QUESTION BANK

DEPARTMENT: CIVIL **SEMESTER: V**

SUBJECT CODE / Name: 19CEB301 / SOIL MECHANICS

Unit 5 – SLOPE STABILITY

PART – A (2 marks)

1. Differentiate finite slope and infinite slope.
2. Write down the expression for factor of safety of an infinite slope in case of cohesion less soil.
3. List out any two slope protection methods.
4. Illustrate the types of failure in infinite slopes
5. Define critical surface of failure.
6. What are different factors of safety used in the stability of slopes?
7. What is a stability number? What are the uses of stability charts?
8. State the two basic types of failure occurring in finite slopes.
9. What is a slide?
10. What are the different types of Slope failure?
11. State some of the Slope protection measures.
12. Mention the types of slopes in soil.
13. Define stability number.
14. What are the types of slopes?
15. What are the types and causes for slope failure?
16. What are the various methods of analysis of finite slopes?
17. Define factor of safety and critical depth.
18. Define stability number.
19. How does tension crack influence stability analysis?
20. What are the various slope protection measures?

PART – B (16 marks)

1. Explain the procedure to calculate the factor of safety of a finite slope possessing both cohesion and friction (c - Φ) by method of slices.

2. A slope is to be constructed in a soil for which c = 0 and $\Phi = 36°$. It is to be assumed that the water level may occasionally reach the surface of a slope with seepage taking place parallel to the slope. Determine the maximum slope angle for a factor of safety 1.5,assuming a potential failure surface parallel to the slope. What would be the factor of safety of the slope, constructed at this angle, if the water table should be below the surface? The saturated unit weight of the soil is 19 kN/m^3.

3. A new canal is excavated to a depth of 5 m below ground level through a soil having the following characteristics: C = 14 kN/m^2; $\Phi = 15°$; e = 0.8 and G = 2.70. The slope of banks is 1 in 1. Calculate the factor of safety with respect to cohesion when the canal runs full. If it is suddenly and completely emptied, what will be the factor of safety?

4. Write down the procedure for determining the factor of safety of a given slope by friction circle method.

5. A canal is to be excavated to a depth of 6m below ground level through a soil having the following characteristics c = 15 kN/m^2, $\Phi = 20°$, e = 0.9 and G = 2.67. The slope of the banks is 1 in 1. Determine the factor of safety with respect to cohesion when the canal runs full. What will be the factor of safety if the canal is rapidly emptied completely?

6. Explain with neat sketches the Bishop's method of stability analysis.
7. What are different types of slope failures? Discuss the various methods for improving the stability of slopes.

8. An embankment 10 m high is inclined at 35° to the horizontal. A stability analysis by the method of slices gave the following forces: $\Sigma N = 900kN$, $\Sigma T = 420kN$, $\Sigma U = 200kN$. If the length of the failure arc is 23.0 m, predict the factor of safety. The soil has c = 20kN /m2 and $\Phi = 15°$.

9. Explain the Swedish slip circle method in detail.
10. Explain Taylor's stability number and its applicability.

11. Explain in detail the friction circle method of stability analysis for slopes with sketch.
12. Explain any one method of slope protection against failure.
13. A cut 9 m deep is to be made in clay with a unit weight of 18 kN/m^3 and cohesion of 27 kN/m^2. A hard stratum exists at a depth of 18 m below the ground surface. Determine from Taylor's charts if a 30^0 slope is safe. If a factor of safety of 1.50 is desired, what is a safe angle of slope?
14. Explain method of slices of stability analysis
15. Explain Bishop Method of Stability Analysis in detail with neat sketches