

**B.Tech. CIVIL (WATER RESOURCES
ENGINEERING)**

Term-End Examination

June, 2010

ET-533 (A) : IRRIGATION ENGINEERING

Time : 3 hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. The answers should be in your own language and supported with examples and neat sketches, wherever required. Use of calculator is permitted. Any missing data may be assumed suitably.

1. Define the following : **7x2=14**
 - (a) Irrigation
 - (b) Field Capacity
 - (c) Evapotranspiration
 - (d) Drainage coefficient
 - (e) Effective rainfall
 - (f) Net Positive Suction Head (NPSH)
 - (g) Infiltration

2. Distinguish between *any four* of the following :
 - (a) Warabandi and Phad System **4x3½=14**
 - (b) Irrigation scheduling and Irrigation frequency.
 - (c) Hygroscopic water and capillary water.

- (d) Wilting point and available moisture.
 - (e) Border irrigation and furrow irrigation.
 - (f) Centrifugal pump and reciprocating pump
 - (g) Infiltrometer and lysimeter
3. (a) Describe Sprinkler method of irrigation. List advantages and disadvantages of Sprinkler method of irrigation over drip irrigation method. **10**
- (b) How turbine pump is different from a centrifugal pump ? Explain in brief. **4**
4. (a) A wet sample of soil, 1800 g, was moulded into 1000 cm^3 . The soil was dried in an oven to a constant mass of 1500 g. Compute the following : **10+4**
- (i) water content by weight and volume
 - (ii) dry unit weight of soil
 - (iii) porosity
 - (iv) air-filled porosity
- (b) Take specific gravity of soil as 2.67 g/cm^3 . Explain Grainmeter method to determine soil moisture.
5. (a) Discuss the criteria for the selection of pumps for irrigation. **7+7**
- (b) Under what conditions are centrifugal and turbine pumps used in irrigation ?

6. (a) A deep well turbine pump installed in a tube well has a discharge of 20 lps. The pumping water level is 23 m below the centre line of discharge head. The delivery and suction pipe diameters are 8 cm and 10 cm respectively. The delivery pipe is 20 m long measured from the end of the vertical discharge pipe. A gate valve and two long bends fitted in the delivery pipe caused the head loss of 2.5 m inclusive of head loss caused due to their presence. Determine the input horse power of the motor to operate the system if the efficiency of the pump is 67 percent. 10
- (b) How will you estimate the bill of electricity based on input horse power ? 4
7. (a) Trace the history of development of irrigation during various plan periods since independence of India. 10
- (b) Explain briefly the procedure of gravel pack design for a tube well. 4
8. Write short notes on *any four* of the following : $4 \times 3\frac{1}{2} = 14$
- (a) Land levelling and grading.
- (b) Four corner method in cut-fill estimation
- (c) Soil moisture constants
- (d) Classification of canals
- (e) India's water budget
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