RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR SCREENING TEST FOR THE POST OF AGRICULTURE RESEARCH OFFICER (PLANT PATHOLOGY) AGRICULTURE DEPARTMENT

PART-A
General Knowledge of Rajasthan

Unit-I

Historical Rajasthan: Pre and Proto-historical sites of Rajasthan. Important historical centers of early Christian Era. Prominent rulers of major Rajput dynasties of Rajasthan and their achievements & contributions – Guhilas- Sisodiyas, Chauhans, Rathores and Kachchawas.

Emergence of Modern Rajasthan: Agents of Social Awakening in Rajasthan during 19th and 20th Centuries. Political Awakening: role of newspapers and political institutions. Praja Mandal movement in various princely states in 20th century. Integration of Rajasthan.

Art of Rajasthan: Architectural tradition of Rajasthan- temples, forts and palaces from ancient to modern period; Various schools of paintings developed during medieval period; Classical Music and Classical Dance, Folk Music & Instruments; Folk Dances & Drama.

Language & Literature: Dialects of Rajasthani language, Literature of Rajasthani language and Folk literature.

Religious life: Religious communities, Saints and Sects in Rajasthan. Folk Deities of Rajasthan.

Social Life in Rajasthan: Fairs and festivals; Social customs and traditions; attires and ornaments.

Geography of Rajasthan:- Broad physical features- Mountains, Plateaus, Plains & Desert; Major Climatic types; Major rivers and lakes; Major forest types and distribution; Population growth, Density and Distribution; Desertification, Droughts & Floods; Environmental pollution and Ecological concerns.

– 30 Questions

PART-B
(PLANT PATHOLOGY)

1. **History and Scope of Plant Pathology**- History of plant pathology with particular reference to India. Major epidemics and their social impacts including classification of plant diseases. Historical developments of chemicals, legislative, cultural and biological protection measures including classification of plant diseases. Scope and application of microbes in agriculture industry and pollution.

2. **Mycology**- Introduction, terms and basic concepts. General characters of fungi, types of fungal thalli, fungal tissues, modifications of thallus, reproduction in fungi (asexual and sexual). Classification of fungi. Comparative morphology, ultra structure, characters of different groups of fungi up to generic level. Importance of fungi, mycorrhizal associations and lichen. Fungal genetics and variability in fungi.

3. **Plant Bacteriology**- History and introduction to phytopathogenic procarya viz. bacteria, MLO/phytoplasma, spiroplasma and other fastidious procarya. Classification, nomenclature and important diseases caused by phytopathogenic procarya. Importance, growth and nutrition of phytopathogenic bacteria. Reproduction in prokaryotes. Variability among phytopathogenic procarya. General biology of bacteriophage, L-form bacteria, plasmids and *Bdellovibrio.* Prokaryotic inhibitors and their mode of action against phytopathogenic bacteria.

4. **Plant Virology**- History of plant viruses, composition and structure of viruses. Symptomatology of important plant viral diseases, transmission, chemical and physical properties, host virus interaction, virus vector relationship. Classification, replication and movement of viruses. Isolation and purification, electron microscopy, protein and nucleic acid based diagnostics. Mycoviruses, arbo- and baculoviruses, satellite viruses, satellite RNAs, viroids and prions. Mechanism of resistance, genetic engineering and management of plant viruses.

5. **Plant Disease Management**- Principles of plant disease management by cultural, physical, biological, chemical methods for plant disease control. Concept, tools and components of Integrated Disease Management (IDM). Quarantine, exotic pathogens and pathogens introduced into India. Genetic basis of disease resistance and pathogenicity, gene for gene hypothesis, breeding for disease resistance. Seed certification. Chemical nature and classification of fungicides and antibiotics. Method of application of fungicides. Spraying and dusting equipments, their care and maintenances. Plant growth promoting Rhizobacteria (PGPR).

6. **Diseases of Crop Plants**- Major fungal, bacterial, viral, viroids, phytoplasmal and nematode diseases of cereals, millets, oilseeds, pulses, fruits, vegetables, plantation, fiber, spices and ornamental crops with special reference to etiology, disease cycle/transmission and integrated management. Post harvest diseases in transit and storage and their management. Phanerogamic parasites and Non-parasitic Diseases of crop plants and their management.

7. **Principles of Plant Pathology**- Plant disease concepts, biotic and abiotic causes of plant diseases. Survival and dispersal of important plant pathogens, role of environment and host nutrition on disease development. Host parasitic interaction, infection process, disease development: role of enzymes, toxins, growth regulators. Defense mechanisms. Altered plantmetabolism as affected by plant pathogens. Genetics of resistance 'R' genes, mechanism of genetic variation in pathogen, molecular basis for resistance and genetic engineering of disease resistance.

8. **Laboratory and Analytical Techniques**- Preparation and sterilization of common media. Methods of isolation of pathogens and their identification. Preservation of microorganisms in pure culture. Methods of inoculation. Measurement of plant disease. Molecular detection of pathogens in seeds and other planting materials: Nucleic acid probes, ELISA, ISEM and PCR. Laboratory equipment and their use: autoclave, hot air oven, laminar flow, spectrophotometer, electrophoresis, light and electron microscopy, incubator, ultracentrifuge, ELISA Reader.

9. **Epidemiology and Forecasting of Plant Disease**- Concepts of epidemiology. Development of disease in plant population. Monocyclic and polycyclic pathogens. Role of environment and meteorological factors in the development of plant disease epidemics. Survey, surveillance (including through remote sensing), and prediction and forecasting of diseases. Epidemic analysis and prediction models. Crop loss assessment: critical and multiple point models.

10. **Mushroom production Technology**- Mushroom cultivation, food, medicinal value, uses of mushroom, edible and poisonous mushrooms. Life cycle of cultivated mushrooms, maintenance of pure culture, preparation of spawn and facilities required for establishing commercial spawn lab. Major insect pests, diseases and abnormalities of cultivated mushroom and their management.

-120 Questions

*****

Pattern of Question Paper:

1 Objective Type Paper
2 Maximum Marks: 150
3 Number of Questions: 150
4 Duration of Paper: 2.30 Hours
5 All Questions carry equal marks
6 Medium of Screening Test: Bilingual in English & Hindi
7 There will be **Negative Marking**

(For every wrong answer, one-third of marks prescribed for that particular question will be deducted.)

*****