification; Conservation laws; quark-model.

Solid State Physics: Crystal structure: Two and three dimensional bravais lattices, miller indices, diamond and sodium chloride structure; Crystal diffraction-Bragg's law, Laue's equation, reciprocal lattices of SC, BCC and FCC structures; Lattice vibrations, Einstein and Debye model of specific heat; Free electron model of metals, Fermi gas and Fermi energy; Band theory, Brillouin Zones, Kroning Penny model; Metals and insulators; Superconductivity, Properties of Magentic materials.

3. Model questions

1. An oscillator is nothing but an amplifier with:
   (A) Positive feedback (B) Negative feedback
   (C) No feedback (D) Large gain
2. Photon is a quantum of energy of:
   (A) Electromagnetic energy (B) Elasic energy
   (C) Magnetic energy (D) Electrostatic energy
3. The number of atoms in a unit cell of an fcc structure (with lattice constant) is
   (A) One (B) Four (C) Two (D) Ten
4. An accelerator which cannot accelerate protons is:
   (A) linear accelerator (B) Cyclotron (C) Betatron (D) Van de Graff generator
5. Nuclear cross section has the dimensions of:
   (A) Area (B) Length (C) Volume (D) Density

MET - SOCIOLOGY

(For admission to M.Sc. programme in Sociology)

1. Test Structure

(a) There will be 200 multiple choice type questions each of one mark to be attempted in allotted time of 3 hours.

(b) The question paper shall have two sections as under:

Section I: General Agriculture (Code AG) or General Home Science (Code HS). This section will carry 100 questions with 30% weightage. The candidate can attempt either General Agriculture (Code AG) or General Home Science (Code: HS).

Section II: Sociology. This section will carry 100 questions with 70% weightage.

(c) Each correct answer will carry one mark whereas ¼ mark will be deducted for every wrong answer.

(d) Minimum percentage of marks required to be obtained in the Entrance Test to be called for Counselling is 20% with negative marking.

2. Syllabus

Section I:

General Agriculture (Code: AG)

Issues facing modern day agriculture in Punjab. Principles of crop production. Improved varieties, cultural practices, major pests and diseases (and their control) of wheat, rice, cotton, sugarcane, pulses, oilseeds and important vegetables, fruits and ornamentals of Punjab. Importance, status and scope of fruit industry in Punjab. Importance and classification of vegetable crops in Punjab. Breeding method of self-pollinated, cross pollinated and vegetatively propagated crops. Seed certification. Principles of agroforestry. Scope of floriculture and landscaping in Punjab. Functions and deficiency symptoms of micro and macronutrients. Problematic soils, their characteristics and management. Improved irrigation practices in field and horticultural crops. Water resources of Punjab state. Organic manures, inorganic and biofertilizers. Handling, processing and preservation of foods of plant and animal origin. Fundamentals of agricultural business and marketing. Extension education in relation to rural development and precision farming. World trade in agriculture, commodities, quarantine, SPS measures and IPRs.

General Home Science (Code: HS)

Food, food groups and their functions. Balanced diet. Effects of cooking on food. Principles of nutrition. Recommended Dietary Allowances. Deficiency diseases. Meal planning. Therapeutic Nutrition. Heredity and environment; growth and development. Principles of growth and development. Developmental tasks. Meaning, need, importance, and scope of early childhood education. Puberty and pubertal changes. Early and late maturation. Meaning and classification of children with special needs. Concept of special education. Marriage, its types and functions. Family and its functions. Stages of family life cycle. Extension education. *Panchayati raj* institutions. Indian Council of Agricultural Research. Teaching, learning and teaching-learning process. Projected, non-projected, electronic and folk media. Instructional strategies/techniques. Communication process. Diffusion and adoption process. Opinion leaders/ change agents. Extension training. Programme planning. Participatory rural appraisal techniques. Basic textile and clothing construction terminology. Yarn classification and uses. Basic finishes. Basic weaving and knitting terminology. Different types of looms and weaves. Design elements and principles of clothing and apparel designing. Clothing selection and wardrobe planning. Dyeing and printing process. Common dyeing and printing defects. Concept and principles of management, management process, work, work environment, work simplification, fundamentals of housing, principles of design and home furnishing, selection, care and maintenance of household equipment and furniture, family finance and consumer education. Functional interiors for special needs.

Section-II:

Sociology: definition, nature and scope. Relationship of sociology with other social sciences: psychology, economics, history, anthropology. Basic concepts: society, community, neighbourhood, social group and its types, association, organization, institution, social role, social status, social stratification and its basis, socialization, social system and its elements. Social processes: cooperation, accommodation, assimilation, competition and conflict. Culture, its types and attributes. Social values and their role in society. Norms & its types (folkways, mores and laws). Social control: concept and agencies of social control. Social change: its dimensions and factors. Basic social institutions: family, marriage, economic and political (Panchayati raj system). Rural sociology and its aim. Characteristics of rural society, Physical structure of rural society. Rural-urban differences. Green revolution. Rural social problems: poverty, indebtedness, drug addiction.

Model Questions

1. Primary and secondary group typology was given by:
   (A) W.G. Sumner (B) C.H. Cooley
   (C) F. Tonnies (D) H.P. Fairchild
2. Restriction on beef eating in Hindu society is:
   (A) Idea (B) Taboo
   (C) Tradition (D) Belief

MET - AGRICULTURAL STATISTICS

(For admission to M.Sc. programme in Statistics)

1. Test structure

(a) The question paper will have to be attempted in 3 hours.

(b) There will be two sections in the paper as under:

Section-I (for students of B.Sc. Non-Medical and B.A. with Mathematics). This section will carry 100 questions of two marks each.

Section-II (for students of B.Sc. with Statistics and B.Sc. CSM). This section will carry 150 questions

(50 questions of two marks each and 100 questions of one mark each)

Choice of Section-I or Section-II will have to be given at the time of submitting application form at Sr. No. 6. Choice once selected will not be changed later on.

(c) Each correct answer will carry two marks / one mark whereas ½ / ¼ mark (as applicable) will be deducted for every wrong answer.

(d) Minimum 20% marks are required in the Entrance Test to be called for Counselling/interview.

2. Syllabus

SECTION – I (MATHEMATICS)

Countable and uncountable sets, Riemann integral, Mean value theorems of integral calculus, Improper integrals and their convergence, Comparison tests, Abel's and dirichlet's tests, Beta and gamma functions, Double and triple integrals, Fourier series.

Groups, Vector Spaces, Linear transformations, Matrices and linear transformations.

Probability theory, Bayes' theorem, Random variables, Expectation, Mean, Variance, Moment generating function, Distributions: Binomial , Geometric , Poisson , Uniform , Exponential , Gamma and Normal.

Secant, Regula falsi, Newton's method, Interpolation: Lagrange and hermite interpolation, Numerical differentiation, Numerical quadrature, Direct methods for solving systems of linear equations, Runge-Kutta's method.

Sequence and series, Infinite series, vector calculus and its applications, Continuity, Sequential continuity, Uniform continuity, Limit and continuity of functions of two and three variables, Partial differentiation and its applications.

Exact differential equations, of first order and first degree; first order and higher degree, Orthogonal trajectories, Linear differential equations with constant coefficients

SECTION – II (STATISTICS)

Classification, tabulation and presentation of data, population, sample, Measures of location, Dispersion, Skewness and kurtosis, Two dimensional random variable, Joint probability distributions, Marginal and conditional probability distributions, Conditional expectation, Measures of association and contingency, Correlation and simple linear-regression, Coefficient of determination, Spearman's rank correlation coefficient, Multiple and partial correlation in three variables, Multiple regression.

Probability, Bayes' theorem and its applications, Random variable, Probability mass function, Probability density function, Distribution function and its properties, Moment generating function, Two dimensional random variables: Joint, Marginal, Conditional distributions, Uniform, Binomial, Poisson, Normal, Exponential, Gamma and Beta distributions, Chebyshev's inequality and its applications, Weak law of large numbers, Central limit theorem.

Point and interval estimation, Unbiasedness, Consistency, Efficiency and sufficiency, Methods of moments, Maximum likelihood estimators for the parameters of Binomial, Poisson and normal distributions, Confidence intervals, Hypothesis testing, Sampling distributions of Chi-square, t & F distributions and their relationships, Large

and small sample tests, Testing of correlation coefficient, Fisher's Z-transformation, Chi-square test for goodness of fit and independence of attributes.

Census and sample surveys, Basic concepts in sampling, sample size, Sampling methods for estimation of population mean, variance and standard error of estimates : simple random sampling (SRS), Stratified random sampling and systematic sampling. Fixed, random and mixed effects models, Analysis of variance for one-way and two-way classifications under the fixed effect models, Fundamental principles of design, CRD, RBD, LSD and their analysis.

Limits and continuity, Derivatives and their applications, Exponential and logarithmic functions, Integration and their applications, Definition of an angle its various measures and relations between them, Circular functions.

The solution of linear and quadratic equations in one variable, Arithmetic, Geometric and harmonic progressions, Permutations and combinations, Principle of induction, Binomial theorem for positive integral index.

3. Model Questions

Section –I

1. The sum of the series

$$\frac{1}{1!}+\frac{1+2}{2!}+\frac{1+2+3}{3!}+\cdots$$

(A) e (B) e/2
(C) 3e/2 (D)1+e/2

2. The row space of a 20 X 50 matrix A has dimension 13. What is the dimension of the space of solutions of AX=0?
   (A) 7 (B) 13
   (C) 37 (D) 33
3. Up to isomorphism, the number of abelian groups of order 108 are:
   (A) 12 (B) 9
   (C) 6 (D) 5

Section-II

1. Which one of the following is true?
   (A) The sample mean is always less than the population mean.
   (B) The sample mean is always more than the population mean.
   (C) The sample mean is an unbiased estimate of population mean.
   (D) None of the above is true.
2. If 'O' and 'E' be the observed and expected frequencies, then the χ^2 is equal to:
   (A) $\sum\frac{(O+E)^2}{N}$ (B) $\sum\frac{(O-E)^2}{E}$
   (C) $\sum\frac{(O+E)^2}{E}$ (D) None of the above.
3. Numerical value of correlation coefficient r can never be:
   (A) Greater than unity (B) Less than unity
   (C) Greater than zero (D) None of the above

MET - COMMUNITY SCIENCE

(For admission to M.Sc. programmes in Apparel & Textile Science, Extension Education & Communication Management, Food & Nutrition, Human Development & Family Studies, Resource Management & Consumer Science)

1. Test Structure

(a) The question paper shall have two SECTIONS:

SECTION - I: General Community Science, which will be compulsory for all the candidates.

SECTION - II: A candidate has to opt for at least one discipline out of the following. However, a maximum of two disciplines can be selected as per candidate's eligibility:

1. Apparel & Textile Science
2. Extension Education & Communication Management
3. Food & Nutrition
4. Human Development & Family Studies
5. Resource Management & Consumer Science

Any change in choice of discipline will not be allowed after the submission of application form.

(b) There will be 150 multiple choice type questions **(SECTION - I: 90; SECTION - II: 60)** each carrying one mark which are to be attempted by the candidate in the allotted time of **2 hours 10 minutes**.

(c) Candidate appearing for two disciplines will be required to sit for **additional SECTION-II** paper chosen by him/her consisting of **60 questions** to be attempted in additional allotted time of **50 minutes**.

(c) Each correct answer will carry one mark whereas ¼ mark will be deducted for every wrong answer.

(d) Minimum percentage of marks required in the Entrance Test to be called for Counselling is 20% .

2. Syllabus

Section I

General Community Science

Food and its functions. Food groups and nutrients. Concept and components of balanced diet. Composition and nutritive value of foods. Effect of cooking on the nutritive value of food. Basic principles of nutrition. Recommended Dietary Allowances. Body composition. Classification, functions, sources, requirements and deficiency/excess of carbohydrates, fats, proteins, vitamins and minerals. Principles and methods of food preservation. Food standards and quality control. Assessment of nutritional status. Major nutritional problems prevalent in India and Punjab- Protein Energy Malnutrition, Anaemia, Vitamin A deficiency, Iodine Deficiency Disorders and Fluorosis. National nutrition programmes and policies. Meal planning - principles, menu planning for normal individuals of different age groups. Therapeutic Nutrition and its importance. Planning of therapeutic diets in various diseases.

Basic concepts- heredity and environment, growth and development, maturation and learning. Genetic basis, Research designs and methods of data collection. Stages of prenatal development, alternative methods of concepion. Characteristics of the new born, types of birth, Neonatal reflexes. Physical cognitive, social and emotional development during different stages of human life cycle. Developmental tasks. Meaning, need, importance, and scope of early childhood education. Puberty and pubertal changes. Concept of adulthood and aging. Adjusting to occupational transitions and retirement. Children with special needs. Concept of impairment, disability, handicap and special education. Definition, purpose, types and functions of marriage. Definition, nature and functions of family. Concept and stages of family life cycle. Factors responsible for the changing structure of the modern family. Concept, nature, scope, principles and need of family counselling.

Extension education- concept, need, importance, principles and objectives. Concept and need of rural development. Rural development programme before and after independance - Gurgaon experiment, Sevagram

initiative, Shantiniketan project, Nilokheri Project, Firka development project/scheme, CDP, IRDP, SGSY, NRLH, NRHM. *Panchayati raj* institutions- concept, structure and functions. Indian Council of Agricultural Research, Schemes and Institutions for Women in Agriculture - CIWA, MKSP. Participation of women in agriculture and allied areas. Concept of teaching, learning and teaching-learning process. Projected, non-projected, electronic and folk media. Instructional strategies/techniques. Communication- elements, types, functions and barriers. Diffusion and adoption- adoption process, rate of adoption and adopters categories. Innovation and innovation- decision process, Opinion leaders/ change agents. Extension training- importance, principles, training needs, adult learner and their characteristics, qualities of good trainer. Management of extension training- monitoring, evaluation. Programme planning and steps involved in it. Participatory rural appraisal techniques.

Clothing construction terminology. Equipment and accessories used in clothing construction, their care and use. Preparation of fabric for garment construction. Application of design elements and principles of clothing and apparel designing. Factors affecting clothing selection and wardrobe planning for various age groups. Basic textile terminology, textile fibres and their classification. Properties and use of natural and synthetic fibres. Yarn classification, properties and types. Methods of fabric construction. Laundry-principles, methods, equipment and auxiliaries. Principles, classification and techniques of stain removal. Role of water, soaps and detergents as cleansing agents. Basics weaving and knitting terminology. Woven and knitted structures. Conventional loom and its parts. Different types of weaves. Principles and classification of knitting. Stitches used in knitting and types of knitted fabrics. Nonwovens- construction, properties, types and end uses. Felting, macramé and crocheting. Anthropometry- importance and techniques. Different constructional features and accessories used in women's and men's garments.

Family Resource Management - Concept and principles of management, Management process, Work, Work environment, Work simplification, Fundamentals of housing, Elements and principles of design, Home furnishing, Selection, care and maintenance of household equipment and furniture, Family finance and consumer education. Functional interiors for special needs.

Section II

Apparel & Textile Science

Textile finishing- classification, types and importance. Dyes and pigments. Application and classification of dyes. Dyeing equipment and techniques of dyeing fibres, yarns and fabrics. Styles of printing. Printing equipment and methods. Common dyeing and printing defects. Traditional textiles and embroideries of India. Retailing and Merchandising- concept, terminology, format and principles. Marketing research, sale promotion, pricing methods and export and import procedures. Different methods of pattern making, grading and dress designing. Fitting problems and their remedies. Fashion illustration and design development through CAD.

Extension Education & Communication Management

Extension education- concept, need, importance, principles and objectives. Concept and need of rural development. Rural development programs before and after independence- Gurgaon experiment, Sevagram initiative, Shantiniketan project, Nilokheri project, Firka development project, CDP, IRDP, SGSY, NRLM, NRHM. Panchayati raj institutions- concept, structure and functions. Participation of women in agriculture and allied areas. Schemes and institutions for women in agriculture- CIWA, MKSP. Concept of teaching, learning and teaching-learning process. Projected, non-projected, electronic and folk media. Instructional strategies/techniques. Communication-elements, types, functions and barriers. Diffusion and adoption- adoption process, rate of adoption and adopter categories. Innovation and innovation-decision process, opinion leaders/change agents. Extension training-importance, principles, training needs, adult learner and their characteristics, qualities of good trainer. Extension Programme planning and steps involved in it. Monitoring and evaluation of extension programme. Participatory rural appraisal techniques.

Food & Nutrition

Macro and micro nutrients, food analysis. Physical, chemical and nutritional changes during processing of food. Food hygiene and sanitation. Food toxins. Food related laws and quality control. Food product development and

packaging. Institutional food management. Planning, organizing and controlling the bakery and confectionary unit. Etiology, metabolic changes, clinical manifestation, complications and dietary management of metabolic and lifestyle diseases. Sports nutrition.

Human Development & Family Studies

Piaget's stages of cognitive development, Kohlberg's stages of moral development. Freud's psycho-sexual stages and Erickson's psycho-social stages of personality development. Constitutional provisions, laws, schemes, projects and policies for children, women and elderly. National and International organizations and agencies working for the welfare of children, women, youth, elderly and differently abled. APGAR. Neonatal Behavioural Assessment Scale for infants and toddlers, Development assessment through anthropometry, Developmental Screening test, Vineland Social Maturity Scale. Screening and assessment of preschool and primary school children-Stanford Binet Intelligence Scale, Wechsler Scale of Intelligence, Thematic Apperception Test, Children's Apperception Test, Raven's Coloured Progressive Matrices. Home Observation Measurement of the Environment (HOME).

Resource Management & Consumer Science

Material used for furniture, Types of furniture, their selection and furniture arrangement. Selection, care and maintenance of hard floor material, soft floor coverings and resilient floor materials. Exterior and interior wall materials, Types of windows and window treatments. Types of flower arrangements, Elements and principles of Art. Application of colour in interiors. Work simplification techniques. Equipment in the home. Residential and Commercial space designing. Types of accessories, their selection and placement. Resource management, Management process, Systems approach to management, Principles of house planning, Housing standards and Finance, Consumer Education, Rights and Responsibilities of consumers.

3. Model Questions

Section I:

General Community Science

1. Sodium in the body is present in:
   (A) Extracellular fluid (B) Intracellular fluid
   (C) None (D) Both
2. Which of the following is not a variation of plain weave
   (A) Rib (B) Basket
   (C) Twill (D) None of the above
3. The task lighting provides:
   (A) Functional and localized light (B) Overall luminosity
   (C) Ambient lighting (D) Aesthetic light
4. Adding white to any colour will:
   (A) Increase its value (B) Decrease its value
   (C) Increase its chroma (D) Decrease its chroma

Section II:

Apparel & Textile Science

1. Which dyes are used for dyeing protein fibres?
   (A) Direct (B) Acid
   (C) Sulphur (D) Vat
2. Retailing includes selling to:
   (A) Manufacturer (B) Wholesaler
   (C) End-user (D) All of the above

Extension Education & Communication Management

1. At which stage of innovation decision process, reinforcement is done?
   (A) Persuasion stage (B) Knowledge stage
   (C) Decision stage (D) Confirmation stage
2. A method used to generate as many ideas as possible
   (A) Brain storming (B) Colloquium
   (C) Symposium (D) Buzz session
3. What is the full form of CIWA:
   (A) Central Institute of Women in Agriculture (B) Central Institute for Women in Agribusiness
   (C) Centre for International Women Association (D) Centre for Integrated Workers' Association

Food & Nutrition

1. HACCP principles are most widely applied to:
   (A) Chemical hazards (B) Microbiological hazards
   (C) Physical hazards (D) All of the above
2. The goal of every food service established is to make :
   (A) Sales (B) Preparations
   (C) Profits (D) Money

Human Development & Family Studies

1. Early childhood education is mainly directed at:
   (A) Motor development (B) Reading and writing
   (C) All round development (D) Language development
2. The child with higher-chronological age than mental age:
   (A) Deaf and Dumb (B) Emotionally disturbed
   (C) Socially maladjusted (D) Mentally retarded
3. In Piaget's theory, "Operations" refer to:
   (A) physical behaviours (B) abstract levels of thinking
   (C) words and visual images (D) internalized mental actions
4. The appropriate disciplinary technique used by parents for a school aged child should be:
   (A) Authoritative (B) Permissive
   (C) Democratic (D) Over protective
5. The fact that an infant's head and upper body develop before the lower body, it illustrates the:
   (A) Cephalocaudal principle (B) Integrational principle
   (C) Maturational principle (D) Proximodistal principle
6. Jean Piaget is known for his contribution to:
   (A) Physical development (B) Social development
   (C) Cognitive development (D) Emotional development

Resource Management & Consumer Science

1. Which of the following flooring material is not natural?
   (A) Brick (B) Marble
   (C) Mosaic (D) Linoleum
2. Consumer protection was amended in the year.
   (A) 1986 (B) 1996
   (C) 2016 (D) 2019