

# Model Question Paper (CBCS Scheme)

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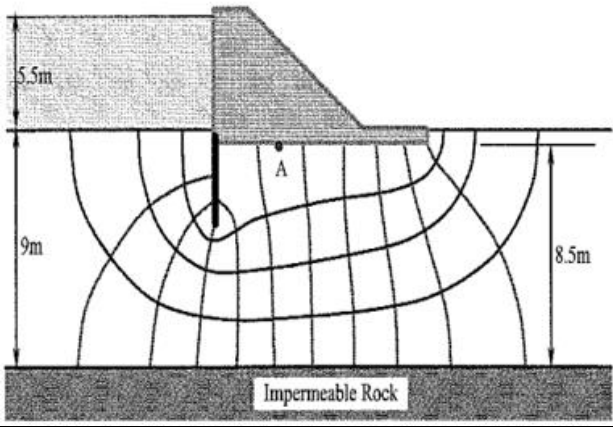
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## Sixth Semester B.E. Degree Examination APPLIED GEOTECHNICAL ENGINEERING (21CV642)

TIME: 03 Hours

Max. Marks: 100

Note: 01. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.  
02.

Module -1			*Bloom's Taxonomy Level	Marks
Q.01	a	What are the objectives of site investigation also explain rotary boring technique	L1	10
	b	A sampling tube has inner diameter of 70 mm and cutting edge diameter of 68 mm. Their outside diameters are 72 mm and 74 mm respectively. Determine the area ratio, inside clearance and outside clearance of the samples. This tube is pushed to the bottom of the bore hole to a distance of 550 mm ,with a length of sample recorded being 530 mm. Find the recovery ratio.	L3	10
OR				
Q.02	a	Explain the terms with the help of a neat sketch of sampling tube: I) Inside clearance. ii) Outside clearance. Determine the area ratio for a sampler having outer diameter of cutting edge as 75mm and wall thickness as 1.7mm. Also state the type of sampler	L2	10
	b	Define disturbed and undisturbed samples also list their features	L1	10
Module-2				
Q. 03	a	Estimate the position of ground water table with following data by Hvorselve's method. Depth up to which water is bailed out 10.5m. Water rise in 1 day = 0.63m; 2day = 0.57; 3rdday = 0.51m	L3	10
	b	With neat sketch explain the properties of flow nets and its applications	L2	10
OR				
Q.04	a	List different methods of dewatering, explain any two methods	L2	10
	b	<p>A computer generated flow net is shown in the figure below for a concrete dam. The material beneath the dam is a highly weathered rock having a coefficient of permeability of <math>k=2 \times 10^{-5}</math> and a total unit weight of <math>19.6 \text{ kN/m}^3</math>. An impermeable grout curtain has been installed at the base to reduce the uplift pressure beneath the dam</p> <p>a) Determine the amount of water that flows beneath the dam. b) Calculate the uplift water pressure at point A on the base of the dam.</p> <div style="text-align: center;">  </div>	L3	10
Module-3				
Q. 05	a	Explain Rankine's theory, and derive the expression for active earth pressure for C - Ø soil.	L3	10
	b	A retaining wall of height 10m Supports cohesion less soil with the following properties. $G = 2.65$ , $e = 0.65$ and $\phi = 30^\circ$ , Water table lies at 3m depth. Surface	L3	10

		of backfill is horizontal and carries surcharge of intensity $14\text{kN/m}^2$ . Draw lateral active earth pressure distribution diagram. Determine total active earth pressure and its point of application.		
OR				
Q. 06	a	With neat sketch explain types of earth pressures	L2	10
	b	An 8 m high retaining wall supports a 5.5 m deep sand ( $\gamma_d = 18.5 \text{ kN/m}^3$ $\phi = 34^\circ$ ) overlying a saturated sandy clay ( $\gamma_{\text{sat}} = 20 \text{ kN/m}^3$ $\sigma' = 28^0 \text{ kPa}$ $C = 17\text{kPa}$ ). The groundwater level is located at the interface of two layers. Sketch the lateral stress distribution up to a depth of 8 m for an active condition.	L3	10
<b>Module-4</b>				
Q. 07	a	Explain three basic modes of failure in Finite slope	L2	10
	b	Explain Swedish slip circle method for cohesive soil	L2	10
OR				
Q. 08	a	Explain causes for slope instability and also list the methods of stabilisation of slopes	L2	10
	b	Explain Fellenius method for critical slip circle	L2	10
<b>Module-5</b>				
Q. 09	a	A circular area 8m diameter carries a uniformly distributed load of $100 \text{ kN/m}^2$ determine the vertical stress at a depth of 2m, 4m and 8m. Plot the variation of vertical stress with depth.	L3	10
	b	A stratum of clay with an average liquid limit of 45% is 6m thick. Its surface is located at a depth of 8m below the ground surface. The natural water content of the clay is 40% and specific gravity is 2.7. Between ground surface and clay the subsoil consists of fine sand. The water table is located at a depth of 4m below the ground surface. The average submerged unit weight of sand is $10.5 \text{ kN/m}^3$ and the unit weight of sand above the water table is $17 \text{ kN/m}^3$ . The weight of building that will be constructed on the sand above clay increases the overburden pressure on the clay by $40 \text{ kN/m}^2$ . Estimate the settlement of building.	L3	10
OR				
Q. 10	a	A reinforced concrete foundation of dimensions $1.8 \text{ m} \times 3.6 \text{ m}$ exerts a uniform pressure of $180 \text{ kN/m}^2$ on a soil mass with $E = 45 \text{ MN/m}^2$ . Determine the Immediate settlement under the foundation. Take $\mu=0.3$ and $I_f = 1$	L3	05
	b	Two columns M and N 6m apart, load on column M is $400\text{kN}$ and on column N is $300\text{kN}$ . The load can be considered as point loads. Calculate the vertical stresses in the soil 3 m below the foundation vertically below M, N and midpoint between M & N.	L3	10
	c	With neat sketch explain Newmark's Chart,	L2	05

\*Bloom's Taxonomy Level: Indicate as L1, L2, L3, L4, etc. It is also desirable to indicate the COs and POs to be attained by every bit of questions.