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B.E /B.Tech (FULL TIME) END SEMESTER EXAMINATION APRIL/MAY 2019
B.E AGRICULTURAL AND IRRIGATION ENGINEERING
VII SEMESTER
AI 8703 – SOIL AND WATER CONSERVATION ENGINEERING
(Regulation 2012)

Time: 3 Hours

Answer ALL Questions
(11th question is compulsory)

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. List at least four causative factors of land degradation.
2. What causes accelerated soil erosion all over the world?
3. What are the assumptions underlying Rational method of runoff computation?
4. What is meant by Antecedent moisture content? What is its application?
5. When is mechanical control resorted to as soil conservation measures?
6. What are wind breaks? Give examples.
7. What should be the catchment area to cultivated area ratio for a watershed in a semi arid region. The crop proposed is sorghum of 120 days crop period and crop water requirement is 475 mm. If design rainfall is 250 mm at 67% probability, run off co-efficient is 0.45 and effective rainfall is 0.35.
8. Suggest suitable rain water harvesting measures for the Eastern Coromantal region.
9. What are the types of sediment loads?
10. Sediment samples collected at the outlet of watershed has 5 gm/litre of coarse sediments, 6 gm/litre of medium sediments and 1.2 gm/litre of fine sediments. Estimate the total suspended load and express it in ha.m/m^3. Assume the density of sediment to be 1.3 gm/c.c

Part – B (5 x 16 = 80 marks)

11. Design a bench terrace for a land having slope of 15 percent, the soil is sandy loam. The terrace width to be as channel which is to be provided with uniform grade of 0.4%.

Data given:

i) Maximum rainfall intensity for the region during 10 year return period is 25 cm/hr for the duration equal to time of concentration.

ii) Total length of terrace to be constructed is 150 m.

iii) It is a high rainfall region hence terrace with inwardly sloping bend to be constructed.

iv) The width of bench terrace is 6 m.

v) Inward slope of bench is 5%.

vi) Side slope is 1:1

vii) Height of the shoulder bend is 30 cm bottom width 75 cm and side slope is 1:1

vii) C for sandy loam soil is 0.30 assume any other relevant information as per standard practice.

12.a) i) Write briefly on the symptoms of soil erosion..   (8 Marks)
ii) What are the classes of water and wind erosion?   (8 Marks)
(OR)

12.b) Determine the runoff from a catchment area of 100 ha for 100 years return period during which the maximum rainfall was recorded as 10 cm in 6 hour rainfall duration. The catchment area has two parts, in which one of 25 ha is under pasture. The soil of catchment is related to hydrologic group B. The initial abstraction of catchment is rated as $I_u = 0.3 S$
(16 Marks)

13.a) How would you identify various classes for land use capability   (16 Marks)
(OR)

(P.T.O)

13.b) Calculate the total energy involved by rainfall by using the E30 index and KE > 25 methods. The required information are given as under:

SI.No	Rainfall intensity (cm/hr)	Rainfall amount (cm)
1	0 – 2	3.0
2	2 – 4	2.5
3	4 – 6	4.5
4	6 – 8	3.5
5	>8	1.5

(16 Marks)

14.a) i) Distinguish agronomical and mechanical measures followed for soil conservation.   (8 Marks)

ii) Write various points which favour selection of agronomic measures.   (8 Marks)

(OR)

14.b) Explain design steps of gully control structures.

(16 Marks)

15.a) i) Distribution of sediments in reservoir.

(8 Marks)

ii) What are the factors affecting sediment distribution problem in reservoir.   (8 Marks)

(OR)

15.b) i) Classify the eroded soils based on sheet erosion and wind erosion.

(8 Marks)

ii) Write briefly on classification of eroded lands.

(8 Marks)