

Seat No.	
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T.E.(Civil) (Part - II) (Semester - VI) Examination, December - 2015
GEOTECHNICAL ENGINEERING - II (Revised)

Sub. Code : 45543

Day and Date : Wednesday, 02 - 12 - 2015

Total Marks : 100

Time : 02.30 p.m. to 05.30 p.m.

- Instructions :**
- 1) Question No.1 from Section-I and Question No. 5 from Section- II are compulsory. Attempt any two questions from the remaining in each Section.
 - 2) Figures to the right indicate full marks.
 - 3) Make assumptions wherever necessary.
 - 4) Use of non-programmable calculator is allowed.

SECTION-I

Q1) All questions are compulsory :-

[4×5=20]

- a) Enlist type of soil sample.
- b) Write a short note on methods of improving stability of slope.
- c) Explain
 - i) General shear failure
 - ii) Local shear failure
- d) List the factors influencing settlement.

Q2) a) What are the types and causes of slope failure?

[5]

- b) A long natural slope in a $c - \phi$ soil is inclined at 12° to the horizontal, the water table is at the surface and the seepage and is parallel to the slope. If a plane slip has developed at a depth of 4 m, determine the factor of safety. Take $c = 8 \text{ kN/m}^2$; $\phi = 22^\circ$ & $\gamma_{\text{sat}} = 19 \text{ kN/m}^3$

[6]

- c) List out the current methods of soil exploration.

[4]

P.T.O.

- Q3) a)** Enlist the assumptions of Terzaghi's bearing capacity equation . [5]
- b)** A square footing located at a depth of 1.3 m below ground level has to carry a safe load of 800 kN. Find the size of footing if the desired factor of safety is 3. The properties of soil are voids ratio = 0.55, Degree of saturation = 50%, Specific gravity = 2.67; $c = 8 \text{ kN/m}^2$; $\phi = 30^\circ$; $N_c = 37.2$, $N_q = 22.5$, $N_r = 19.7$. Use Terzaghi's theory. [10]
- Q4) Write notes on (any three)** [15]
- a) Explain the term**
- i) Core recovery
 - ii) RQD
- b) Friction circle method.**
- c) Standard Penetration test.**
- d) Immediate settlement- computations from I.S.method**

SECTION-II

- Q5) All questions are compulsory :-** [4×5=20]
- a)** Write the various types of shallow foundation that you studied and explain in what condition each can be preferred.
 - b)** Write a note on under reamed pile.
 - c)** Why wells tilt while sinking? Write the remedial measures are taken for rectification.
 - d)** Explain Precast bored piles.
- Q6) a)** Write the assumptions and limitations of rigid analysis of shallow foundation design [6]
- b)** Write detail notes on floating foundation. [5]
- c)** List the various types of raft foundation. [4]

- Q7) a) Give detailed pile classification [6]
- b) Estimate the safe load carrying capacity of a single bored pile 20 m long, 500 mm diameter. The adhesion coefficient (α) is 0.4. Take a factor of safety of 2.5. The soil strata is as follows: [9]

Depth (m)	Soil deposit	Undrained shear strength kN/m ²
0-5	Loose fill	50
5-10	Weathered over-consolidated clay	70
10-15	Over-consolidated clay	100
15-20	Highly over-consolidated clay	200

Assume that $\phi_u = 0$ is valid and $N_c=9$ for deep foundation.

- Q8) a) Give stepwise procedure for design of anchored sheet pile by free earth support method. [6]
- b) Write a note on Cofferdam. [5]
- c) Write the use of geo synthetics in civil engineering projects. [4]



- Q9) a) What are the types and causes of slope failure? [5]
- b) A long natural slope in a $c - \phi$ soil is inclined at 12° to the horizontal, the water table is at the surface and the seepage and is parallel to the slope. If a plane slip has developed at a depth of 4 m, determine the factor of safety. Take $c = 8 \text{ kN/m}^2$, $\phi = 22^\circ$ & $\gamma_{sat} = 19 \text{ kN/m}^3$. [6]
- c) List out the current methods of soil exploration. [4]