Code No: RT31352          **R13**          SET - 1

**III B. Tech I Semester Supplementary Examinations, October/November - 2018**
## SOIL AND WATER CONSERVATION ENGINEERING
(Agricultural Engineering)

Time: 3 hours                                                          Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**
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## PART –A

| | | | |
|---|---|---|---|
| 1 | a) | What are the causes of soil erosion? Write down harmful effects of soil erosion. | [4M] |
| | b) | Write down different factors affecting wind erosion. | [3M] |
| | c) | Write down rational method of runoff estimation and its limitations. | [4M] |
| | d) | What is terracing? Give classification of bench terracing. | [4M] |
| | e) | Write short note on<br>(i) Sediment delivery ratio,(ii) Trap efficiency, and(iii) hydraulic radius of trapezoidal grassed waterway | [3M] |
| | f) | Describe different types of temporary gully control structures. | [4M] |

## PART -B

2 a) What is gully erosion? Write down different stages of gully development? [5M]

b) Determine soil loss from a watershed having following data: [6M]
Average watershed slope length = 150 m, average watershed slope = 10 %, rainfall erosivity factor = 6000 MJ-mm/ha-h-year, soil erodibility factor = 0.02 t-ha-h/ha-MJ.mm, cropping management factor = 0.2, conservation practice factor for contour farming = 0.5, slope gradient factor = 1.168, and exponent (m) = 0.53.

c) Calculate the rainfall erosivity index for the following data. [5M]

| Time since the beginning of storm (min) | 0 | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|---|
| Cumulative rainfall (mm) | 0 | 6 | 10 | 20 | 23 | 30 | 32 |

3 a) Explain the mechanics of wind erosion. [5M]

b) Describe different types of wind erosion control measures. [5M]

c) Write down the soil loss equation of wind erosion. What are the different methods to stabilize sand dunes? [6M]

4 a) Describe the agronomical measures for controlling soil erosion. [6M]

b) Describe the lad use capability classification. [5M]

c) Describe the Cook's method for computing runoff. [5M]

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5  a)  Define terrace and classify the terrace.                                                                    [5M]
   b)  Give a classification of bund and derive the formula for finding the height of        [6M]
       bund.
   c)  On a 20 % hill slope, it is proposed to construct bench terraces. If the vertical      [5M]
       interval is 2 m, calculate (i) length per hectare, (ii) earthwork, and (iii) area lost
       both for vertical cut and batter slope of 1:1. The cut should be equal to fill.

6  a)  Write down construction methods and maintenance of grassed waterway.              [5M]
   b)  Write down various measures for controlling reservoir sedimentation.                 [5M]
   c)  Design a grassed waterway of parabolic shape to carry a flow of 2.6 m$^3$/sec  down   [6M]
       a slope of 3 per cent. The waterway has a good stand of grass and a velocity of
       1.75 m/sec can be allowed. Assume the value of n in Manning's formula as 0.04.

7  a)  What are the different types of permanent gully control structures? Describes the    [6M]
       conditions where these structures are constructed?
   b)  What is drop spillway? Describe the components and their functions of a drop         [4M]
       spillway.
   c)  Define farm pond and write a short note on types of farm pond. Write down the        [6M]
       points to be considered for selection of site for a farm pond.

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