

# C.U.SHAH UNIVERSITY

## Summer Examination-2022

**Subject Name: Geotechnical Engineering- II**

**Subject Code: 4TE06GTE1**

**Branch: B.Tech (Civil)**

**Semester: 6**

**Date: 06/05/2022**

**Time: 02:30 To 05:30**

**Marks: 70**

**Instructions:**

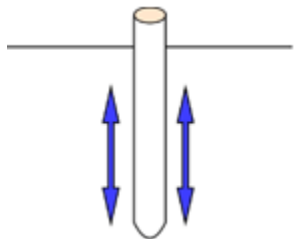
- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

**Q-1**

**Attempt the following questions**

**(14)**

- a) Which of the following is proved to be useful, ongoing over the site? (1)
  - a) Excavation b) Escarpments c) Flood marks d) All of the mentioned
- b) Earth embankments or slopes are commonly required for which of the following purpose? (1)
  - a) Railways b) Earth dams c) Road ways d) All of the mentioned
- c) The assumption of Boussinesq equation is that the soil is \_\_\_\_\_ (1)
  - a) elastic b) semi-elastic c) plastic d) semi-plastic
- d) A foundation is said to be shallow if its depth is \_\_\_\_\_ than its width. (1)
  - a) Equal to and Less than b) Greater than c) None of the mentioned d) All of the mentioned
- e) Originally, Rankine's theory of lateral earth pressure can be applied to only \_\_\_\_\_ (1)
  - a) Cohesion less soil b) Cohesive soil c) Fine grained soil d) Coarse grained soil
- f) The figure below represents \_\_\_\_\_ piles. (1)



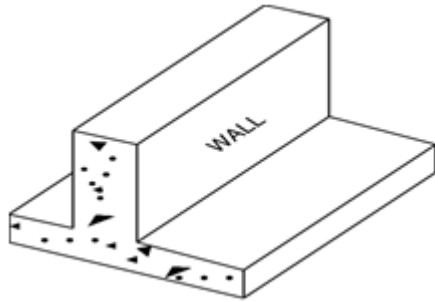
- a) Load bearing b) End bearing c) Friction d) Sheet
- g) In cohesive soil, the pressure distribution beneath the footing is \_\_\_\_\_ (1)
  - a) Linear b) Non linear c) Zero d) None of the mentioned
- h) The information that should be yielded on site exploration is \_\_\_\_\_ (1)
  - a) Rock formation b) Depth of ground water c) Structural loading d) All of the mentioned
- i) Slopes is classified into \_\_\_\_\_ types. (1)
  - a) 2 b) 3 c) 4 d) 5
- j) Sheet piles are commonly used as \_\_\_\_\_ in hydraulic structure. (1)
  - a) Bulk heads b) Bearing stratum c) Boulders d) Composite piles



k) The art of driving piles into the ground was first established by \_\_\_\_\_ (1)

a) Greeks b) Romans c) Philippians d) None of the mentioned

l) The \_\_\_\_\_ figure \_\_\_\_\_ below \_\_\_\_\_ represents: (1)



a) Isolated footing b) Wall footing c) Strap footing d) Mat foundation

m) The factor that is responsible for inclination of resultant pressure to the retaining wall \_\_\_\_\_ is \_\_\_\_\_ (1)

a) Frictional force b) Surcharge c) Earth pressure d) Weight of the wall

n) The problems due to stress distribution in soils due to a concentrated load was studied \_\_\_\_\_ by \_\_\_\_\_ (1)

a) G.B Airy b) Terzaghi c) Darcy d) Boussinesq

### Attempt any four questions from Q-2 to Q-8

**Q-2 Attempt all questions (14)**

A) What are the assumptions in Rankine's theory? Explain active earth pressure for dry or moist backfill with no surcharge. (7)

B) Define: i) Gross bearing capacity ii) Net bearing capacity iii) Ultimate bearing capacity iv) Net ultimate bearing capacity v) Safe bearing capacity vi) Net safe bearing capacity (7)

**Q-3 Attempt all questions (14)**

A) What are the methods available for subsurface exploration. Explain any one in detail. (7)

B) Determine ultimate bearing capacity and safe bearing capacity of strip footing, 1.20m wide and having  $d_f=1.0\text{m}$ . use terzaghi's equation and assume general shear failure. Take  $\Phi=35^\circ$ ,  $\gamma=18\text{KN/m}^3$  and  $C=15\text{KN/m}^2$  and factors of bearing capacity are  $N_c=57.8$ ,  $N_q=41.4$ ,  $N_\gamma=42.4$  (7)

**Q-4 Attempt all questions (14)**

A) Explain Terzaghi's theory for bearing capacity of soil. (7)

B) Derive an expression for the factor of safety of an infinite slope in a purely cohesive soil. (7)

**Q-5 Attempt all questions (14)**

A) What are the different factors of safety used in stability of slopes? (7)

B) What are the factors affecting spacing of piles? Explain about load carrying capacity and efficiency of pile group. (7)

**Q-6 Attempt all questions (14)**

A) Describe classification of piles based on their load carrying characteristics. (7)

B) A retaining wall 6 m high, with vertical back supports cohesive soil backfill having unit weight  $19\text{ kN/m}^3$  and angle of internal friction as zero. Calculate (7)



- (i) Internal pressure intensity at top
- (ii) Depth of tension crack
- (iii) Lateral pressure intensity at the base.

**Q-7**

**Attempt all questions**

**(14)**

- A) Calculate the factor of safety of a slope in a pure clay, the slip circle has the radius 13.5m and central angle  $68^\circ$ . The c.g. of the wedge is 6m away horizontally from the centre of rotation. Area of wedge is 35 m<sup>2</sup>. The soil properties are:  $c = 30\text{kN/m}^2$ ,  $\gamma = 20.5\text{kN/m}^3$ . **(7)**
- B) State different types of shallow foundation. Explain any one with neat sketch. **(7)**

**Q-8**

**Attempt all questions**

**(14)**

- A) Explain in details the construction of Newmark's influence chart. How is it used? **(7)**
- B) Explain Rabhann's Graphical method for active earth pressure. **(7)**

