

KATHMANDU UNIVERSITY
End Semester Examination
February/March, 2019

Marks Scored:

Level : B.Sc.
Year : III

Course : ENVS 338
Semester: I

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date 03 MAR 2019

SECTION "A"
[20 Q. × 0.5 = 10 marks]

Encircle the most appropriate answer.

1. Engineering function of plant is.....
a. slip b. roll c. loose d. support
2. Covering water sensitive slope to avoid liquefaction is called
a. catch b. armour function c. anchor function d. drain function
3. The process of water is taken into the plant through the roots and returned to the atmosphere by the process of transpiration through the leaves is called.....
a. evaporation b. infiltration c. leaf drip d. water uptake
4. There is a cope of bioengineering in.....
a. reservoirs and dams b. control of runoff in small catchments
c. water course and shoreline protection d. slope stabilization
5. One of the justifications of the use of Bioengineering is by
a. erosion control b. interviews with local people
c. noise reduction d. vegetation barriers
6. Origins of Secondary slope is.....
a. tectonic (fault scarps) b. erosion and modification
c. depositional d. human activity
7. are geological phenomena in which water-laden masses of soil and fragmented rock rush down mountainsides
a. Gully Erosion b. Debris Flow c. Slope failure d. Flood
8. The ends of the check dam should be keyed right into the gully sides and should be raised at least 250 mm to form a central spillway or notch, this ensures that water coming over the dam will then run down the middle and not the ends.
a. erode b. flood c. scour d. litter
9. If you plants around the toe wall,
a. structure protects plant b. plant protects structure
c. plant replaces structure d. plant improves performance of structure
10. Highway slope site drought factor Class III reveals the site is
a. cool, moist sites b. moderately dry sites
c. warm, dry sites d. very hot and dry sites

11. Factors to be considered for the selection of plant species for bioengineering must be local species, easy on establishment and.....
 - a. climbers
 - b. annual
 - c. persistence
 - d. taprooted
12. Factors governing distribution of vegetation are altitude, aspect, rainfall, geology and
 - a. seed
 - b. water
 - c. soils
 - d. settlement
13. By observation and comparison of sites in the field we find out the
 - a. environmentally advantageous
 - b. socially advantageous
 - c. reducing instability and erosion
 - d. increasing the slope's factor of safety
14. Ridges shield the lower land behind them formed the
 - a. shade from the sun
 - b. rain shadow effect
 - c. exposure to the sun
 - d. higher site temperature
15. Life span of wattle fence is.....
 - a. one season
 - b. two season
 - c. five years
 - d. twenty years
16. Stone pitching is done in
 - a. smooth plane slops
 - b. gully base
 - c. toe of slop
 - d. mid slop
17. can be positioned in rocky soil of mid slop up to 50° .
 - a. prop wall
 - b. check dam
 - c. bolster
 - d. rendering
18. is a roll of material made from coconut fiber used to form a toe protection structure on a slope and to trap any sediment derived from erosion
 - a. Fibers chine
 - b. Brush mattress
 - c. Brush layering
 - d. Fascine
19. For the slope should have an inclination of at least of 10–20%
 - a. live crib wall
 - b. brush layering
 - c. live fascines
 - d. palisade
20. also referred to as mass wasting, is the down slope movement of rock debris and soil in response to gravitational stresses.
 - a. Falls
 - b. Slope failure
 - c. Slides
 - d. Flows

SECTION "B"

[20 Q. \times 0.5 = 10 marks]

Fill in the blanks.

21. Bioengineering is use of living plants either alone or in combination with small scale civil engineering structures or non living plant material for the purpose of reducing the instability and controlling erosion on slope.
22. Loose earthy material has the tendency of rolling down the slope because of as well as erosion.

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23. Pool formation occurs in surface as the water running over the ground surface trapped byand prevent run-off.
24. Advantages ofare, it protects slopes against erosion, reduces the instance of shallow seated instability , improves surface drainage and reduces slumping.
25. Geomorphology is the scientific study of the origin and evolution of topographic and features created by physical or chemical processes operating at or near the earth's surface.
26. Factors Influencing slope morphology are geology, climate andactivity.
27. Slope stability is based on the interplay between two types of forces; forces and resisting forces.
28. While protecting gully if using concrete-bound masonry, include to drain water from behind the check dam and reduce hydrostatic pressure.
29. Check dam should be constructed by using the best-drained and most cost-effective materials such as dry stone masonry or then concrete-bound mortar.
30. Dominant plants such as utis must be replaced or thinned out within years to avoid overshadow the under storey plants.
31. Small spiny shrubs are found in the and Dolpa areas.
32. Rain-bearing winds are found on many higher ridges in the and middle mountain areas, such as along roads from Sindhuwa to Basantapur, Mude to Charikot and Sahajpur to Dadeldhura, and the Shivapuri Lekh above.
33. Wire netting is applicable onrock slop.
34. Debris slop of $>50^{\circ}$ needs wall, which may have life span of +25 years.
35. French drain is also called gravel drain.
36. Roots bind soil particles to the ground surface and reduce their to erosion.
37. Bioengineering is often used in combination with structural techniques, either tostructures or as a complementary approach to increase the overall impact of the measures.
38. High can reduce by appropriate techniques such as palisades, grassed water ways, brush layering, bamboo fencing, wattle fencing, and similar measures.
39. Bamboo can be used to prevent soil creep or surface erosion on a slope , to hinder gully extension, particularly in seasonal water channels, and to control flood waves along a river bank.
40. A is a layer of interlaced live branches placed on a bank face or slope, often with a live fascine and/or rock at the base.



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SECTION "C"

(Long answer questions)
[3Q × 7 = 21 marks]

Answer *ANY THREE* questions.

1. Define bioengineering. Introduce different bioengineering techniques. [1+6]
2. How vegetation achieve hydrological functions and engineering factions? Give note on advantages of bioengineering. [5+2]
3. What do you understand by site moisture? Justify with a table how these are important and recognizable. [1+6]
4. What are the guidelines for selection of optimal techniques? Give an account of functions, applications, life span and limitations of support structures. [4+3]

SECTION "D"

[34 marks]

5. Write short notes on the followings (*ANY THREE*) [3 × 3 = 9]
 - a. Slope Attitudes
 - b. Bamboo Plantation
 - c. Selection of Plant Species for Bioengineering
 - d. Criteria for the Use of Bioengineering
6. Justify the followings (*ANY FOUR*) [4 × 4 = 16]
 - a. Bioengineering minimize the effects of flash flood risk
 - b. There are problems on slopes
 - c. Water is the main cause of slope instability
 - d. Management of plant communities are important for successful bioengineering solution
 - e. Grass seeding is done mostly with mulching or jute netting.
7. Differentiate the followings (*ANY THREE*) [3 × 3 = 9]
 - a. Debris Flow and Slope Failure
 - b. Plants and Civil Engineering Structure
 - c. Palisades and Fascines
 - d. Horizontal Line Grass Planting and Diagonal Line Grass Planting

