JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- Dec. 2017

B.Tech. VII Semester

COURSE CODE: 10B13CE736   MAX. MARKS: 35

COURSE NAME: Underground Technology

COURSE CREDITS: 3   MAX. TIME: 2 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

[1] High displacement concrete piles, 15 m long, are to be installed in loose sand. The choice is between 450 mm square precast driven piles and 500 m diameter driven cast in situ piles. Which type of pile should be used for **(a)** building that imposes a very small lateral load on the piles and **(b)** building that imposes high lateral load on piles? The two buildings apply the same axial load on piles.   [5]

[2] Permeation grouting is to be excavated in dry sandy gravel starting from a depth of 3 m below the ground surface down to a depth of 12 m. Grouting will be undertaken as ascending stage grouting in stages of 3 m starting from 12 m depth and moving upwards to 9, 6 and 3 m depth. What is the maximum permissible grout pressure at 12 m depth? By what amount should this grout pressure be reduced for each stage of ascent? The sand gravel has $\gamma_t = 18$ kN/m^3, $\phi' = 40°$ and $K_0 = 0.45$.   [3+3 = 6]

[3] List the factors that influence the choice of the side – support systems to be used for vertical excavations in soil.   [4]

[4] Derive the expression for embedment depth 'D' of a cantilever sheet pile in cohesive soil.   [4]

[5] Figure 1 shows a free standing sheet pile penetrating in clay. Determine the embedment depth given H = 5m, P = 40 kN/m and $q_u = 30$ kN/m^2.   [8]
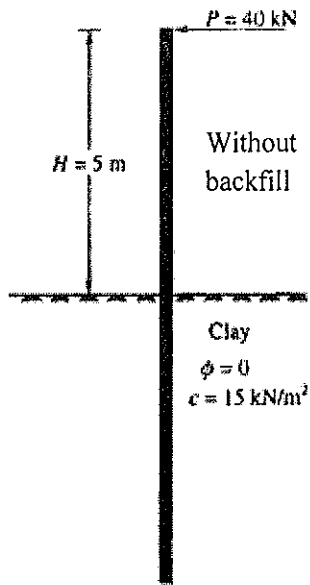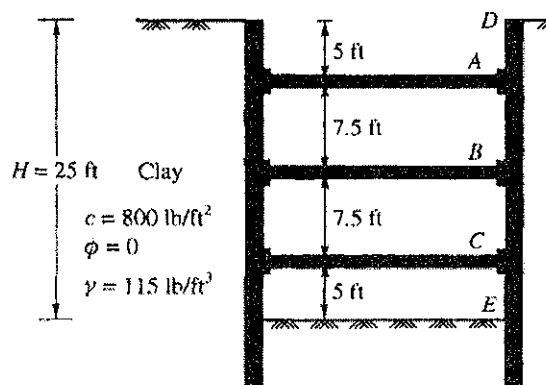
Figure 1

[6] Figure 2 gives a section of a long braced cut. The sides are supported by steel sheet pile walls with struts and wales. The soil excavated at the site is stiff clay with the following properties: $c = 800$ lb/ft^2; $\phi = 0°$; $\gamma = 115$ lb/ft^3.Determine:

    a) The earth pressure distribution envelope.

    b) Strut loads

The struts are placed 12ft apart center to center horizontally.   **[8]**

(a) Section of the braced trench

Figure 2