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B.E (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2012

AGRICULTURAL AND IRRIGATION ENGINEERING

Semester II

AI 9023 Irrigation Water Quality and Modeling

(Regulation 2008)

Time : 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is the difference between a mixture and solution?
2. Define 'water quality'
3. What is target and sample population?
4. List advantages and limitations of regular sampling method
5. Why water is called 'universal solvent'?
6. What is rationale behind drinking water standards?
7. What is Leaching and Leaching ratio?
8. List sources of NPS pollution in the watershed.
9. What are 'agro - ecosystems'?
10. What are the uses of water quality indices?

Part - B (5 x 16 = 80 marks)

11. Discuss the importance of sampling design in environmental investigations. What steps will you adopt to investigate a water quality problem detected inside a command area?
12. a) i) What changes in water quality takes place in atmosphere during precipitation of water?
ii) What is solvation? Explain the process and its use in natural environment.
OR
b) i) Explain the major hydrochemical reactions that affect the quality of water.
ii) Explain changes that take place in the aquifer when fresh recharge meets the groundwater.
13. a) How will you classify salinity of the irrigation water? Explain how irrigation and cultural practices can be used to manage the salinity of root zone
OR
b) What is the permeability problem in irrigation water and how can we classify it? What steps you would take to manage a high sodium water for irrigation purposes.
14. a) What is TMDL and WAC? How can we estimate the nature, type and generation of different pollution load from an agricultural catchment.
OR

- b) Explain USLE. Calculate the soil loss for a 50 ha area before and after its conversion into an agricultural field for a 120 m storm event. The following is the information about the area.

The soil erodibility value is 0.33 and the maximum length of overland flow is 210 m. The land has an average slope of 2.5% and the value of m is 0.3 up to 5 % slope. There are no erosion control practices implemented. The details of land cover and the storm event are given below.

Land cover	Before	After	C value	Storm intensity (cm/hr)	Time (min)
Fallow	26	10	0.9	0.5	0 - 30
Paddy	2	20	0.3	2.5	30 - 60
Cotton	2	15	0.5	1.6	60 - 90
Grass	20	5	0.03	1.2	90 -120

15. a) What are indices? How water quality indices can be used in managing water bodies? Explain any one water quality index known to you.

OR

- b) What is environmental impact assessment and why should we conduct it? Explain how irrigation projects affect hydrological and socio – economic environment.