Compute the intensities of active and passive earth pressure at depth of 6m in dry cohesionless sand with $\theta = 30°$ and unit weight = 18 kN/m^3. What will be the intensities of active and passive earth pressure if the water level rises to the ground level? Take saturated unit weight of sand = 22 kN/m^3.

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Roll No .....

CE - 604

B.E. VI Semester

Examination, June 2016

Geotechnical 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) Discuss I_D-e relationship.

   b) Discuss corrections to the hydrometer readings.

   c) Explain activity of clays in detail.

   d) Discuss the laboratory procedure as per IS code to find liquid limit of soil.

   OR

   A soil sample has a porosity of 40%. The specific gravity of solids is 2.70. Calculate

   i) Voids ratio

   ii) Dry density

   iii) Unit weight if the soil is 50% saturated and

   iv) Unit weight if the soil is completely saturated.

2. a) Define flow net and related terms.

   b) Define compression index and swelling index.

   c) Discuss Burmister method to determine pre-consolidation pressure.

   d) Discuss in detail the methods of computing consolidation settlement.

   OR

   Discuss in details the constant head method, used for measuring permeability of soils in a laboratory.

3. a) Explain apparent cohesion and apparent angle of shearing resistance.

   b) Define pole and deviator stress.

   c) Discuss vane shear test.

   d) Discuss stress conditions in soil specimen during triaxial testing. Discuss the advantages of triaxial test.

   OR

   Following table gives observations for normal load and maximum shear force for the specimens of sandy clay tested in the shear box, 36 cm^2 in area under undrained conditions. Plot the failure envelope for the soil and determine the values of shear strength parameters.

Normal load (N)	100	200	300	400
Maximum shear force (N)	150	200	250	300

4. a) Define stability number and factor of safety with respect to cohesion.

   b) Explain slope failure and base failure.

   c) Draw wedge in equilibrium showing all the forces acting on it for Culmann method.

   d) Describe the Swedish Slip Circle Method for stability analysis of both type of soil.

   OR

   A new canal is excavated to a depth of 5m below ground level, through a soil having the following characteristics. $C = 15\ kN/m^2$, $\theta = 15°$, $e = 0.78$ and $G = 2.72$. The slope of Banks is 1 in 1. Calculate the factor of safety w.r.t. cohesion when the canal runs full ($S_n = 0.083$). If it is suddenly and completely emptied ($S_n = 0.122$), what will be the factor of safety?

5. a) Define active and passive earth pressure.

   b) Discuss the meaning of reinforced earth retaining structure.

   c) Draw Coulomb's wedge of soil showing all forces acting on it and state the criterion for maximum active pressure.

   d) Discuss Rebhann's graphical method for active pressure and derive the expression for coefficient of active earth pressure.

   OR