KATHMANDU UNIVERSITY
End Semester Examination
June/July, 2023

Marks Scored:

Level : B.Sc.
Year : II
Course : ENVS 209
Semester : I
Exam Roll No. :
Time: 30 mins.
F. M. : 20
Registration No.:
Date : 04 JUL 2023

SECTION "A"

Encircle the most appropriate alternative from each set of choices. [20Q. × 0.5 = 10 marks]

1. The manifestation of the physical forces of cohesion and adhesion acting within the soil at various moisture contents is called _____.
   a. Soil plasticity b. Soil consistency c. Soil elasticity d. Both a & b

2. Which of the following erosion is the removal of soil by running water with the formation of an areas of small branching channels? It can be removed by normal tillage operation?
   a. Sheet erosion b. Rill erosion c. Gully erosion d. Suspension

3. Soil structural units having horizontal axis much longer than vertical axis known as____.
   a. Prismatic b. Blocky c. Platy d. Columnar

4. Symbiotic association of fungal hyphae with plant roots is known as _____.
   a. Mycorrhiza b. Mutual infection c. Lichen d. Co-parasitism

5. Which one of the following is **NOT** a soil forming factor?
   a. Climate b. Organisms c. Relief d. Moisture

6. The available water present in soil for better plant growth in between _____.
   a. field capacity and wilting percentage
   b. witting percentage and hygroscopic coefficient
   c. field capacity and air-dry soil
   d. both b & c

7. The percentage of soil water held with water potential – 15 bars is called as _____.
   a. Hygroscopic coefficient b. Wilting point
   c. Field capacity d. Both a & b

8. Soils are natural bodies composed of _____plus roots, animals, rocks, artefacts and so forth.
   a. matrix b. soil c. pedon d. regolith

9. Hydration, hydrolysis, dissolution, acid reaction, oxidation-reduction, completion and integrated weathering are the process of _____weathering of soil.
   a. chemical b. biogeochemical c. biological d. physic

10. _____provides a hierarchical grouping of soil natural bodies.
    a. Pedon and polypedon b. Horizon
    c. Soil taxonomy d. Soil temperature regime

11. _____ with the characteristics of aridic moisture regime and some B Horizon development or salic horizon is Ardisols.
a. Andisole b. Vertisole d. Histosols d. Oxisols

12. Soil texture is basic property of soil since it is_____.
a. not changeable radially b. nutrient rich
c. discover by US department d. stable pyramidal in shape

13. Which fertilizer produce acidity in soil?
a. Ammonium sulphate b. Sodium nitrate
c. Calcium ammonium nitrate d. Calcium nitrate

14. Soil colloidal particle shows _____the phenomena.
a. Plasticity b. Adhesion and cohesion
c. Flocculation d. All of these mentioned

15. Hydrogen bond found in which _____clay mineral.
a. Kaolinite b. Beidelite c. Vermiculite d. Mon tmorillonite

16. _____ involve in conversion from nitrite to nitrate.
a. Nitrosomonas b. Nitrobactor c. Pseudomonas d. Bacillus

17. Rhizobium is an _____ organism.
a. Heterotrophs anaerobic b. Heterotrophs aerobic
c. Autotrophs anaerobic d. Autotrophs aerobic

18. Ammonia volatilization is purely process of _____.
a. Physical b. Chemical c. Biological d. None of these

19. Feldspars is primary mineral that occurs pre-dominantly in _____.
a. Igneous rock b. Sedimentary rock
c. Metamorphic rocks d. All of these mentioned

20. _____ soil occur mainly a soil crust problem.
a. Sandy soil b. Silty clay loam c. Loamy soil d. Clayey soil

Fill in the blanks. **[20Q. × 0.5 = 10 marks]**

21. Organic matter addition into the soil _____ the bulk density of soil.

22. _____soil textural class has clay content more than 45%.

23. Red soil is _____ out of 12 soil orders.

24. Muck _____type is the most fertile soil.

25. Nitrogen is cycled in the soil through _____.

26. In the _____ basis composition of soil 45 % is mineral matter and 50 % are water or air.

27. In Munsell colour chart hue 10 represents as _____.

28. _____ is made up of A+B horizon.

29. As early as 5000BC, the Vedas and Upanishad as well as other ancient literature mentioned soil as synonymous with _____ (the mother) supporting and nourishing all life on earth.

30. The _____ and oxygen contents of soil air are almost same as that of atmospheric air but concentration of carbon dioxide is much higher.

31. Grain size of soil refers to the _____of the soil particles making up the soil mass.

32. Soil _____ are glued together with soil organic matter, plant root exudates, and microorganisms like fungi.

33. Soil conditioners are products that are applied to control water _____ and improve soil properties.

34. _____ water held in the micro pore of the soil because of surface tension, cohesion and adhesion.

35. The higher the soil CEC the greater ability it has to store plant _____.

36. The roots of higher plants are able to enter into complex relationship with soil bacteria and undergo _____ changes.

37. Colloid (H^+A^{3+}) + $2CaCo^3$ + H_2O ---> _____+ Al $(OH)_3$ + $2CO_2$

38. Humus is amorphous, dark brown to black nearly insoluble in water, but mostly soluble in dilute _____solution.

39. In _____most soils are naturally acidic.

40. A healthy soil ecosystem holds 40% bacteria, Actenomycetes , 40% _____, 12% earthworm 5% micro fauna and 3%mesofauna.

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SECTION "B"

[3Q. × 7 = 21 marks]

Attempt *ANY THREE* questions.

1. What is soil colloid? Explain the general properties and types of soil colloid. Draw a simplified representation of a silicate clay crystal in a soil solution. [1+4+3]

2. Introduce the different types of soil organism with their examples. Give notes on the influence of soil organism on soil fertility, productivity and environmental quality. [3+4]

3. Differentiate between solum and saprolite. Explain the soil profile is comprised of two or more soil layers. Show a contrast horizon seen in well drain and poorly drain soil. [2+3+2]

4. What is an acidic soil? Show change in lawn along with pH level. Explain the nine possible impact of soil acidification. [1+2+4]

SECTION "C"

5. Write short notes on (*ANY FOUR*): [4Q. × 2.5 = 10 marks]
   a. Conservation tillage
   b. Liming
   c. Rhizosphere
   d. Andisol
   e. Nitrogen deficiencies

6. Differentiate between (*ANY FOUR*): [4Q. × 3 = 12 marks]
   a. Soil texture and soil taxonomy
   b. Infiltration and percolation
   c. H^+ and OH^- ions in soil solution
   d. Earthworm and nematodes
   e. Pedology and edaphology

7. Justify the statement (*ANY THREE*). [3Q. × 4 = 12 marks]
   a. Polypedon of sufficient size is a landscape component term as soil individual.
   b. Gardener' friends not always so friendly.
   c. Atlas of the Munsell Color System consist several hundred colour chips code.
   d. Gravity do not drain all the water from the soil.