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B.E / B.Tech. (Full Time) DEGREE ARREAR EXAMINATION, OCT / NOV 2011

CIVIL ENGINEERING BRANCH

VI SEMESTER – (REGULATIONS 2008)

CE 9352 – IRRIGATION ENGINEERING

Time : 3 hours.

Max Marks: 100

Answer ALL Questions

Part – A (10 x 2 = 20 Marks)

1. Define the term " irrigation".
2. Mention any two major irrigation projects in India.
3. What is effective rainfall?
4. What are the types of soil water?
5. Give any four advantages of canal lining and explain asphalt canal lining.
6. What is meant by cross- drainage works? Explain its necessity?
7. What are the causes of soil salinity in agricultural land?
8. What is water logging? What are its ill-effects?
9. What is meant by 'Turn Over' of an irrigation system?
10. Distinguish between storage efficiency and water distribution efficiency.

Part – B (5 x 16 = 80 Marks)

11. i) Discuss in detail the advantages and ill effects of irrigation. (8)
ii) Describe the most commonly followed thermo-gravimetric method of soil water measurement. Give the advantages of the method. (8)
12. a. i) Discuss various factors which determine the soil-water-plant relationship. (8)
Field capacity of soil 25%, permanent wilting point is 13%, density of soil 1.5 g/cm³, effective depth of root zone 700 minimum and daily consumptive use rate for the crop is 10 minimum. If the soil is clay loam what should be the frequency of watering so that yield of the crop is not affected. (8)

or

b. 1) Define the following term (10)
Saturation density b) Field capacity c) Permanent wilting point d) Available moisture e) soil moisture deficiency.
ii) Describe in details relationship between soil moisture and plant growth? Show the relationship in diagrammatically also. (6)
13. a. i) Describe an ogee fall, rapid and rapid fall with neat sketch. (12)
ii) The base period, intensity of irrigation and duty of water for various crops under a canal system are given in the table below. Calculate the reservoir capacity if the culturable commanded area is 40,000 hectares, canal losses are 20% and reservoir losses are 10%. (4)

Crop	Base Period (days)	Duty of water at the field (Hectares/cumecs)	Intensity of irrigation (percentage)
Wheat	120	1800	20
Sugarcane	360	1700	20
Cotton	180	1400	10
Rice	120	800	15
Vegetables	120	700	15

or

- b. i) Explain with the help a neat sketch, the various components of the diversion headwork along with their functions. (16)

14. a. i) Explain in detail about the various types of surface and subsurface irrigation methods with neat sketch. (12)

ii) Write short note on the following salinity and sodicity. (4)

or

- b. i) Explain why drainage of irrigated land is necessary? Describe various methods of layout of tile drainage with a neat sketch? (10)

ii) The chemical analysis of the groundwater collected from a well in Madurai. The chemical parameters are given in following tables. Classify the water suitable for irrigation purposes (SAR, Na%, RSC). (6)

Constituents	Ca	Mg	Na	HCO ₃	CO ₃	SO ₄	Cl	K
Con of Ions in mg/l	200	43	495	300	0	366	81	25

15. a. i) Explain the salient features of Bandhara irrigation? Give the layout plan of a Bandharas? Explain the procedure for the design of bandharas? (10)

ii) Write short note on Kudimaramuthu and Warabandhi system of irrigation. (6)

or

- b. i) Describe briefly the structure of 3 tier system in farmer's organization (10)

ii) A stream of 130 liters per second was diverted from a canal and 100 litres per second were received to the field. An area of 1.6 hectares was irrigated in 8 hours. The effective depth of root zone was 1.7m. The runoff loss in the field was 420 cu.m. The depth of water penetration varied linearly from 1.7 m at the head end of the field to 1.1 m at the tail end. Available moisture holding capacity of the soil is 20 cm per meter depth of soil. It is required to determine the water conveyance efficiency, water application efficiency, water storage efficiency. Irrigation was started at a moisture extraction level of 50% of the available moisture. (6)