

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Fifth Semester B.Tech Degree Regular and Supplementary Examination December 2020

Course Code: CE305**Course Name: GEOTECHNICAL ENGINEERING - II**

Max. Marks: 100

Duration: 3 Hours

PART A*Answer any two full questions, each carries 15 marks.*

Marks

- 1 a) Explain the limitations of Boussinesq's method of stress calculation. (5)
- b) A Circular area on the ground surface 8m in diameter carries a uniformly distributed load of 5kN/m^2 . Find the vertical pressure at depth 3m, 5m, 8m and 12m. Also plot the variation of stress with depth. (10)
- 2 a) What are the assumptions of the Coulomb's theory? Illustrate the concept of the Coulomb's active pressure in cohesionless soil. (5)
- b) Illustrate the use of Newmark's influence chart (5)
- c) What is mean by ISOBAR? Explain the significance of Pressure bulb. (5)
- 3 a) Illustrate the different type of earth pressures. Draw the plot showing the variation of pressure intensity. (5)
- b) A retaining wall 10m high has sandy backfill with $e=0.65$ $\phi=30^\circ$ and $G=2.65$. The water table is at a depth of 3m from the ground surface. Draw the earth pressure diagram and determine the magnitude and point of application of the total active earth pressure. Take $\gamma_w = 9.81\text{kN/m}^3$. (10)

PART B*Answer any two full questions, each carries 15 marks.*

- 4 a) Explain the terms (a) Ultimate Bearing capacity (b) Net Ultimate Bearing Capacity (c) Net safe Bearing Capacity (d)Gross safe bearing Capacity (e) Net allowable bearing pressure (10)
- b) A purely cohesive soil was tested by unconfined compression. The strength obtained was 60kN/m^2 . Estimate the ultimate bearing capacity for strip footing, using Terzaghi's theory. (Bearing capacity factor =5.7) (5)
- 5 a) Explain soil improvement through Preloading method. (5)

- b) A 1.5 m wide strip footing is to be placed on a homogeneous clay deposit at a depth of 1.0m below the ground level. The average unit weight of soil is 19kN/m^3 . The cohesive strength of clay can be taken as 40kN/m^2 . The water table is very deep. The load on the footing is 100kN/m run. Check the safety of the foundation against bearing capacity failure. (10)
- 6 a) Illustrate any FIVE methods adopted for the rectification of Tilt & Shift of Well Foundation. (5)
- b) Explain the concept of floating foundation. (5)
- c) Explain the procedure for design of a trapezoidal combined footing. (5)

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) A reinforced concrete pile weighting 30kN (inclusive of helmet & dolly) is driven by a drop hammer weighing 40kN and having an effective fall of 0.8m . The average set per blow is 1.4cm . The total temporary elastic compression is 1.8cm . Assuming the co-efficient of restitution as 0.25 and a factor of safety of 2 , determine the ultimate bearing capacity and the allowable load for the pile. (10)
- b) A group of 9 piles 10m long is used as a foundation for a bridge pier. The piles used are 30cm dia. with c/c spacing 0.9m . The subsoil consists of clay with $q_u = 150\text{ kN/m}^2$. Determine the efficiency neglecting end bearing action. Given adhesion factor as 0.9 . (10)
- 8 a) Draw a neat sketch of IS pile load test setup. Explain the determination of safe load of pile from Load – Settlement plot. (10)
- b) A 30cm diameter concrete pile is driven into a homogeneous consolidated clay deposit ($C_u=40\text{kN/m}^2$, $\alpha=0.7$). If the embedded length is 10m , estimate the safe load ($FS=2.5$ & $N_c=9$) (5)
- c) Explain the design criteria to be considered for Machine foundation. (5)
- 9 a) Explain the IS guideline for choosing the spacing and depth of boring. (10)
- b) What is mean by Site investigation? Explain the purpose of the site investigation. (5)
- c) Draw a typical bore log of a Standard Penetration Test. (5)