KATHMANDU UNIVERSITY
End Semester Examination
18, January 2024

Marks Scored:

Level : B.Tech.
Year : IV

Course : ESEE 432
Semester : I

Exam Roll No. :

Time: 30 mins.

F. M. : 10

Registration No.:

Date :

SECTION "A"
[20Q. × 0.5 = 10 marks]

Choose and encircle the most appropriate answers from the given choices

1. Which of the following is **NOT** the category of Bioengineering?
   a. Vegetative Planting
   b. Assimilation
   c. True bio-engineering
   d. Bio-technical engineering

2. Nitrate as plant helps in the growth of .....
   a. root
   b. leaves
   c. cell wall
   d. saplings

3. The moisture content remaining when a soil has drained freely under gravity is called .....
   a. field capacity
   b. droughtiness
   c. permanent wilting
   d. soil moisture deficit

4. Which of the following is **NOT** the process of vegetative propagation?
   a. Seeding
   b. Polypot seeding (replanting)
   c. Cutting and Layering
   d. Plant competition

5. ..... grass plantation is recommended to reduce the speed of runoff and catch debris.
   a. Horizontal
   b. Vertical
   c. Diagonal
   d. Random

6. .....engineering function is achieved by using turf.
   a. Armour
   b. Catch
   c. Cover
   d. Reinforce

7. Erosivity is the function of .....
   a. Armour
   b. Runoff
   c. Air pressure
   d. Rainfall intensity

8. ..... is a wooden fence or wall of variable height, usually made from wood cuttings or bamboo installed across a slope in order to trap debris moving down the slope.
   a. Toe wall
   b. Riprap
   c. Geo-textile
   d. Palisades

9. Among the direction, the slope facing ..... is cool and damp.
   a. East
   b. West
   c. North
   d. South

10. Which of the following authority of Nepal is responsible for implementation of Bio engineering works in national highways?
   a. Department of Environment
   b. Department of Forest
   c. Department of Road
   d. Disaster Management Unit

11. Which of the following is **NOT** a proper method for Nursery operation?
    a. The production of the seedling in polythene pots is polypots.
    b. Cloches are the tunnel made with truss supported steel roof plates.
    c. Propagation of bamboos are done from single node culm cuttings.
    d. The main method of propagating grass in Nursery is slip cutting.

12. The slope orientation relative to the sun is…
    a. Slope length b. Slope angle c. Slope ratio d. Slope aspect

13. The wall constructed to protect the base of the slope is ……
    a. Toe wall b. Breast wall c. Gravity wall d. Crib wall

14. Which of the following example is the reinforce function of bioengineering?
    a. Soil nailing b. Turfing
    c. Concrete jacketing d. Cribs walls

15. The process of reproduction or multiplication of plants from variety of sources is…..
    a. Harvesting b. Propagation
    c. Watering Crib walls d. Conceal

16. A land which contributes runoff to a common point is called……
    a. Water management b. Watershed
    c. Water reservoir d. Waste land

17. The factory to produce and supply plants for bioengineering program is….
    a. Tunnel b. Cold store c. Nursery d. Cottage industry

18. Main Central Thrust is the boundary between
    a. Higher and Lesser Himalaya b. Lesser and sub Himalaya
    c. Higher and sub Himalaya d. Sub Himalaya and Gangetic plain

19. Which is **NOT** the mountain in between Main Frontal Thrust in the south and Main Boundary Thrust in the North?
    a. Churia Hills b. Mahabharat Hills c. Siwalik Hill d. Sub Himalayans

20. Gully erosion is …..
    a. Numerous small channels of the order of tens of millimeters in depth are formed.
    b. Removal of fines along underground channel
    c. Rotational movement of the materials occurs forming spoon shaped scar.
    d. Water accumulates in narrow channels and removes soil up to considerable depth.

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SECTION "B"
[8Q × 5 = 40 marks]

Attempt *ALL* questions.

1. Define bio-Engineering. Briefly explain about the different engineering and hydrological functions of bio-Engineering.

2. Explain about the mass movement and its classification indicating factor contributing to increase in shear stress.

OR

Fill in the blank boxes given below:

S.N	Structures	Functions	Applications	Advantages	limitations
1	Turfing				
2	Brush Layering				
3	Vertical line of grass plantation				

3. Define nursery. What are the main components of nursery? Explain about the factors to be considered to select the nursery site.

4. Explain about the causes and mechanisms of slope failure during highway construction in Nepal.

5. List out the basic sixteen steps of landslide mapping technique that are used in Nepal.

OR

Write short notes on *ANY TWO* [2Q. × 2.5 = 5 marks]

a. Relative strength of structures over time
b. Mass movements and its classification
c. Palisades and mulching

6. Fill in the blank boxes given below:

S.N	Structures	Functions	Applications	Advantages	limitations
1	Stone pitching				
2	Check dams				
3	Gravity walls				

7. What are the different factors that govern the distribution of vegetation in Nepal?

8. Calculate the amount of increased shear strength of a bioengineered site by perpendicular root area method which composes of the angle of internal friction of 28^0 (28 degrees). The roots were observed in a cross section area of 4.5 sq.m. The detail of the roots are as follows

Diameter of roots (mm)	No. of roots	Tensile strength of root fiber (MPa)	Average angle of shear distortion in shear zone (^{0}) or (degree)
120	13	45	9
140	21	52	11
90	28	48	18
110	27	34	26