

NATIONAL UNIVERSITY OF LESOTHO - FACULTY OF AGRICULTURE

DEPARTMENT OF SOIL SCIENCE & RESOURCE CONSERVATION

SSR 328/311 - SOIL AND WATER CONSERVATION

Final Examination paper

May, 2019

Total Marks: 100

3hours

Instructions:

All questions carry equal marks (20 marks)

Choose five (5) questions only.

Question 1. (20 marks)

- a) Describe the three main processes of water erosion (12)
- b) How do the following factors influence water erosion?
 - a) Topography (4)
 - b) Vegetation cover (4)

Question 2. (20 marks)

- a) List any three (3) on-site problems and three (3) off-site problems caused by water erosion (6)
- b) Discuss the three types of erosion by water (6)
- c) Using the USLE equation, estimate the soil loss from a maize field (at low yield) in the lowlands of Lesotho. No conservation measures practiced. Soil is Matela series
 $R = 200$, $LS = 3.3$, $P = 1$, $K = 0.25$, $C = 0.64$ (4)
- d) What will be the soil loss of the same field if the cropping system changed to continuous planting of wheat at low yield? $C = 0.24$ (4)

Question 3. (20 marks)

Briefly discuss the merits of the conservation tillage system over conventional tillage system.

Question 4 (20 marks)

- a) What are the main functions of terraces? (4)
- b) Distinguish between a flat channel terrace and a bench terrace (4)
- c) Calculate the maximum spacing of terraces (HI) in a field with an average slope of 2%. (Assume $X=0.2$ and $Y=0.3$) (6)
- d) What are the three (3) main functions of diversion furrows (6)

Question 5. (20 marks)

- a) What are marginal areas? (4)
- b) Briefly explain any four (4) causes of land degradation in rangelands. (12)
- c) What are the four (4) functions of check dams towards erosion control? (4)

Question 6 (20 marks)

- a) Briefly explain the three (3) main causes of saline soils and three (3) main causes of sodic soils (12)
- b) With the aid of a diagram explain briefly the influence of sodium on soil structure and the role it plays in soil erosion (8)

Question 7 (20 marks)

- a) Describe the three (3) modes of particle transport during wind erosion (9)
- b) List any four (4) types of damage caused by wind erosion (8)
- c) What are the three (3) advantages of using windbreaks to control wind erosion (3)