B.Tech Odd Semester (CBCS) Exam., December—2017

AGRICULTURAL ENGINEERING

(5th Semester)

Course No. : AECC-22

(Soil and Water Conservation Engineering)

Full Marks : 50
Pass Marks : 15

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 figures in the margin indicate full marks for the questions.

1. *(a)* Differentiate between geological erosion and accelerated erosion. Discuss their role in soil formation and erosion. 3+3=6

(b) Discuss the factors that affect the raindrop erosion. 4

2. *(a)* Define the terminal velocity of raindrop and establish the relation between terminal velocity and raindrop diameter. 2+5=7

(b) How is the raindrop erosion affected by height of rainfall? 3

3. Explain the design considerations of contour bund. 10

4. Using the following rainfall data of a particular storm, calculate the 30 minutes, maximum rainfall intensity (I_{30}) and rainfall erosivity index (R) of storm by EI_{30} method : 10

Time (min) :	10	20	30	40	50	60	70	80	90	100
Rainfall (cm) :	0·87	0·10	1·23	1·28	0·41	1·69	1·0	1·38	1·31	0·64

5. Considering a typical gully, which needs to be protected by using permanent structures, enlist them and explain with a neat sketch. 10

6. *(a)* Define various mechanics of wind erosion by initiation of soil movement. 5

(b) 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°. 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

7. Define shelter belt and give the design and layout of shelter belt for wind erosion control. How does shelter belt reduce the wind impact? 2+4+4=10

8. *(a)* Calculate the spacing and number of spurs to control a stream bank of 250 m length both sides, if the length of spur is 8 m and projected at angle of 45° from the top. 4

(b) Explain various methods for controlling the stream bank erosion by—

(i) stone revetment;

(ii) brushwood edging;

(iii) masonry spur. 6

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