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Explain the Taylor's stability number. A slope is to be constructed at on inclination of 30° with horizontal. Determine the safe height of the slope at a factor of safety 1.5. The soil has properties: $C = 15kN/m^2$, $\phi = 22.5°$ and $\Upsilon = 19kN/m^3$. Take stability number $S_n = 0.046$ for inclination $i = 30°$ and $\phi_m = 15°$ and $S_n = 0.02$ for $i = 30°$ and $\phi = 22.5°$.

5. a) Explain the all three coefficients of earth pressure.

   b) Write the assumptions of Coulumb's wedge theory.

   c) Explain the effect of surcharge on active earth pressure in a smooth vertical retaining wall. The back fill is submerged upto some depth behind, retaining wall and sand is over lain by clay in back fill.

   d) A retaining wall 6m high with vertical back, supports a cohesive back fill having unit weight = $19kN/m^3$, apparent cohesion = $26kN/m^2$ an angle of internal friction zero. Calculate

      i) Depth of tension crack

      ii) Lateral active earth pressure intensity at base

      iii) Draw active earth pressure intensity distribution diagram along the height of the wall.

OR

Discuss the Rebhann's graphical method for active earth pressure estimation.

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Total No. of Questions : 5] *[Total No. of Printed Pages : 4*

Roll No .....

CE-604

B.E. VI Semester

Examination, December 2016

Geo Technical Engineering - I

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.

iv) Except Numericals, Derivation, Design and Drawing etc.

1. a) Define the terms:

   i) Void ratio

   ii) Specific gravity

   b) Explain about the flocculated and dispersed structures in clay.

   c) Derive the relationship between void ratio (e), degree of saturation (Sr), water content (w), and specific gravity (G) of the soil mass.

   d) Describe the Indian standard soil classification system of soil.

OR

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Draw the plasticity chart used for the classification of fine grained soil as per IS:1498-1970

Classify the following soil A and B using IS classification system

SOIL-A

i) Liquid limit = 40%

ii) Plastic limit = 20%

iii) Soil passing 75μ IS sieve = 80%

SOIL-B

i) Passing 4.75 mm sieve = 68%

ii) Passing 75μ sieve = 7%

iii) Uniformity Coeff. = 7

iv) Coeff. of curvature = 3

v) Plasticity index = 3

2. a) Explain the Darcy law of permeability.

b) Describe the characteristics of flow net.

c) Explain the e-log σ′ curve in consolidation.

d) Describe the two methods of estimation of permeability of soil in laboratory.

OR

A undisturbed soil sample 30mm thick got 50% consolidated in 20 minutes with drainage allowed at top and bottom in the laboratory. The clay layer from which the sample was obtained is 4m thick in field conditions.

Estimate the time it will take to consolidate with double surface drainage and single surface drainage. In both the conditions, consolidation process is uniform.

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3. a) Discuss the phenomenon of liquefaction.

b) Draw the contact pressure distribution diagram below rigid and flexible footing.

c) Describe the Newmark's influence chart.

d) Samples of a dry sand are to be tested in triaxial and direct shear test. In the triaxial test the specimen fails when the major and minor principal stress are 960kN/m^2. and 260kN/m^2. respectively. What shear strength would be expected in direct shear test, when normal stress is 230kN/m^2?

OR

A consolidated undrained triaxial tests were performed on two identical samples of saturated soil. The pore pressure was also measured as under:

Cell pressure (σ_3) (kN/m^2)	Dev. stress (σ_d) at failure (kN/m^2)	Pore pressure at failure (U) (kN/m^2)
260	180	100
375	240	140

Determine the shear strength parameters on the both effective and total stress concepts.

4. a) Discuss the different types of slope failures.

b) Discuss about the stability of down stream slope during steady seepage in earthen dam.

c) Explain the stability analysis of infinite slope for cohesionless soil.

d) Describe the swedish circle method of stability analysis in brief.

OR

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