

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS OF COMPETITIVE EXAMINATION FOR THE POST OF AGRICULTURE RESEARCH OFFICER (PLANT PATHOLOGY) AGRICULTURE DEPARTMENT

Part-A

- 40 Questions

General Knowledge of Rajasthan

Unit-I: History, Culture & Heritage of Rajasthan -

Pre & early history of Rajasthan. Age of Rajputs: Major dynasties of Rajasthan and the achievements of prominent rulers. Emergence of Modern Rajasthan: factors of socio-political awakening of 19th century; Peasants and tribal movements of 20th century; Political struggle of 20th century and the integration of Rajasthan.

Visual Art of Rajasthan - Architecture of forts and temples of Rajasthan; Sculpture traditions of Rajasthan and various schools of painting of Rajasthan.

Performing Arts of Rajasthan - Folk music and musical instruments of Rajasthan; folk dance and folk drama of Rajasthan.

Various religious cults, saints and folk deities of Rajasthan.

Various dialects and its distribution in Rajasthan; literature of Rajasthani language.

Unit-II: Geography, Natural Resource & Socio-Economic Development of Rajasthan -

Geography of Rajasthan: Broad physical features- Mountains, Plateaus, Plains & Desert; Major rivers and lakes; Climate and Agro-climatic regions; Major soil types and distribution; Major Forest types and distribution; Demographic characteristics; Desertification, Droughts & Floods, Deforestation, Environmental Pollution and Ecological Concerns.

Economy of Rajasthan: Major Minerals- Metallic & Non- Metallic; Power Resources- Renewable and Non-Renewable; Major agro based industries- Textile, Sugar, Paper & Vegetable oil; Poverty and Unemployment; Agro food parks.

Unit-III: Current Events and Issues of Rajasthan and India -

Important Persons, Places and Current events of the State. National and International events of importance. New Schemes & Initiatives taken recently for welfare & development in Rajasthan.

- 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 plant metabolism 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.

Scheme of the examination				
S. No.	Subject	No. of Questions	Total Marks	Examination Duration
Part-A	General Knowledge of Rajasthan	40	40	2.30 Hours
Part-B	Concerned Subject (as prescribed in qualification)	110	110	
	Total	150	150	

1. The competitive examination shall carry 150 marks and 150 questions of Multiple Choice Type questions.

2. There shall be one paper. Duration of Paper will be Two hours and Thirty Minutes.

Negative marking shall be applicable in the evaluation of answers. For every wrong answer one-third of the marks prescribed for that particular question shall be deducted.

Explanation: - Wrong answer shall mean an incorrect answer or multiple answers.

उक्त पद हेतु आयोजित की जाने वाली परीक्षा के लिए ओ.एम.आर. उत्तरपत्रक में प्रश्नों के विकल्प भरने के संबंध में विशेष निर्देश:-

1. Each question has five options marked as 1, 2, 3, 4, 5. You have to darken only one circle (bubble) indicating the correct answer on the Answer Sheet using BLUE BALL POINT PEN.
2. It is mandatory to fill one option for each question.
3. If you are not attempting a question then you have to darken the circle '5'. If none of the five circles is darkened, one third (1/3) part of the marks of question shall be deducted.
4. After solving question paper, candidate must ascertain that he/she has darkened one of the circles (bubbles) for each of the questions. Extra time of 10 minutes beyond scheduled time, is provided for this.

A candidate who has not darkened any of the five circles in more than 10% questions shall be disqualified.