

ANNEXURE-A

**SYLLABUS AND SCHEME OF EXAMINATION FOR THE POST OF  
AGRICULTURE OFFICER, TAFS GRADE-I**

**MCQ Part I: English & General Knowledge including current affairs**

**(30 Questions = 30 Marks)**

**1. English:-**

**15 Questions = 15 Marks**

- Synonyms & Antonyms
- Use of common Phrase & Idioms
- Use of appropriate prepositions and articles
- Comprehension
- Ordering of words in a sentence
- Ordering of sentences
- Spotting of errors
- Use of appropriate and qualifying words etc.
- Parts of speech
- Gender, person & number
- Tense-past, present, future
- Voice change.

**2. General knowledge including current affairs:- 15 Questions = 15 Marks**

- Geography of India: - Physical, Social & Economic.
- Geography of Tripura: - Natural resources with special reference to its soil, forest, water and power.
- History of Tripura:- During 1857 to 1949.
- Culture of Tripura:- Different Tribes, Languages, Customs, Festivals, Important Historical sites etc.
- Indian Polity and Economy: - Country's Political system and Constitution of India, Panchayati Raj, Community development, Economic development during Plan periods.
- Science & Technology
- Current affairs of national and international importance

## MCO Part II: Agriculture

(150 Questions = 150 Marks)

### **1. Agriculture in India and Tripura:**

**10 Questions = 10 Marks**

- i. Agriculture in India, its importance in national economy.
- ii. History of Indian Agriculture.
- iii. National agricultural setup in India
- iv. Area production and productivity of major crops of Tripura and India.
- v. Government Agricultural Policies
- vi. Agricultural Education, Research and Extension institutes of National Importance.
- vii. Agro- Climatic & Agro-ecological zones of India.

### **2. Natural Resource Management:**

**20 Questions = 20 Marks**

- i. Soil formation, composition, physical properties.
- ii. Soil fertility and productivity
- iii. Problem soils and their management
- iv. Essential plant nutrients.
- v. Manures & fertilizers
- vi. Integrated nutrient management (INM)
- vii. Scheduling of irrigation, methods of irrigation
- viii. Water use efficiency
- ix. Quality of irrigation water
- x. Water stress & management
- xi. Conservation of soil and water
- xii. Watershed and wasteland development
- xiii. Cropping systems
- xiv. Integrated farming system (IFS)
- xv. Dryland agriculture
- xvi. Sustainable agriculture
- xvii. Recycling of agricultural waste
- xviii. Biodiversity and its conservation
- xix. Application of Remote Sensing & GIS in Agriculture.

### **3. Fundamentals of Crop Production:**

**20 Questions = 20 Marks**

- i. Factors of crop Production
- ii. Agricultural seasons of India and Tripura
- iii. Recommended Package of practices of different crops with major emphasis in Tripura.
- iv. System of Rice Intensification (SRI).
- v. Jhum Cultivation in Tripura
- vi. Organic Agriculture
- vii. Weather, climate, atmosphere. Elements of weather, climatic normals for major crops, weather aberration, weather forecasting, global warming and climate change
- viii. Tith & tillage
- ix. Crop establishment
- x. Nano-particles and their applications
- xi. Precision Agriculture.

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- xii. Statistical Methods
  - xiii. Major Weeds of Tripura & Integrated Weed Management (IWM). Commonly used herbicides in India and Tripura.
  - xiv. Farm mechanization and its role in agricultural production and rural employment.
  - xv. Basic knowledge of farm implements.

#### 4. Horticulture:

**30 Questions = 30 Marks**

- i. Definition and branches, importance in human nutrition and national economy and scope
- ii. Plant propagation-methods and propagating structures
- iii. Principles and methods of training and pruning,
- iv. Juvenility and flower bud differentiation, unfruitfulness, pollination, pollinizers and pollinators, fertilization and parthenocarpy.
- v. Importance/role of plant bio-regulators in horticulture.
- vi. Irrigation and fertilizer application methods in horticultural crops.
- vii. Rootstocks - importance and role
- viii. Orchard layout and planting systems, high density planting and meadow orchard.
- ix. Production technologies of major fruits - mango, banana, citrus, pineapple guava, litchi, papaya, sapota, grape, apple, pear and minor fruits like ber, jackfruit, strawberry, pomegranate.
- x. Kitchen gardening, origin, production technology of major vegetable crops like Tomato, Brinjal, Chilli, Capsicum, Cucumber, Melons, Gourds, Pumpkin, French bean, Peas; Cole crops such as Cabbage, Cauliflower, Knol-khol; Bulb crops such as Onion, Garlic; Root crops such as Carrot, Raddish, Beetroot; Tuber crops such as Potato, True Potato Seed (TPS) cassava; Leafy vegetables such as Amaranth, Palak, perennial vegetables.
- xi. Production technology of important flowers like rose, gerbera, carnation, liliun and orchids under protected conditions and gladiolus, tuberose, chrysanthemum under open conditions. Package of practices for loose flowers like marigold and jasmine under open conditions.
- xii. Production technology of important medicinal plants like ashwagandha, asparagus, aloe, costus, Cinnamomum, periwinkle, isabgol and aromatic plants like mint, lemongrass, citronella, palmarosa, ocimum, rose, geranium, vetiver.
- xiii. Principles of landscaping, landscape uses of trees, shrubs and climbers.
- xiv. Physiological disorders of national importance in important horticultural crops.
- xv. Pre-harvest factors affecting postharvest quality, maturity, ripening and changes occurring during ripening, respiration and factors affecting respiration rate.
- xvi. Storage (ZECC, cold storage, CA, MA, and hypobaric)
- xvii. Value addition of horticultural crops, principles and methods of packaging, tetrazine films.
- xviii. Principles and methods of preservation, Drying/ Dehydration of fruits, osmotic drying, fermentation.
- xix. Application of nanotechnology in post harvest horticulture.

- xx. Canning -- Concepts and Standards, packaging of products.
- xxi. Protected cultivation - importance and scope, status of protected cultivation in India and World.
- xxii. Types of protected structure, cladding material involved in greenhouse/ poly house, greenhouse design, environment control, artificial lights, Automation, Soil preparation, substrate management, Irrigation and fertigation management.
- xxiii. Greenhouse cultivation of important horticultural crops – rose, carnation, chrysanthemum, gerbera, orchid, anthurium, lillium, tomato, bell pepper, cucumber, strawberry, pot plants, etc.
- xxiv. Off-season production of flowers and vegetables.
- xxv. Production Technology of Mushrooms.

## 5. Crop Improvement:

20 Questions = 20 Marks

### i. Genetics

Pre and Post Mendelian concepts of heredity, Mendelian principles of heredity. Architecture and Types of chromosome. Chromosomal theory of inheritance- cell cycle and cell division- mitosis and meiosis. Probability and Chi-square. Dominance relationships, Epistatic interactions with example.

Multiple alleles, pleiotropism and pseudoalleles, Sex determination and sex linkage, sex limited and sex influenced traits, Blood group genetics, Linkage and its estimation, crossing over mechanisms, chromosome mapping. Structural and numerical variations in chromosome and their implications, Use of haploids, dihaploids and doubled haploids in Genetics. Mutation, classification, Methods of inducing mutations & CIB technique, mutagenic agents and induction of mutation. Qualitative & Quantitative traits, Polygenes and continuous variations, multiple factor hypothesis, Cytoplasmic inheritance. Genetic disorders. Nature, structure & replication of genetic material. Protein synthesis, Transcription and translational mechanism of genetic material, Gene concept: Gene structure, function and regulation, Lac and Trp operons.

### ii. Crop Physiology

Diffusion and osmosis, Absorption of water, transpiration and Stomatal Physiology; Mineral nutrition of Plants: Functions and deficiency symptoms of nutrients, nutrient uptake mechanisms; Photosynthesis: Light and Dark reactions, C<sub>3</sub>, C<sub>4</sub> and CAM plants; Respiration: Glycolysis, TCA cycle and electron transport chain; Fat Metabolism: Fatty acid synthesis and Breakdown; Plant growth regulators.

### iii. **Plant Breeding**

Concept, nature and role of plant breeding, major achievements and future prospects; Genetics in relation to plant breeding, modes of reproduction and apomixes, self-incompatibility and male sterility- genetic consequences, cultivar options. Domestication, Acclimatization and Introduction; Centres of origin, components of Genetic variation; Heritability and genetic advance; Genetic basis and breeding methods in self- pollinated crops - mass and pure line selection, hybridization techniques and handling of segregating population; Multiline concept. Concepts of population genetics and Hardy-Weinberg Law, Genetic basis and methods of breeding cross pollinated crops, modes of selection; Population improvement Schemes- Ear to row method, Modified Ear to Row, recurrent selection schemes; Heterosis and inbreeding depression, development of inbred lines and hybrids, composite and synthetic varieties; Breeding methods in asexually propagated crops, clonal selection and hybridization; Maintenance of breeding records and data collection; Wide hybridization and pre-breeding; Polyploidy in relation to plant breeding, mutation breeding-methods and uses; Breeding for important biotic and abiotic stresses; Biotechnological tools-DNA markers and marker assisted selection. Participatory plant breeding; Intellectual Property Rights, Patenting, Plant Breeders and Farmer's Rights.

Centers of origin, distribution of species, wild relatives in different cereals; pulses; oilseeds; fibres; fodders and cash crops; vegetable and horticultural crops; Plant genetic resources, its utilization and conservation, study of genetics of qualitative and quantitative characters; Important concepts of breeding self pollinated, cross pollinated and vegetatively propagated crops; Major breeding objectives and procedures including conventional and modern innovative approaches for development of hybrids and varieties for yield, adaptability, stability, abiotic and biotic stress tolerance and quality (physical, chemical, nutritional); Hybrid seed production technology in Maize, Rice, Sorghum, Pearl millet and Pigeonpea, etc. Ideotype concept and climate resilient crop varieties for future.

### iv. **Seed and seed technology:**

Introduction, definition and importance. Deterioration causes of crop varieties and their control; Maintenance of genetic purity during seed production, seed quality; Definition, Characters of good quality seed, different classes of seed. Foundation and certified seed production of important cereals, pulses, oilseeds, fodder and vegetables. Seed certification. Seed Act, 1966 and Seed Act enforcement. Duty and powers of seed inspector, offences and penalties. Seeds Control Order 1983, Varietal Identification through Grow Out Test and Electrophoresis, Molecular and Biochemical test. Detection of genetically modified

crops, Transgene contamination in non-GM crops, GM crops and organic seed production.

Seed drying, processing and their steps, seed testing for quality assessment, seed treatment, its importance, method of application and seed packing. Seed storage; general principles, stages and factors affecting seed longevity during storage. Measures for pest and disease control during storage. Seed marketing: structure and organization, sales generation activities, promotional media. Factors affecting seed marketing, Role of WTO and OECD in seed marketing.

## **6. Crop Protection:**

**30 Questions = 30 Marks**

### **i. Plant Pathology**

Importance of plant diseases, scope and objectives of Plant Pathology. Terms and concepts in Plant Pathology. Pathogenesis. Factors affecting disease development, disease triangle and tetrahedron, classification of plant diseases. Important plant pathogenic organisms like fungi, bacteria, fastidious vascular bacteria, phytoplasmas, Spiroplasma, viruses, viroids, algae, protozoa, phanerogamic parasites and nematodes with examples of diseases caused by them. Disorders due to abiotic causes. Growth and reproduction of plant pathogens. Liberation / dispersal and survival of plant pathogens. Types of parasitism and variability in plant pathogens. Pathogenesis. Role of enzymes, toxins and growth regulators in disease development. Defense mechanism in plants. Epidemiology: Factors affecting disease development. Principles and methods of plant disease management, Integrated Disease Management (IDM). Nature, chemical combination, classification, mode of action and formulations of fungicides & antibiotics.

Diseases of Field Crops, Horticultural Crops & their Integrated Disease Management (with major emphasis on diseases prevalent under Agro-climatic condition of Tripura).

### **ii. Agricultural Entomology:**

Major points related to dominance of Insecta in Animal kingdom. Classification of phylum Arthropoda upto classes. Relationship of class Insecta with other classes of Arthropoda. Morphology and Functions of Various Parts of Insect Body. Metamorphosis and diapause in insects. Types of larvae and pupae. Structure and functions of digestive, circulatory, excretory, respiratory, nervous, secretory (Endocrine) and reproductive system, in insects. Types of reproduction in insects. Major sensory organs like simple and compound eyes, chemoreceptor.

Insect Ecology: Introduction. Environment and its components. Effect of biotic and abiotic factors on Insects.

Classification of class Insecta up to Orders, basic groups of present-day insects with special emphasis to orders and families of Agricultural importance. Categories of pests. Concept and Components of IPM, practices, scope and limitations of IPM. Survey surveillance and forecasting of insect pests and diseases, Economic Injury Level (EIL), Economic Threshold Level (ETL). Classification, toxicity and formulation of insecticides. Agrochemicals & Bio-pesticides under Crop Protection. Recent methods of pest control, repellents, antifeedants, hormones, attractants, gamma radiation. Insecticides Act 1968. Application techniques of spray fluids. Symptoms of poisoning, first aid and antidotes.

Important Pests of different Field Crops, Horticultural Crops, Stored Grains and their Management (with major emphasis on pests prevalent under Agroclimatic condition of Tripura).

**7. Social Science:**

**20 Questions = 20 Marks**

(i) Principles of farm business management:

1. Types and systems of farms
2. Classical production functions
3. Management of resources
4. Farm Planning and budgeting
5. Investment analysis
6. Risk and uncertainties in agriculture
7. Cost concepts
8. Multi credit delivery system

(ii) Agricultural Extension: Principles and Methods:

- Rural Sociology
- Extension methods for transfer of technology
- Communication models
- Diffusion and adoption
- Role of women in agriculture
- ICT in agriculture
- Capacity building of extension personnel, SHG and farmers
- Role of KVK

(iii) Agricultural Marketing & Market Intelligence:

- Market structure
- Agricultural Cooperatives
- Agricultural Loan
- Marketing efficiency
- FRP- Procurement Price
- Problem and prospects of Agricultural marketing
- Importance of Agriculture in the Indian economy
- Farm Business and Finance Management
- Marketing and pricing of agricultural inputs (seeds, fertilizer and PPC) and output (production).

## II. Scheme of Examination

- i. Evaluation of candidates will be done in two (2) stages viz. MCQ test followed by interview/ personality test. Marks distribution will be as follows:

Sl. No.	Name of the Subjects	Number of Questions/ Maximum Marks
1	MCQ Part I: English & General Knowledge including current affairs	30
2	MCQ Part II: Agriculture	150
3	Interview/ personality test	20
<b>Total</b>		<b>200</b>

- ii. Question Paper for written exam will be of 180 Marks (180 MCQ). Question will be of MCQ type carrying one (1) mark each.
- iii. Duration of Examination will be of 180 minutes (3 hours).
- iv. There will be negative marking of 0.25 Mark for every wrong answer.
- v. Minimum qualification marks in MCQ test should be as per standing norms of TPSC.
- vi. Accordingly, merit list of qualified candidates may be prepared considering 100 point roster as per the standing norms of Govt. of Tripura.
- vii. Interview call letter may be issued with a ratio of 1:5 (No. of post: No. of successful candidate).
- viii. Each question will have four (4) distracters. Some of the questions may have "None of these" as one of the distracters if felt necessary.
- ix. Candidates must appear before the selection committee for interview/ personality test.
- x. Final merit list will be prepared by adding both marks obtained in the written test followed by interview.

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**(R. Debbarma)**  
**Deputy Secretary to the**  
**Government of Tripura**