KERALA AGRICULTURAL UNIVERSITY

B.Tech (Agrl.Engg) 2013 Admission

IVth Semester Final Examination- June/July -2015

Cat. No: Lwre.2205

Title: Soil and water Conservation Engineering (2+1)

Marks: 50

Time: 2 hours

I. Fill up the blanks - (10 x 1=10)

1. The soil erosion in its natural condition without influence of human beings is called ----------.

2. The uniform removal of soil in thin layers from sloping land is called ----------

3. A mechanical or vegetative barrier used for protecting orchards, farmsteads, building apartments etc from blowing winds is called ----------.

4. The potential ability of rain to cause erosion is called its----------.

5. The elevation difference between a point in the watershed and the outlet is called ----------.

6. ----------class land has no limitation and can be safely used for all cultivation including intensive cultivation.

7. Contour cultivation is more effective on land with slope ranging between --------to------ %

8. ----------cross section of channels approximates that of natural channels.

9. The velocity required to initiate movement of particles in the bottom of a stream is called ----------

10. Rainfall intensity is the ratio of its --------- to time.

II. Write short notes on any FIVE questions (5 x 2=10)

1. What are sand dunes? How are they stabilized?
2. Explain the different stages of development of gullies
3. What is contour cultivation? Explain its limitation as a soil conservation method?
4. What are *Puertorican (California)* terraces?
5. Define water harvesting? List various water harvesting techniques.
6. Define land capability. What are the limitations taken into consideration for land use capability classification?
7. Briefly outline different methods to control reservoir sedimentation.

III. Write short essays on any FIVE questions (5 x 4=20)

1. Design a vegetated water way of parabolic cross-section to carry a peak runoff rate of 2.6m^3 /s. The slope of the waterway is to be maintained at 3%.The water way has a good vegetative cover and the permissible velocity may be assumes as 1.75m/s. Take Manning's coefficient as 0.03.
2. The outer bank of a river is to be protected from severe erosion and a protection method using spurs is recommended. Calculate the spacing and number of spurs needed, if the total length of bank to be protected is 300m. The length of the spur is to be limited to 8m and the spur is to be projected at angle of 45^0 from the bank.
3. Contour cultivation was adopted on a field for cultivating ginger with the following information.

Rainfall erosivity index	= 1000 metric tones/ha
Soil erodibility factor	= 0.20
Topographic factor	= 0.10
Crop management factor	= 0.50
Conservation practice factor	= 1.0

Calculate the annual soil loss from this field. Explain how the soil loss is affected by adopting better conservation methods.

4. Classify bench terraces on the basis of bench slope. With neat sketches explain each type and highlight the suitability of each type of bund.

5. What are geo-textiles? Explain the suitability of geo-textiles for soil and water conservation.

6. Describe strip cropping and explain the various types of strip cropping.

7. Make brief account of various temporary gully control structures.

IV. Answer any one of the following (1x10 = 10 marks)

1. Contour bunds are to be constructed on a land with general slope of 5%. Rainfall excess for the area for 24-h duration is 80cm. The horizontal interval for the bunds was designed to be 15m. Calculate the height, cross sectional area, total length and earth work of contour bund per hectare. Make neat scale drawing of section designed.

2. What is Land use capability classification? Explain land capability sub classes. Explain the characteristics of each class of land.