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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST-3 EXAMINATION- DECEMBER -2021
B.Tech V Semester

COURSE CODE: 18B11CE514 MAX. MARKS: 35
COURSE NAME: FOUNDATION ENGINEERING
COURSE CREDITS: 03 MAX. TIME: 2 HR

Note: *All the questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means. Assume suitable data if required. Answer in sequence.*

1. An earth retaining structure is 10 m tall with vertical back and horizontal fill up to the top and loaded with an additional surcharge of 14 kN/m^2. The top 3m depth of the cohesionless backfill is dry and rest is saturated under GWT. The soil properties are G=2.65, e=0.65 and ϕ=30°.Construct neat earth pressure diagrams with related pressure intensities and calculate the resultant thrust acting on the wall and its point of action. **[8]**

2. (a) A square footing is required to carry a net load of 1200 kN. The depth of the foundation is 2 m and the tolerable settlement is 40 mm. The soil is sandy with N=12.Taking the factor of safety as 3, determine the size of the footing using Teng's method. Assume water table to be very deep. **[3]**

   (b) Briefly explain the phenomenon of negative skin friction. **[2]**

3. Determine the safe load that can be carried by a pile having gross weight of 1.5 t, using ENR formula and modified Hiley's formula. Assume same energy loss constant in both cases. Given:
   1. Weight of hammer = 2.0 t
   2. Height of free fall = 91 cm
   3. Hammer efficiency = 75%
   4. Average penetration under the last 5 blows = 10 mm
   5. Length of pile = 22 m
   6. Diameter of pile = 300 mm
   7. Coefficient of restitution = 0.55 **[5]**

4. 200 mm diameter 8 m long piles are used as foundation for a column in a uniform deposit of medium clay with UCS of 100 kN/m^2 and adhesion factor 0.9. 9 piles are arranged in a square pattern in pile group. Assuming group efficiency of unity, determine the spacing between the piles. Neglect end bearing resistance of piles. **[5]**

5. A 6x7 pile group has the following details: Diameter of each pile=200mm, c/c spacing=600 mm, capacity of a single pile=400kN.Determine the efficiency and capacity of free standing pile group.

   OR

   Explain the equivalent raft approach to calculate the consolidation settlement under a pile group for different soil types. **[4]**

6. Explain any two of the following with their working principle and associated calculations:

   (a) Standard Penetration Test
   (b) Seismic Refraction Method
   (c) Cyclic pile load test **[4x2]**