

B. E / B. Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS NOV/DEC 2011
AGRICULTURAL AND IRRIGATION ENGINEERING BRANCH
SEVENTH SEMESTER – (REGULATION 2004)
AI 473 SOIL AND WATER CONSERVATION

TIME: 3 hr

Max Mark: 100

Answer ALL questions

PART – A (10 x 2 = 20 MARKS)

1. A moist sand sample has a volume of 450 cm^3 and a wet mass of 786 gm, the particle density is 2.65 gm/cm^3 and dry mass is 731 gm. Determine the void ratio and porosity.
2. What is meant by Synthetic Unit Hydrograph
3. Differentiate geologic and accelerated erosion.
4. List any five benefits of tillage operations.
5. What are the different forms of wind erosion? Define them
6. State the various effects of shelter belt on wind movement.
7. Why farm pond need to be protected against erosion and list the methods of protecting the farm pond.
8. Under what conditions failure of the embankment takes place?
9. Why reciprocating pump is called as self priming pump?
10. Differentiate aquitard and aquifuge

PART – B (5 x 16 = 80 Marks)

11. a. i The following data refer to three tri-axial tests performed on a representative undisturbed sample of a soil.

Test No	Cell Pressure (KN/m ²)	Axial load dial reading at failure (KN)	Additional Vertical Pressure (KN/m ²)	Total Vertical Pressure (KN/m ²)
1	50	66	84	134
2	150	106	134.4	284
3	250	147	186.4	436.4

The load dial calibration factor is 1.4 N/div. Each sample is 75 mm long and 37.5 mm dia. Find both by analytical and graphical means, the values of apparent cohesion and the degree of internal friction. (16)

12. a. i The following data of a rainfall is available. Determine the rainfall erosivity factor(R) for this storm. (16)

Time increments (min)	0	15	30	45	60	75	90	105	120	135	150
Mass curve ordinates (cm)	0	0.3	0.8	1.5	2.5	4.0	5.2	6.0	6.6	7.0	7.0

OR

12. b.i Differentiate between the approaches of USLE and MUSLE models for soil loss and comment on their ranges of utility (8)

b.ii Discuss in detail the various vegetative and mechanical practices adopted for soil conservation practices (8)

13 a.i Describe the permanent measures to control the wind erosion (10)

a.ii Explain the mechanics of wind erosion (6)

OR

13. b.i Explain the effects of width, shape and height of shelter belt on wind erosion control (10)

b.ii Find out the length of area protection from a wind break, with the following information

Height of wind break = 6m, Angle of deviation of prevailing wind perpendicular to the wind break = 22° , Actual wind velocity at 15 m height = 13 kmph, Threshold wind velocity at 15 m height = 15 kmph. (6)

14. a. i Describe with proper illustrations the different methods for the storage of water in the soil (8)

a.ii Discuss the stepwise method to determine the required capacity of a reservoir (8)

OR

14. b. i With the help of a suitable diagram show the installation of different components in a pond (8)

b.ii How do the design requirements of earth embankments change with different types of soil (8)

15. a. i Discuss in detail the criteria to be followed in selecting a pump for irrigation from an open well (16)

OR

15. b.i Explain the working of a jet pump and discuss the methods of operation and maintenance of it (16)