

(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 $25 \text{ KN}/\text{M}^3$. If the specific gravity of solids is 2.70, determine the Dry unit weight, void ratio, and the Degree of saturation, take $\gamma_w = 10 \text{ kn}/\text{m}^3$.
e) A square footing has dimensions of $2\text{m} \times 2\text{m}$ and a depth of 3m. Determine its ultimate bearing capacity in pure clay with an unconfined strength of $0.15 \text{ N}/\text{mm}^2$, $\phi = 0^\circ$ and $\gamma = 1.7 \text{ g}/\text{cm}^3$. Assume Terzaghi's factors for $\phi = 0$, as $N_c = 5.7$; $N_q = 1$ and $N_y = 0$.
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 $25 \text{ KN}/\text{M}^3$. 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 $\gamma_w = 10 \text{ kn}/\text{m}^3$.
c) What do you mean by site investigation? What are the different purposes for which site investigation is done?

