PVP 14

Code: CE7T5B

IV B.Tech - I Semester – Regular/Supplementary Examinations
October - 2018

GROUND IMPROVEMENT TECHNIQUES
(CIVIL ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks

11 x 2 = 22 M

1.

a) Write the criteria for providing effective well radius.
b) What is the significance of vacuum well points?
c) What quantity of cement is required for permeation grouting in gravel, having void ratio of 0.6, if the grout mix has water – cement ratio of 6:1? Assume that 50% of the void space gets filled with the grout slurry.
d) What are the suitability and applications of lime stabilization?
e) Under what circumstances sand blanket is provided.
f) What is stress concentration factor?
g) Differentiate the densification process in granular soils by Impact on ground surface and Impact at depth.
h) What is the design steps involved in reinforced earth wall.
i) List the types of geotextiles used as soil reinforcement.

j) Write the factors affecting the magnitude of swelling pressure.

k) What are the limitations of under reamed piles?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks.

3 x 16 = 48 M

2. a) Explain the various methods that may be employed for dewatering and discuss in details of the well point systems of drainage. 8 M

b) What are the factors influencing the selection of a particular dewatering method? 8 M

3. a) In a dry sandy gravel ascending stage, grouting is carried out in stages of 2m starting from 10m depth and moving upwards to 8m, 6m and 4 m depth below the ground surface. Determine the maximum permissible grout pressure at 10m. Also determine the amount of decrease in pressure for each stage of ascent of grouting. The soil has $\gamma_t = 17.5\ kN/m^3$, $\Phi' = 35^0$ and $K_0 = 0.40$. 8 M

b) How is soil stabilized by using soft aggregates? Why is cement used for stabilization of soil? 8 M

4. a) An embankment of 10 m height is to be constructed in an 8m thick layer of clay overlaying rock. The embankment will increase the mean effective vertical stress in the clay after consolidation from a value of 80 kN/m^2 to 200 kN/m^2. The embankment to carry a road will be laid in 4 months. The surfacing will be laid 12 months after the commencement of constructions. Only 3 cm of settlement can be accepted after the surfacing of the road. Design a suitable sand drain installation to achieve the above requirements. Given $C_v = C_{vr} = 8 \times 10^{-4}$ cm^2/s and $m_v = 3 \times 10^{-2}$ cm^3/kg. 8 M

b) Discuss the failure mechanism of stone column. Explain how the load-bearing capacity of stone column is determined. 8 M

5. Design a geo-grid wall of 6m height. The vertical maximum spacing of reinforcement is 1.0m. The wall is backfilled with a granular soil having $\gamma = 17$ kN/m^3 and $\Phi' = 30^0$. The back fill surface carries a uniform surcharge dead load of 17 kN/m^2 and the bearing capacity of soil is 564 kN/m^2. The coverage ratio is 0.80 and a factor of safety of 1.5 is to be used along with different reduction factors of $RF_{ID} = 1.2$, $RF_{CR} = 2.5$, $RF_{CD} = 1.3$ and $RF_{BD} = 1.0$. given that $T_u = 70$ kN/m, $C_r = 0.85$, $C_i = 0.80$ 16 M

6. a) Define and explain the types and applications of soil nailing, by drawing typical neat sketches. 8 M

b) What are the different methods of identifying expansive soils? Discuss the preventive measures of expansive soils. 8 M