ADAMAS UNIVERSITY PURSUE EXCELLENCE	**ADAMAS UNIVERSITY** **END-SEMESTER EXAMINATION : JANUARY 2021** (Academic Session: 2020 – 21)		
Name of the Program: (Example: B. Sc./BBA/MA/B.Tech.)	B. Tech.	**Semester:** (I/III/ V/ VII/IX)	V
Paper Title :	Soil Mechanics II	**Paper Code:**	ECE43105
Maximum Marks :	40	**Time duration:**	3 Hours
Total No of questions:	10	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	IS 6403: 1981 and IS 2911 will be required		

Answer all the Groups

Group A

Answer all the questions of the following $5 \times 1 = 5$

1.

a) According to Meyerhof, for deep foundation the value of angle 'β' with horizontal, will reach upto maximum which angle?

b) What will be problem happened if rectangular section is chosen for any retaining wall?

c) A wooden pile is driven with a drop hammer of 1.5 kN, having a free fall of 0.45 m. If, the penetration in the last blow is 5 mm. Then as per Engineering NEWS formula, calculate the load carrying capacity of the pile.

d) What will be the recommended top and base slab width of a 5 m high RCC gravity retaining wall?

e) If the diameter of a Under reamed pile shaft is 0. 5 m, then write down the diameter of the intermediate bulbs.

GROUP –B

Answer *any three* of the following $3 \times 5 = 15$

2. Write the equations and values regarding Depth factors (d), Inclination factors (i) of various footings, to obtain their Bearing capacity.

3. Explain Earth pressure at rest. Also write the equation for Co-efficient of Earth pressure at rest.

4. Determine the depth at which a rectangular footing of 1.5 m X 2.5 m be founded, if it has to carry a safe load of 2000 kN. Use Terzaghi's analysis. Consider, the foundation soil has c = 20 kN/m^2, $\varphi = 30^\circ$ and unit weight γ = 18 kN/m^3. Also take, Nc = 37.2, Nq = 22.5 and $N\gamma$ = 19.7.

5. Explain the difference between General and Local shear failure with neat diagram.

GROUP –C

Answer *any two* of the following $2 \times 10 = 20$

6. A retaining wall 6 m high retains sand with angle of shearing resistance of 30^o and $\gamma = 24$ kN/m^3 upto a depth of 3 m from top. From 3 m to 6 m the soil is of with angle of shearing resistance of 25^o and $\gamma = 18$ kN/m^3. A uniform surcharge of 50 kN/m^2 acts at the surface. Determine the total lateral pressure acting on the wall and its point of application. Again if water table will raise upto 4 m depth from backfill surface then what will be change in result?

7. Determine the failure plane for 7 meter high retaining wall with inclined back about 15˚ with vertical plane with following data by Culmann's graphical method. Take Scale factor 1m : 1cm and 1000 kN : 1 cm.

Angle of shearing resistance = 30^o
Unit weight of backfill = 20 kN /m^3
Angle of friction between wall and backfill = 0.75 of φ
Angle of backfill surface = 10˚.

8. Design a pile group and compute the settlement of pile group consisting of RCC piles for a column of size 650 mm X 650 mm carrying a load of 5000 KN. The soil exploration data reveal that the sub soil consist of deposit of soft clay extending to a great depth.

The other data of the deposit are,

Compression index, $C_c = 0.10$
Initial void ratio, $e_0 = 0.9$
Saturated unit weight = 19 KN/ m^3
Unconfined compression strength = 40 KN/m^2
Assume permissible settlement 50 mm.

9. Determine the ultimate load bearing capacity of circular pile of 0.5 m diameter and of 12 m long, passing a no. of layers of granular soil of thickness of 2 m, 3.5 m, 4 m and 4.2 m from G.L. The angles of shearing resistances of the corresponding layers are 25˚, 28˚, 32˚, 32˚ and the unit weights are 18 KN/m^3, 20 KN/m^3, 23 KN/m^3 and 24 KN/m^3.

10. Illustrate Standard Penetration Test with diagram. Also discuss about different samplers for collecting soil samples from different depth. [8 + 2]

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