PRESIDENCY UNIVERSITY
BENGALURU
School of Engineering
Mid - Term Examinations - November 2024

Semester: V

Course Code: CIV3027_v02

Course Name: Foundation Engineering

Program: B-Tech

Date: 07-11-2024

Time: 11.45am to 01.15pm

Max Marks: 50

Weightage: 25%

_____

Instructions:
  (i) Read all questions carefully and answer accordingly.
  (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.   **5Qx2M=10M**

1	Explain finite and infinite slopes with a neat sketch.	**2 Marks**	**L1**	**CO1**
2	List the various factors of safety for slope stability with formulas.	**2 Marks**	**L1**	**CO1**
3	List any four assumptions made in Rankine's theory.	**2 Marks**	**L1**	**CO2**
4	Explain Isobars with a neat sketch.	**2 Marks**	**L1**	**CO2**
5	Active and Passive earth pressure are the pressures which are exerted on the retaining wall. Amongst them, which exerts more pressure and justify your answer.	**2 Marks**	**L2**	**CO2**

Part B

Answer ALL Questions. Each question carries 10 marks.   **4QX10M=40M**

6	**6a**	Explain the various types of slope failure with a neat sketch	**6 Marks**	**L2**	**CO1**
	6b	A 4-meter-deep canal has side slopes of 1:1. The properties of soil are c=20 kN/m², $\varphi=10^0$, e=0.8 and G=2.8. If Taylor's stability number is 0.108, Compute the factor of safety with respect to cohesion, when canal runs full. Also determine the factor of safety with respect to cohesion, for sudden drawdown condition with Taylor's stability number 0.137.	**4 Marks**	**L3**	**CO1**

7	7a	Explain friction circle method of analysis of slopes.	**7 Marks**	**L2**	**CO1**
	7b	Compute the factor of safety with respect to cohesion, of a clay stratum laid at 1 in 2 slope to a height of 10 m, if the angle of internal friction $\varphi = 10^0$; $c = 25$ kN/m^2, Taylor's Stability number $Sn = 0.064$ and $\gamma = 19$ kN/m^3. What will be the critical height of the slope in the soil?	**3 Marks**	**L3**	**CO1**
8	8a	Explain Swedish circle method of analysis of slope ($\varphi_u = 0$ analysis) with a neat sketch	**6 Marks**	**L2**	**CO1**
	8b	Compute the factor of safety with respect to cohesion for a submerged embankment, 25 m high and having a slope of 40^0. ($c = 40$ kN/m^2, $\varphi = 10°$, $\gamma_{sat} = 18$ kN/m^3 and Taylor's stability number $Sn = 0.097$).	**4 Marks**	**L3**	**CO1**

Or

9	9a	Explain Swedish circle method of analysis (c-φ analysis) with a neat sketch	**8 Marks**	**L2**	**CO1**
	9b	The soil has the following properties: cohesion (c) = 26.7 kN/m^2, mobilized cohesion = 17.8 kN/m^2, angle of friction (φ) = 15^0, mobilized angle of friction (φ_m) = 12^0, the average inter granular pressure is 102.5 kN/m^2. Compute the Factor of safety with respect to strength, cohesion and friction.	**2 Marks**	**L3**	**CO1**
10		Explain Newmark's Influence chart with a neat sketch.	**10 Marks**	**L2**	**CO2**

Or

11	11a	Three parallel strip footings 3 m wide each and 5 m apart center to center transmit contact pressures of 200, 150 and 100 kN/m2 respectively. Compute the vertical stress due to the combined loads beneath the centers of each footing at a depth of 3 m below the base. Assume the footings are placed at a depth of 2 m below the ground surface. Use Boussinesq's method for line loads.	**6 Marks**	**L3**	**CO2**
	11b	List any four types of loads applied on soil.	**4 Marks**	**L1**	**CO2**
12		Develop the expression for Rankine's earth pressure theory for cohesion less soil for active case.	**10 Marks**	**L3**	**CO2**

Or

13		Explain various types of earth pressures with a neat sketch.	**10 Marks**	**L2**	**CO2**