B.Tech Even Semester Examination, May, 2025

Agricultural Engineering
(6th Semester)

Course No: AE-603
(Soil and Water Conservation Engineering)

Full Marks: 50
Pass Marks: 25
Time: 2 hours

Note:
1. Attempt any five questions .
2. Begin each answer in a new page
3. Answer parts of a question at a place
4. Assume reasonable data wherever required
5. The figure in the right margin indicates full marks for the question
6. All the mathematical symbols and abbreviations have their usual meanings.

1. (a) What do you mean by USLE? State the applications and limitations of USLE. 2+2+2=6

   (b) Write short notes on:

   (i) Deep and narrow gully

   (ii) Transport limited erosion

   (iii) Sheeterosion

   (iv) U shaped gully 4

2. (a) What is bunding? Describe the type of bunds. 2+3=5

   (b) Determine the terminal velocity and kinetic energy of 2 mm and 3 mm diameter of raindrops, if atmospheric temperature and atmospheric pressure are 20°c and 101.3 kpa respectively. Drag coefficient of 3 mm and 5 mm diameter of raindrops are 0.617 and 0.659 respectively. 5

3. (a) What is terracing? Explain the component of bench terrace. 2+3=5

(b) Enlist the permanent gully control structures and describe any of them with a neat sketch. 5

4. (a) Explain the different methods for calculation of spacing of contour bunds. 5

(b) Write the advantages and disadvantages of drop spillways. 5

5. (a) Describe the process of gully development. 5

(b) Differentiate between chute spillway and drop inlet spillway 5

6. (a) Calculate the area of protection from a wind break of 250 m in length and 15 m height. The angle of deviation of the prevailing wind perpendicular to the barrier is 25^0. The actual wind velocity is 13.5 kmph at 15 m height and minimum wind velocity that is capable of moving the soil fraction is 15 kmph at 15 m height. 5

(b) Define the various mechanics of wind erosion by initiation of soil movement. 5

7. Define shelter belt and explain the design and layout of shelter belt for wind erosion control.How to shelter belt reduce the wind impact. 2+5+3=10

8. (a) Calculate the spacing and number of spurs to control a stream bank of 250 m length both side, if the length of spur is 8 m, and projected at angle of 45^0 from the top 5

(b) Describe the direct method to control the steam bank erosion. 5

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