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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations Feb-2021

SOIL AND WATER CONSERVATION ENGINEERING

(Agricultural Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

- 1 a Determine the soil loss from the field under the following conditions. Soil erodability factor 0.2 tonnes / hectare, Topographic factor 0.2, Soil erosivity factor 800, Crop management factor 0.5, Conservation practice factor 1.0. Also find out how much percent of soil loss is reduced when the cultivation is done on the contour. Assume value of conservation practice for contouring is 0.5. 7M
- b Explain the stages in the gully development. 5M

OR

- 2 a Write about the difference between the Universal Soil Loss Equation (USLE) and Modified Universal Soil Loss Equation (MUSLE). 6M
- b Explain how the climatic factors effecting the soil erosion. 6M

UNIT-II

- 3 a Determine the design peak runoff rate for a 25 year recurrence interval from an area in clay loam containing 20 hectares of cultivated land on 1% slope, 35 hectares of pasture land on 7% slope and 30 hectares of woodland on 12% slope. The most remote point in the watershed is 3200 m away from the outlet. The maximum intensity of 1-hr. rainfall expected during the recurrence interval is 7.5 cm. 6M
- b Explain the mechanism of wind erosion. 6M

OR

- 4 a List out the various land use classes and their slopes. What type of conservation measures you recommended under for each class? 6M
- b The land of small watershed is of hydrologic group C and is under fair pasture cover. The rainfall was recorded as 8.0 cm during a given storm. Calculate the direct runoff from the watershed for average condition of soil, cover and antecedent moisture. Curve Number = 75. 6M

UNIT-III

- 5 a Calculate the storage area required and the height of contour bund in medium soil having an average slope of 2%. The maximum expected rainfall during the 10 year recurrence interval is 15 cm. The infiltration capacity of the soil of the area is about 40 percent of the rainfall absorbed in the field. The horizontal interval between bunds is 60 m. Assume the slope of seepage line to be 4:1 and side slope 1.5:1 6M
- b Explain the classification of Terraces in detail. 6M

OR

- 6 a Write about Conservation Ditching. 4M
- b Design a 150 m long bench terrace for a land having an average slope of 20%. The soil is clay loam. The terrace channel has a uniform grade of 0.5%. Maximum 1-hr intensity of rainfall expected during the 10 year recurrence interval is 10 cm/hr. 8M

UNIT-IV

- 7 a Design a parabolic shaped grassed waterway to carry a flow of 3 m³/s down a slope of 4%. An excellent stand of dub grass is to be maintained in the waterway. Manning's co-efficient = 0.04, side slopes = 2:1 8M
- b Explain the characteristics of contour lines. 4M

OR

- 8 a Explain the factors affecting sediment yield. 6M
 b Explain the design steps of grassed water ways. 6M

UNIT-V

- 9 a Calculate the capacity of a farm pond using Trapezoidal and Simpson's rule for the given area enclosed by different contours at the site as follows:

Contour value	250	251	252	253	254	255	256
Area enclosed (m ²)	220	290	340	370	480	550	620

6M

- b Explain briefly about temporary gully control structures. 6M

OR

- 10 a Explain the design of Brush wood dams. 6M
 b Explain design phases of gully control structure. 6M

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