

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF ASSISTANT PROFESSOR IN AGRICULTURE AGRONOMY FOR COLLEGE EDUCATION DEPARTMENT

PAPER – II

Unit 1: Crop Production-

Crop production techniques for cereals, millets, legumes, oilseeds, fiber crops, sugarcane, tobacco, fodder and pasture crops including origin, history, distribution, adaptation, climate, soil, season, modern varieties, fertilizer requirements, intercultural operations, water requirement. weed management, quality components, industrial use, economics and post-harvest technology.

Unit 2: Soil Water Relationship -

Soil and water as vital resources for agricultural production; Occurrence of groundwater, groundwater aquifers, exploration of groundwater; Hydrological cycle; Soil-plant water relationship; Fate of rain water received at the soil surface, runoff and infiltration reciprocity, factors affecting infiltration, means to enhance infiltrability of soil, mechanical and biological means to reduce runoff and soil loss; Cropping patterns, alternate land use and crop diversification in rainfed areas, Soil water relations, water retention by soil, soil moisture characteristics, field capacity, permanent wilting point, plant available water and extractable water; Soil irrigability, classifications, factors affecting profile water storage; Determination of soil water content, computation of soil water depletion, soil water-potential and its components, Movement of soil water under saturated and unsaturated water flow; Field water budget, water gains and water losses from soil, deep percolation beyond root zone, capillary rise; Evapotranspiration (ET), scope for economizing water, measures for reducing direct evaporation from soil and crop canopies; Soil physical properties in relation to plant growth and development; Erodability of soils and their prevention.

Unit 3: Plant Water Relationship-

Plant water relations: Concept of plant water potential, cell water relations, plant water potential and its components; Significance of osmotic adjustment, leaf diffusive resistance, canopy temperature, Water movement through soil – plant atmosphere systems, uptake and transport of water by roots; Development of crop water deficit, crop adaptation to water deficit, morpho physiological effect of water deficit; Drought tolerance, mechanisms of drought tolerance, potential drought tolerance traits and their measurements, management and strategies to improve crop productivity under different patterns of drought situations of limited water supplies; Effect of excess water on plant growth and production; Types of droughts, drought indices.

Unit 4: Irrigation Water Management-

History of irrigation in India; Major irrigation projects in India; Water resources development; Crop water requirements; Concepts of irrigation scheduling, Different approaches of irrigation scheduling; Soil water depletion, plant indices and climatic parameters; Concept of critical stages of crop growth in relation to water supplies; Crop modelling, crop coefficients, water production functions; Methods of irrigation *viz.* surface methods, overhead methods, drip irrigation and air conditioning irrigation, merits and demerits of various methods, design and evaluation of irrigation methods; Measurement of irrigation water, application and distribution efficiencies; Management of water resources (rain, canal and ground water) for agricultural production; irrigation legislation; Water quality, conjunctive use of water, irrigation strategies under different situation of water availability, optimum crop plans and cropping patterns in canal command areas; Socio-economic aspects of on-farm water management; Irrigation water distribution, Irrigation efficiencies; Interaction between irrigation and fertilizers.

Unit 5: Management of Problematic Soils and Water-

Problem soils and their distribution in India and Rajasthan; Salt-affected, acidic, water logged soils; Ground water resources, water quality criteria and use of brackish waters in agriculture; Reclamation of problem soils, role of amendments and drainage; Crop production techniques in problem soils - crops, varieties, cropping system and agronomic practices; Excess salt and salt tolerant crops; Drainage for improving water logged soils for crop production; quality of irrigation water, Crop production and alternate use of problematic soils and poor quality water for agricultural production; Amelioration of salt affected soils.

Unit 6: Organic Farming-

Natural farming, Zero budget natural farming- concept, components, principle, Organic farming – concept, definition, relevance and future prospects; principles; organics and farming standards; selection and conversion of land, soil and water management - land use; Organic farming and water use efficiency; soil fertility, nutrient recycling, organic residues, organic manures, composting, soil biota and decomposition of organic residues, earthworms and vermicompost, green manures, bio-fertilizers and Farming systems, Control of weeds, diseases and insect pest management, biological agents and pheromones, bio-pesticides. inspection, certification, labelling and accreditation procedures; organic farming and national economy.

Unit 7: Modern Concepts in Crop Production-

Crop growth and development, growth curves, Quantitative agro-biological principles and inverse yield nitrogen law; Mitscherlich equation, Baule unit., physiology of grain yield in cereals; plant population and planting geometry in

relation to different resources, ideal plant type. Scientific principles of crop production; soil plant relations; yield and environmental stress, use of growth hormones and regulators for better adaptation in stressed condition. modern concept of tillage; determining the nutrient needs for yield potentiality of crop plants, precision agriculture. use of GIS, GPS and remote sensing in modern agriculture.

Note: - Pattern of Question Paper

1. Objective type paper
2. Maximum Marks: 75
3. Number of Questions: 150
4. Duration of Paper: Three Hours
5. All Questions carry equal marks.
6. Medium of Competitive Exam: Bilingual in English & Hindi
7. There will be Negative Marking.