CBCS SCHEME

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BCV613C

Sixth Semester B.E./B.Tech. Degree Examination, June/July 2025
Applied Geotechnical Engineering

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is subsoil exploration? Mention its objectives.	6	L1	CO1
	b.	Briefly explain the stages of site investigation.	6	L2	CO1
	c.	Explain the wash boring techniques with a neat sketch.	8	L2	CO1
		OR			
Q.2	a.	What is Bore log? Briefly explain with a typical sample.	6	L2	CO1
	b.	With a neat sketch, explain split spoon samplers.	6	L2	CO1
	c.	Determine the area ratio of the sampling tube of having 51 MM external diameter and internal diameter of 48 mm.	8	L3	CO1
		Module – 2			
Q.3	a.	What is dewatering? Mention its objectives.	6	L1	CO2
	b.	What is flow net? Mention the properties of flownets.	6	L2	CO2
	c.	Define phreatic lines, equipotential lines, flow lines and Hvorslev's depth estimation of GWT.	8	L3	CO2
		OR			
Q.4	a.	Establish the location of ground water in a clayey strata, water in a bore hole was bailed out to a depth of 1067 cm below ground surface and rise in water level was recorded at 24 hours intervals as follows: $h_1 = 64$ cm, $h_2 = 57.20$ cm, $h_3 = 51.8$ cm	10	L3	CO2
	b.	In a site investigation to be determined the depth of ground water table, the water in a bore hole was bailed out to a depth of 8 mt below ground level and recorded rise in water table in the bore hole are as follows: $h_1 = 50$ cm in the first 24 hours $h_2 = 30$ cm in the second 24 hours $h_3 = 20$ cm in the third 24 hours using Hvorslev's method compute the depth of ground water table.	10	L3	CO2
		Module – 3			
Q.5	a.	Define active earth pressure with neat sketch.	6	L2	CO3
	b.	Mention the assumptions and limitations of Rankines theory.	6	L2	CO3

	c.	A cantilever retaining wall of 7 mt height retains 5 and 1 the properties of the sand are e = 0.5, $\phi = 30°$ and G = 2.7. Using Rankines theory, determine the active earth pressure at the base when the backfill is i) Dry ii) Saturated iii) Submerged, and also the resultant active force in each case. In addition determine the total water pressure under the submerged condition.	8	L2	CO3
		OR			
Q.6	a.	Explain in detail, the geotechnical design of gravity and cantilever retaining wall.	10	L4	CO3
	b.	A retaining wall with a vertical back of height 7.32 mt supports a cohesionless soil of unit weight 17.3 kN/m^3 and an angle of shearing resistance $\phi = 30°$. The surface of the soil is horizontal. Determine the magnitude and direction of the active thrust per meter of a wall using Rankines Theory.	10	L3	CO3
		Module – 4			
Q.7	a.	With a neat sketch, explain different types of slope failures.	10	L2	CO4
	b.	Explain Fellineous method for critical slip circle.	10	L2	CO4
		OR			
Q.8	a.	Find the factor of slope (safety) of infinite extent having a slope angle 25°. The slope is made of cohesionless soil with $\phi = 30°$. Also analyze the slope, if it is made of clay having $c^1 = 30$ kN/m^2, $\phi = 20°$, e = 0.65 and G = 2.7 and under the following conditions, i) When the soil is dry ii) When water seeps parallel to the surface and slope iii) When the slope is submerged.	10	L3	CO4
	b.	Explain the Swedish slip circle method for 'C' and C - ϕ sails in detail.	10	L2	CO4
		Module – 5			
Q.9	a.	Explain : i) Pressure bulb ii) Isobar iii) Pressure distribution on horizontal plane iv) Pressure distribution on vertical plane v) Newmarks chart.	10	L2	CO5
	b.	Explain the Bossiness's theory in detail.	10	L2	CO5
		OR			
Q.10	a.	What are the different types settlements? Explain.	10	L1	CO2
	b.	A concentrated load of 1000 kN is applied at the ground surface, compute the vertical pressure: i) At a depth of 4 mt below the load ii) At a distance of 3 mt at the same depth, use Boussiness's equation.	10	L3	CO5

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