Roll No. _____

END SEMESTER EXAMINATION
SEMESTER- IV

COURSE CODE: CE 502 | **DURATION: 3 (THREE)HRS**
COURSE TITLE: GEOTECHNICAL ENGINEERING II | **MAXIMUM MARKS: 75**
SESSION: JULY- DEC'2021 | **PASS MARKS: 35 %**

NOTE: *1. Attempt any 5 (five) questions.*
2. Mark for each question is shown against it.
3. Assume suitable logical data wherever necessary.

1.	**(a)**	Differentiate between Active earth pressure and Passive earth passive	**(4)**
	(b)	Discuss the coulomb's Wedge Theory	**(4)**
	(c)	A retaining wall 6 m high retains sand if frictional angle=30° and unit weight of 24 KN/m^3 up to the depth of 3m. From the top from 3 m to 6 m soil is cohesive with cohesion = 20 KN/m² and ϕ= 20°. A uniform surcharge of 100 KN/m² acts on the soil. Calculate the total active pressure on the wall at its line of action. For second soil unit weight=18 KN/m^3.	**(7)**
2.	**(a)**	Explain the relationship between retaining wall, backfill, surcharge and surcharge angle?	**(5)**
	(b)	A wall of 6m height retains sand having a unit weight of 20 kN/m^3 and angle of friction of 30°. If the surface of the backfill slope upwards at 15° to the horizontal, find the active thrust per unit length of the wall, using Rankine's theory.	**(5)**
	(c)	Explain the types of slopes and how the failure takes place on them?	**(5)**
3.	**(a)**	Name the factors affecting stability of slopes.	**(3)**
	(b)	Discuss the different types of slope protection methods.	**(6)**
	(c)	Explain briefly the following terms: i. Face failure ii. Toe failure and iii) Base failure	**(2x3)**
4.	**(a)**	Define foundation. How foundation may fail?	**(1+2)**
	(b)	Elaborate with neat sketches the types of shallow foundation.	**(7)**
	(c)	Which type of foundation you will provide for the following conditions? i. If the structural load is high and soil is loose. ii. If the footing area is greater than 40% of the plinth area. iii. If swelling pressure is high and differential free swell is greater than 35% iv. When you have to construct footing for unequal column loads. v. When individual footings are very close to each other.	**(1x5)**
5.	**(a)**	A square footing is located at a depth of 1.3 m below the ground surface and required to carry the safe load of 800KN at the base of the footing. Find the size of the footing if desired factor of safety is 3. Given that void ratio is 0.55, degree of saturation is 0.5, specific gravity of soil is 2.65, cohesion is 8 KN/m². Frictional angle is 30°. Terzaghi's bearing capacity factor for ϕ=30°	**(8)**
	(b)	Discuss with sketches, the different modes of shear failure of foundation.	**(7)**
6.	**(a)**	A square footing is required to carry a net load of 1200 KN. Determine the size of the footing if the depth of foundation is 2m and tolerable settlement is 40 mm. the soil is sandy with N=12, F.S = 3, water table is very deep. Use Terzaghi's equation.	**(7)**
	(b)	A rectangular footing has a size of 1.8mx3m has to transmit the load of a column at a depth of 1.5 m. Calculate the safe load which the footing can carry at a factor of safety of 3 against shear failure, use IS Code method. The soil has following properties:	**(8)**

		n=40%; G=2,67; w=15% c=8 kN/m²; ϕ =32.5°	
7.	**(a)**	Explain how the SPT number is computed?	**(6)**
	(b)	Distinguish between disturbed and undisturbed samples.	**(2)**
	(c)	Explain briefly, the types of Boring.	**(7)**
8.	**(a)**	Discuss with neat sketches, the classification of piles based on its function.	**(6)**
	(b)	Differentiate between pile and pier foundation.	**(4)**
	(c)	Explain types of caissons.	**(3)**
	(d)	Define the following terms: i. Well curb and ii. Negative skin friction.	**(1x2)**

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