Unit 2 - Week 0

Course outline

How does an NPTEL online course work?

Week 0

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Assignment 0

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-01-27, 23:59 IST.

1) A smooth, vertical retaining wall of 6m height supports a completely submerged granular backfill with properties: $\phi' = 30°, c' = 0, \gamma_{sat} = 18\ kN/m^3$. Calculate the total active lateral thrust acting on the wall in kN/m (Use Rankine's theory and assume unit weight of water = 10 kN/m^3) — 1 point

a. 108 b. 132
c. 54 d. 228

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

2) A concentrated load of 50 kN is applied on the surface of a homogeneous soil. The vertical stress increment in the soil due to the load, at a point which is 10 m deep and is at a horizontal distance of 3 m from the load will be (in kPa): — 1 point

a. 11.2 b. 0.19
c. 0.24 d. 9.62

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

3) A square footing, resting on a soil with properties: $\phi = 30°, c = 0, \gamma = 20\ kN/m^3$, carries an ultimate load of 8000 kN. If the footing is at a depth of 3 m from the ground level, determine the size of the footing assuming that the footing fails by general shear failure. (Use Terzaghi's theory and neglect water table effect) — 1 point

a. 1.94 m b. 4.2 m
c. 3.5 m d. 2.2 m

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
d.

4) The effective stress shear strength parameters of fully saturated clay are: $\phi' = 20°$; $c' = 15$ kPa. A sample of this clay was tested in a UU test under a cell pressure of 100 kPa and the principal stress difference at failure was 60 kPa. Calculate the value of pore water pressure at failure. — 1 point

a. 83.5 kPa b. 32 kPa
c. 555 kPa d. 320 kPa

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

5) An isolated column foundation with a rectangular base of 4m × 5m was placed at a depth of 4m from the ground surface. Load on the column was 1240 kN. The base of the footing was underlain by stiff clay. Find the primary consolidation settlement if the soil properties are e_0= 0.9, Cc=0.27, bulk unit weight of soil (above water table) = 17.2 kN/m^3, saturated unit weight of soil = 20 kN/m^3 and water table is at base of the footing. (Assume unit weight of water = 10 kN/m^3, Use 1:2 distribution of stress) — 1 point

a. 81 mm b. 42 mm
c. 223 mm d. 111.5 mm

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

6) A strip footing, 2.5 m wide is placed at a depth of 2 m below the ground surface rests on a saturated clay soil with properties: $\gamma_{sat} = 15\ kN/m^3$, $\phi_u = 0°, c_u = 30\ kN/m^2$. Using Terzaghi's theory determine the ultimate bearing capacity of the footing under undrained loading conditions. (Assume unit weight of water = 10 kN/m^3) — 1 point

a. 181 kPa b. 60 kPa
c. 201 kPa d. 171 kPa

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

7) An isolated square footing of size (3 m × 3 m) carrying a total load of 1080 kN rests on a cohesive soil with Young's Modulus = 5×10^4 kN/m^2 and Poisson's ratio = 0.4. Determine the immediate settlement of the footing. (Influence Factor at the centre = 0.82; Do not apply any correction) — 1 point

a. 45 mm b. 54.4 mm
c. 4.96 mm d. 6.05 mm

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

8) A 10 m long pile with square cross section (350 mm × 350 mm) is driven in a deposit of loose sand having properties: $\phi = 28°, c = 0, \gamma = 16.5\ kN/m^3$. If the friction angle between the pile and the soil is three-fourth of the internal friction angle of the soil, find out the ultimate load carrying capacity of the pile. (Use: critical depth concept, L_{cr} = 15B; K = 1; bearing capacity factor = 25). — 1 point

a. 1080 kN b. 430 kN
c. 608 kN d. 887 kN

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

9) A square group of nine piles, each 12 m long with 300 mm diameter is in a deep deposit of clay with an average value of undrained cohesion, 40 kN/m^2. What would be the ultimate load carrying capacity of the pile group, if the spacing between the piles is 700 mm. Assume adhesion factor = 0.8. — 1 point

a. 4304 kN b. 3486 kN
c. 3895 kN d. 387 kN

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
b.

10) A single acting steam hammer of weight 22 kN was used to drive a concrete pile. If the total settlement recorded for the last 10 blows was 30mm, calculate the pile capacity (in kN) using Engineering News Record formula. (Height of fall of the hammer =780 mm) — 1 point

a. 520 b. 880
c. 700 d. 950

a.
b.
c.
d.

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.