Registration No : | | | | | | | | | | |

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B.Tech
PCI6I101

6th Semester Regular / Back Examination 2018-19
FOUNDATION ENGINEERING
BRANCH : CIVIL
Time : 3 Hours
Max Marks : 100
Q.CODE : F359

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part- I

Q1 **Only Short Answer Type Questions (Answer All-10)** **(2 x 10)**

a) List out the different types of retaining wall with diagram.
b) What is the ultimate bearing capacity of square footing resting on the surface of a saturated clay of unconfined compressive strength of 100 kN/m^2.
c) Write down the Vesics Bearing Capacity equation defining each of the terms.
d) A pile is driven in uniform clay of large depth. The clay has an unconfined compressive strength of 90 kN/m^2. The pile is 30 cm diameter and 6 m long. Determine the safe frictional resistance of the pile, assuming a factor of safety of 3. Assume the adhesion factor is 0.7.
e) What is bore log and write down its use in soil exploration?
f) What is Sowers and Sowers (1970) guidelines?
g) What is area ratio?
h) What is batter piles describe with diagram?
i) Differentiate between cleavage and parting.
j) What is RQD?

Part- II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) Discuss Culmann's graphical solution for active earth pressure.
b) Explain the differences between Terzagh's method and Meyerhoff's method for finding bearing capacity of soil.
c) What are the different types of failure observed in soil? Explain with diagram.
d) Excavation was being carried out for a foundation is plastics clay with a unit weight of 22.5 kN/m^3. Failure occurred when a depth of 8.10 m was reached. What is the value of cohesion if $\phi=0^0$
e) A foundation 2 m square is founded in 1.2 m below the surface of uniform sandy gravel having a density of 19.2 kN/m^3, above the water table and a submerged density of 11.2 kN/m^3. The strength parameter with respect to effective stress are $c'=0$ and $\phi'=30^0$. Find the gross ultimate bearing capacity for the following conditions:
   (i) water table is well below the base of foundation
   (ii) water table rises to the level of the base of foundation
   (iii) The water table rises to ground level

   Given $N_q=22$, $N_y=20$

f) Design a square pile group to carry 400 kN in clay with unconfined compression strength of 60 kN/m^2. The piles are 25 cm diameter and 5 cm long . Adhesion factor may be taken as 0.6.

g) What is N value of SPT? How do you find the relative density from N value? Explain the various corrections to be the observed value of N.

h) Discuss how you can obtain the bearing capacity of soils from plate load tests?

i) What is an undisturbed sample? What are the tools available for the same? Discuss a thin walled tube sample. What is its degree of disturbance?

j) Discuss the electrical resistivity method of geophysical exploration.

k) A SPT was conducted in dense sand deposited at a depth of 22 m, and a value of 48 was observed for N. The density of the sand was 16kN/m^2. What is the value of N, corrected for overburden pressure?

l) Describe different joint System in rocks with diagram.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

Q3 Differentiate the between the Rankine and Coulmb theories of earth pressure. **(16)**

A retaining wall of 7.5 m high, retains a cohessionless backfill. The top 3 m of the fill has a unit weight of 18 kN/m^3 and $\phi=35^0$ and the rest has unit weight of 24 kN/m^3 and $\phi=25^0$. Determine the pressure distribution on the wall.

Q4 In a mass housing complex scheme over a vast area, two types of soils were encountered. **(16)**
One of which is partially saturated silty clay with c_u=5.8 kN/m^2, $\phi_u=25^0$, and γ= 18.5 kN/$m^3$and extends over most of the area. The other, predominantly clay having c_u=55 kN/m^2 spreads to a lesser extent. The water table is at a greater depth. As per the strip footings of the building have to be placed at 1 mt depth. Compute the width of the footing required in each type of soil if the load intensity is 150 kN/m run. Adopt a factor of safety of 2.5 in both the soils, and only shear failure need to be considered. For $\phi_u=25^0$, take N_c=20.7,N_q=10.7,N_γ=10.8
If there is a possibility of the water table rising to the ground surface, what should be the change in the width of footing in both the areas? The submerged unit weight of the silty clay is 11.2 kN/m^3.

Q5 Describe the different methods for finding out the group efficiency of piles. **(16)**
A group of concrete piles in square in plan and consists of 9 piles each 12m long and 500 mm diameter. The piles are bored piles and installed at a spacing of 3 d in a deep clay deposit having an unconfined compressive strength of 6.4 kN/m^2. At the tip of the pile and below, the undrained shear strength c_u= 45 kN/m^2. The average unit weight of the soil and concrete are 19.2 and 22.5 kN/m^3, respectively. Estimate the total ultimate load of the pile foundation.

Q6 Sketch a well foundation showing all its component parts. What are the advantages of well foundation? What are the forces acting on well foundation? How do you estimate the bearing capacity and depth of a well foundation? **(16)**