KATHMANDU UNIVERSITY
End Semester Examination [C]
May/June, 2019

Marks Scored:

Level : B.E.
Year : III

Course : CIEG 303
Semester: I

Exam Roll No.:

Time: 30 mins.

F.M. : 10

Registration No.:

Date : 05 JUN 2019

SECTION "A"
[20 Q. × 0.5 =10 marks]

Encircle the most of appropriate answer.

1. When drainage is not permitted under initially applied normal stress only and full primary consolidation is allowed to take place, the test is known as_____.
   a. drained test
   b. quick test
   c. consolidated undrained test
   d. rapid test

2. When the products of rock weathering are transported by river and deposited downstream, the soil is termed as _____.
   a. alluvial soil
   b. colluvial soil
   c. aeolian soil
   d. residual soil

3. The coefficient of curvature of a poorly-graded soil should be _____.
   a. less than 1
   b. more than 4
   c. in between 1 and 3
   d. in between 0 and 0.5

4. The minimum water content at which the soil just begins to crumble when rolled into threads of 3 mm in diameter, is known at the state of _____.
   a. permeability limit
   b. shrinkage limit
   c. liquid limit
   d. plastic limit

5. Low plasticity limit has the value of _____.
   a. < 50%
   b. 50% - 60%
   c. 60% - 70%
   d. > 70%

6. A soil sample contains void ratio 0.8 and specific gravity of 2.75. The water content required to fully saturate at this void ratio will be _____.
   a. 43%
   b. 30%
   c. 39%
   d. 62%

7. Degree of saturation of a natural soil deposit having water content 15%, specific gravity 2.50 and void ratio 0.5, is_____.
   a. 60%
   b. 58%
   c. 80%
   d. 75%

8. The normal stress is _____.
   a. an abstract quantity
   b. equal to total stress
   c. principal stress
   d. actual contact stress

9. The inclination of the failure plane behind the vertical retaining wall in p state is inclined to the horizontal at an angle of _____.
   a. $45°+\phi'/2$
   b. $45°-\phi'/2$
   c. $45°+\phi'$
   d. $45°-\phi'$

10. When drainage is allowed in a tri-axial test, the test is termed as _____.
   a. rapid test
   b. undrained test
   c. drained test
   d. consolidation undrained test

11. The active earth pressure caused by a cohesionless backfill on a smooth vertical retaining wall may be reduced by _____.
a. compacting the backfill
b. providing a surcharge load on the backfill
c. saturating the backfill with water
d. providing a surcharge load and saturating the backfill with water

12. Slurry pile wall _____.
a. cast-in-place concrete walls built using bentonite slurry
b. vertical wide flange steel members with horizontal timber lagging
c. cylinder or box filled with rocks, concrete
d. precast concrete members linked together to form a crib

13. The stability of a slope is increased by _____.
a. decreasing pore water pressure installing proper drainage paths
b. shock caused by an earthquake
c. increasing pore water pressure in the soil
d. cutting of the toe

14. In the stability of retaining wall, overturning is _____.
a. ratio of restoring moment to overturning moment
b. ratio of overturning moment to restoring moment
c. sum of restoring moment and overturning moment
d. five times the restoring moment

15. The coefficient of active earth pressure is_____.
a. $1-\tan\phi'/1+\tan\phi'$ b. $1+\sin\phi'/1-\sin\phi'$ c. $1-\sin\phi'/1+\sin\phi'$ d. $1+\tan\phi'/1-\tan\phi'$

16. The term 'intact rock' refers to _____.
a. the rock material within the framework of discontinuities
b. in-situ rock with no discontinuities
c. in-situ rock together with its discontinuities and weathering profile
d. discontinuities together with different types of rocks

17. The RQD value in a tunnel alignment is determined to be 75-90% which indicates the rock mass quality as _____.
a. very good quality b. fair c. excellent d. good

18. Kinematic analysis is assessed with the help of _____.
a. Schmidt Stereo Net b. Rose Diagram
c. Wulff Stereo Net d. Bar Diagram

19. Plane failure can be occurred if _____.
a. planar feature dip opposite to hill/cut slope with hill/cut slope at least 55°
b. intersections of any two or more discontinuities
c. joints, beddings or foliation is at same direction with the direction of slope (± 20°) and daylight the slope face
d. wedge with close slope direction (up to 32°)

20. The equal-angle projection _____
a. preserves the angular relationships
b. preserves the area
c. represents with the help of rose diagram
d. represents the data in Schimdt stereo net

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F.M. : 40

SECTION "B"

Attempt *ALL* questions.

1. If a soil consists of sand and fines, would drying the soil in the oven and then sieving it through a standard stack of sieves give accurate results on the fines content? Justify your answer. A soil specimen consists 30% of water content and a wet unit weight of 18 kN/m^3. If the specific gravity of solids is 2.75, determine the dry unit weight, void ratio and the degree of saturation. Assume unit weight of water is 10 kN/m^3. [5]

2. Define equipotential line and flow line. Describe with illustration to explain the different methods used to construct the flow net. Give reasons to plot flow net in engineering field. [5]

3. Discuss Mohr Coulomb failure criteria with suitable example. The effective stress shear strength parameters of a soil are: $c' = 30$ kPa and $\phi' = 32°$. Determine the shearing resistance on a plane within a submerged soil mass where the total normal stress is 385 kPa and the pore water pressure is 200 kPa. [5]

4. Discuss the secondary compression soil parameters and settlement rates in detail with suitable diagram. [5]

5. Describe the classification of earth retaining structure. Enumerate the pressure distribution against retaining wall for cohesive soil with suitable diagram. [5]

6. A retaining wall 6 m high, with a smooth vertical back is pushed against a soil mass having $c' = 40$ kPa and $\phi' = 15°$; $\gamma = 19$ kN/m^3. What is the total Rankine passive pressure, if the horizontal soil surface carries a uniform load of 50 kN/m^2? [5]

7. A sheet pile wall is driven to a depth of 6 m into a permeable sand layer (k=6.10^{-3} mm/s) of 13.5 m thickness lying on an impermeable layer. The water on one side of the wall is at a height of 4.5 m, while on the other side, pumps maintain the water level at ground level. To design the pumping system, draw, by hand, the flow net and estimate the flow under the wall in m^3/day. [5]

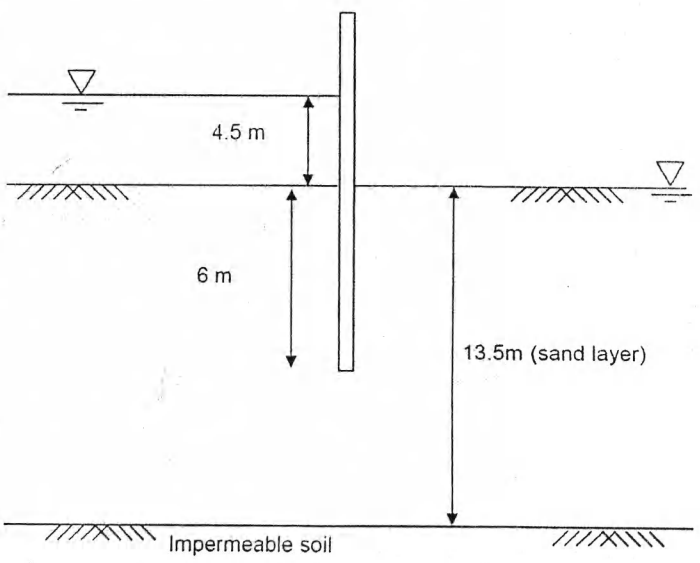

Figure 1

8. Elaborate significance of folds and faults in engineering project in detail with suitable examples. [5]