

RAJASTHAN PUBLIC SERVICE COMMISSION, AJMER

SYLLABUS FOR COMPETITIVE EXAMINATION FOR THE POST OF ASSISTANT PROFESSOR IN AGRICULTURAL ENGINEERING FOR COLLEGE EDUCATION DEPARTMENT

PAPER – I

Unit 1: Soil and Water Conservation Engineering -

Hydrological cycle and measurement of its components; Precipitation-analysis of precipitation data; runoff estimation; Hydrograph analysis, Unit hydrograph Infiltration – Indices and equations, drought and its classification. Mechanics of soil erosion - wind and water erosion: soil erosion types, factors affecting erosion; Soil loss measurement techniques; biological and engineering measures to control erosion; terraces and bunds; vegetative waterways; gully control structures, drop, drop inlet and chute spillways; earthen dams. Water harvesting and its techniques. Universal Soil Loss Equation. Watershed Management, watershed characterization and land use capability classification; water budgeting in watershed, rainwater harvesting, check dams and farm ponds. Darcy's Law, steady and unsteady flow in confined and unconfined aquifers.

Unit 2: Irrigation and Drainage Engineering -

Water requirement of crops; consumptive use and evapotranspiration; measurement of infiltration, soil moisture & Water requirement. Design of irrigation channels and underground pipelines; irrigation scheduling; surface, sprinkler and micro irrigation methods, design and evaluation of irrigation methods; irrigation efficiencies. Measurement of irrigation water. Classification of pumps; pump characteristics; pump selection and installation. Planning, design and layout of surface and sub-surface drainage systems; Drainage coefficient; leaching requirement.

Unit 3: Agricultural Structures and Process Engineering-

Site selection, design and construction of farm steps – farm house, cattle shed, dairy barn, poultry house, goat housing, machinery and implement sheds, storage structure for food grains, feed and forage, construction of silos. Green house technology: Introduction of green and net house, Types of Green Houses. Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house equipment, materials of construction for

traditional and low cost green houses. Importance of Engineering properties such as physical, thermal, rheological and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation. Basic concepts of cleaning & grading, drying and dehydration. drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipments; conveyer and elevators, their principle, working and selection.

Unit 4: Dairy Processing Engineering -

Dairy development in India, Engineering, thermal and chemical properties of milk and milk products, Process flow charts for product manufacture, Unit operation of various dairy and food processing systems. Cleaning of dairy utensils, Principles and equipment related to receiving of milk, pasteurization, sterilization, homogenization, centrifugation and cream separation. Preparation methods and equipment for manufacture of cheese, paneer, shrikhand, butter and ice cream, Filling and packaging of milk and milk products; Spray and roller drying; Dairy plant design and layout, Plant utilities.

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.