

Technical Paper – I (Full Marks : 150)
(Objective Type/MCQ)

1 Irrigation and Drainage Engineering **60 Marks**

Definition of Irrigation, Geometry of Irrigation Channel; Types of Irrigation; Sources of Irrigation water; Different parts of Irrigation Canals & their functions; Uniform flow formulae; Measurement of Irrigation water; Design of Irrigation canals – Chezy's formula, Manning's formula, Kennedy's and Lacey's silt theories and equations; Field Application of Irrigation water; Empirical methods for estimating consumptive use; Design principles and practices for surface Irrigation systems; Lining of Irrigation channels – Advantage and disadvantages. Numerical problems. Surface water distribution systems; Water Conveyance and Control: Open channels; Definitions; Discharge capacity of channels; Structures to control irrigation channels; Water control and Diversion structures; Land grading and Field Layout.

2 Water requirement of crops **30 Marks**

Concepts of crop water requirement; Field irrigation requirement; Crop season; Duty; Delta and Base Period, their relationship; Definitions and Terminology; Gross Command Area; Culturable Command Area; Intensity of irrigation; Factors affecting Consumptive use; Numerical problems.

3 Hydrology **30 Marks**

Definition and Scope; Hydrologic cycle; Hydrograph; Rainfall and Run-off Analysis; Factors affecting runoff; Estimation of runoff; Salient characteristics of a Basin; Infiltration; Ground water Hydrology; Terminology.

4 Soil Mechanics and Foundation Engineering

15 Marks

Definition of soil; Different Soil Classifications; Grain size classification; Types of soil and their properties; Terms used in soil mechanics; Load bearing capacity of soil; Factors affecting the safety of structures; Causes of failure of foundations.

5 Farm Power and Machinery

15 Marks

Sources of farm power and scope of mechanization; Engine types; Engine speeds; Mechanical Efficiency; Comparison between Diesel and Carburettor Engines; Comparison between Two and Four stroke cycle engines; Transmission of power: Horse power transmitted; Velocity ratio; Tillage.

Technical Paper – II (Full Marks : 150)
(Objective Type/MCQ)

- 1. Soil and Water Conservation Engineering** **40 Marks**
Classification of Rainfall; Computation of Rainfall; Run off, its process, Time of Concentration T_c ; Land use capability classification Based on the slope of Land; Terminology. Soil Conservation structures: Design requirements of Permanent structures, Design procedures; Basic components of soil conservation structures; Drop spillway; Froud number; Hydraulic jump. Numerical problems.

- 2. Tube Wells and Pumps** **35 Marks**
Types of Tube wells; Terminology; Discharge or Drawal of Tube well; Methods for drilling Tube wells; Ground water and Aquifers; Ground water replenishment; Hydraulics of Wells; Design of Irrigation Wells; Methods of water measurements; Weirs; Parshall flumes; Orifices; Irrigation Pumps: Indigenous water lifts; Positive displacement pumps; Centrifugal pumps; Hydraulic ram.

- 3. Surveying and Levelling** **20 Marks**
Units of Measurements; Basic Units of Length, Area, Volume, SI Units; Derived Units; Scales; Measurement of distances and Areas; Chain Surveying; Levels, Levelling and Topographical surveying;

- 4. Concrete Technology** **20 Marks**
Types of cements; Properties of cement; Aggregates; Water; Admixtures; Proportioning of Concrete, its Methods; Curing of concrete; Water proofing of concrete; Concrete; Types of Concrete; Concrete mixture for the structure; Fuller's rule for Cement mixture.

5. Mechanics of Structures/Farm Structures.

15 Marks.

Stress and Strain; Hooke's Law; Lateral and Longitudinal Strain; Poisson's Ratio; Bulk Modulus; Relation amongst E, N and K; Beam; Distribution of Shear stress; Direct and Bending stress; Torsion of shafts; Columns and Struts. Factors for selecting the sites of the farm buildings; Building materials; Classification, characteristics and uses of bricks; Terminology.

6. Aptitude Test

20 Marks.

o Numerical And Figurework Tests: (4 Marks)

These tests are reflections of fluency with numbers and calculations. It shows how easily a person can think with numbers. The subject will be given a series of numbers. His/Her task is to see how the numbers go together to form a relationship with each other. He/She has to choose a number which would go next in the series.

o Verbal Analysis And Vocabulary Tests: (6 Marks)

These tests measure the degree of comfort and fluency with the English language. These tests will measure how a person will reason with words. The subject will be given questions with alternative answers, that will reflect his/her command of the rule and use of English language.

o Visual And Spatial/3-D Ability Tests: (4 Marks)

These tests are used to measure perceptual speed and acuity. The subject will be shown pictures where he/she is asked to identify the odd one out; or which comes next in the sequence or explores how easily he/she can see and turn around objects in space.

o **Abstract Reasoning Tests: (6 Marks)**

This test measures the ability to analyse information and solve problems on a complex, thought based level. It measures a person's ability to quickly identify patterns, logical rules and trends in new data, integrate this information, and apply it to solve problems.