Reg No:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

V SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

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) Determine the depth at which vertical stress reduces to 10% of the applied pressure on a circular footing. (7½)

b) A retaining wall supports a two layered backfill having the following properties: (7½)
Upper layer: angle of internal friction=30^0; unit weight=16KN/m^3; thickness=3m
Lower layer: angle of internal friction=45^0; unit weight=20KN/m^3; thickness=2m
Determine the total passive earth pressure.

2 a) State any 4 major limitations in Boussinesq's theory. Why is the theory still in use in spite of limitations? (7½)

b) A retaining wall [height=5m] supports a granular backfill [angle of internal friction=36^0; unit weight above WT=16KN/m^3; unit weight below WT =19KN/m^3] WT table is at a depth of 2m beneath the backfill surface. Determine the total active earth pressure.. (7½)

3 a) A uniform pressure acts on a rectangular footing having coordinates [in metres] of corners (0,10), (8,10), (8,0), and (0,0). Find the (m,n) combinations which are to be used for determination of vertical stress [using Fadum's chart] at a depth of 8m vertically beneath the point having coordinates (8,12). (7½)

b) State the assumptions in Rankine's theory. (7½)

PART B

Answer any two full questions, each carries 15 marks.

4 a) What are the soil types for which local shear failure can be expected? Draw the typical pressure versus settlement curve for such a failure. (7½)

b) Design a rectangular combined footing for two columns, each of size 250mmX250mm, the magnitude of column loads being 850kN and 1050kN. c/c distance between columns is 3.8m and a clear spacing of 0.125m only is available beyond the outer face of 850kN column. Take SBC of subsoil as 202kPa. (7½)

5 a) Two footings A and B, both having length of 22m, are placed on the surface of a dry, purely granular soil. Widths of footings A and B are 2.5m and 1.5m respectively. Determine the ratio of their net safe bearing capacities. (7½)

b) Suggest any three methods (with neat sketches) for rectification of tilts in a well foundation. (7½)

6 a) Define Gross ultimate bearing capacity, Net ultimate bearing capacity, Net safe bearing capacity and Allowable bearing capacity. (7½)

b) What are the situations where raft foundations are preferred? What is meant by floating foundation? (7½)

PART C

Answer any two full questions, each carries20 marks.

7 a) An RCC pile (of 500mmX500mm size and length 6m) is installed in a granular soil having unit weight =17kN/m^3, coefficient of earth pressure = 1.5; angle of wall friction=22 º. Determine the ultimate skin friction load that can be carried by pile. (10)

b) State any two merits of auger boring method of soil exploration compared to wash boring. Mention the soil types for which the auger boring method is applicable. Mention the different types of augers and draw a neat sketch of any one. (10)

8 a) A 3X3 friction pile group, each pile having a length of 10m and diameter of 0.4m is installed in a homogeneous clay layer having undrained shear strength of 50kPa. Take adhesion factor as 0.75. Estimate the ultimate load on the pile group. c/c spacing of piles = 0.9m (10)

b) What is meant by free vibration? Discuss any 3 methods for vibration isolation. (10)

9 a) Explain [with a sketch] negative skin friction on pile. A circular concrete pile of diameter 300mm and length 8m is installed in a subsoil consisting of top 2.5m of recently filled up soil (cohesion of 25kPa). Determine the negative skin friction on the pile. Take adhesion factor as 0.5. (10)

b) What is meant by dilatancy correction? What are the soil types/soil states for which the above correction is applied? Give the related equation for dilatency correction. (10)

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