Printed Pages: 3 **NCE-501**

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 2289542 **Roll No.** | | | | | | | | | | |

B.TECH.

Regular Theory Examination (Odd Sem - V), 2016-17

GEOTECHNICAL ENGINEERING

Time : 3 Hours *Max. Marks : 100*

Note: **i)** **Attempt all questions.**
ii) **Marks are indicated against each questions.**
iii) **Assume any data suitably, if required.**

1. Attempt all parts. Each part carries equal marks. (10×2=20)

a) Define the shear strength of soil.

b) Explain the coefficient of permeability.

c) What do you mean by hydraulic conductivity?

d) Define void ratio, bulk unit weight and specific gravity.

e) The void ratio of soil sample is 1; determine the corresponding porosity of the soil sample.

f) Explain the isobar.

g) Briefly explain the flocculent grain structure.

h) Give states the Darcy's Laws.

i) Define index properties of soil.

j) Define active earth pressure in brief.

2. Attempt any five questions (5×10=50)

a) Explain SPT test. Write the procedure in brief.

b) A soil sample 40 mm thick takes 40 minute to reach 40% consolidation. Find the time taken for a clay layer 8 m thick to reach 80% consolidation. Assume double drainage in both case.

c) Compare b/w compaction and consolidations.

d) A soil specimen has a water content of 15% and a wet unit weight of 25 KN/$M\hat{}3$. If the specific gravity of solids is 2.70, determine the Dry unit weight, void ratio, and the Degree of saturation, take $\gamma_w = 10$ kn/$m\hat{}3$.

e) A square footing has dimensions of 2m x 2m and a depth of 3m. Determine its ultimate bearing capacity in pure clay with an unconfined strength of 0.15 N/$mm\hat{}2$, $\phi = 0^\circ$ and $\gamma = 1.7$ g/c$m\hat{}3$. Assume Terzaghi's factors for $\phi = 0$, as Nc = 5.7; Nq = 1 and Ny = 0.

f) Write the short notes on

i) Field compaction control.

ii) Proctor needle method.

g) Drive the Laplace's equation of continuity with all assumptions.

h) Define the skempton's pore pressure parameters. Derive an expression for b/w pore water pressure and applied stress.

3. Attempt any two parts of the following (2×15=30)

a) Explain the field methods for compaction of soil in details.

b) A soil sample of saturated soil has a water content of 35% and bulk unit weight of 25 KN/$M\hat{}3$. Determine dry density, void ratio and specific gravity of solid particles. What would be the bulk unit weight of the same soil at the same void ratio but at a degree saturation 60% take $\gamma w = 10$ kn/$m\hat{}3$.

c) What do you mean by site investigation? What are the different purposes for which site investigation is done?