

Reg No.: _____

Name: _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017

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

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| 1 | a) What are the assumptions in the Boussinesq's formula for stress distribution? | (5) |
| | b) A water tank is founded on a circular ring type foundation. The ring is of 10m external diameter and 6m internal diameter. Assuming a uniformly distributed load of 300kPa, determine the vertical pressure at a depth of 6m below the centre of the foundation. | (5) |
| | c) What is pressure bulb? Discuss its significance. | (5) |
| 2 | a) Explain the use of Newmark's chart | (5) |
| | b) A wall of 8m height retains a non-cohesive backfill of dry unit weight 18kN/m^3 and $\phi = 30^\circ$. Using Rankine's theory find the total active thrust on the wall and the point of application if it carries a uniform surcharge load of 10kPa. | (10) |
| 3 | Compute the total lateral earth thrust exerted by a layered backfill of height 10m if the wall has a tendency to move towards backfill. The upper layer of thickness 6m has angle of internal friction 32° and saturated unit weight 18kN/m^3 . The lower layer has angle of internal friction 28° , cohesion 20kPa, and saturated unit weight 19kN/m^3 . The backfill also supports a uniform surcharge of intensity 8kN/m^2 . Water table is at a depth of 5m below the surface of the backfill. Also find the point of application. Soil above water table is also saturated | (15) |

PART B

Answer any two full questions, each carries 15 marks.

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| 4 | a) What are the assumptions in Terzaghi's bearing capacity theory | (5) |
| | b) A square footing of $2\text{m} \times 2\text{m}$ is provided at a depth of 1m, in a sandy soil with an angle of internal friction of 30° . Compute the net safe bearing capacity of the soil with a factor of safety of 3, when the water table is at a depth of 0.5m & 1.5m below the ground level. Given $G = 2.65$, $e = 0.7$, Degree of saturation above water table = 80%, $N_c = 95$, $N_q = 80.4$, $N_\gamma = 100.2$. | (10) |
| 5 | a) Differentiate between general and local shear failure of soil. | (5) |
| | b) What remedial measures can be taken to control the differential settlement of foundations? | (5) |
| | c) Under what situations raft foundation is preferred? | (5) |
| 6 | a) Explain with neat sketches, the various elements of a well foundation. | (7) |
| | b) Design the plan dimensions of a trapezoidal footing to support two adjacent columns at a centre to centre distance of 5m carrying loads of 1500kN and | (8) |

3000kN. The smaller column is of size 400mmx400mm and is at a clear distance of 250mm from the property line. The bigger column is of size 750mmx750mm. The permissible soil pressure is 300kPa.

PART C

Answer any two full questions, each carries 20 marks.

- 7 a) What is negative skin friction? (5)
b) What is dynamic pile capacity? (5)
c) A group of 9 piles 12m long and 250mm in diameter is to be arranged in a square form in clay with an average unconfined compressive strength of 60kN/m^2 . Determine the centre to centre spacing of the pile for group efficiency of 1. Neglect bearing at the tip. $\alpha=0.9$ (10)
- 8 a) Explain mass spring model for undamped free vibration (5)
b) Explain with a neat sketch, the wash boring method. What are its advantages and disadvantages? (7)
c) Using modified Hiley's formula, determine the safe load that can be carried by a pile. The gross weight of the pile is 1400kg, weight of hammer 2000kg, height of fall 91cm, hammer efficiency 70%, average penetration under the last 5 blows is 10mm, coefficient of restitution is 0.55 and the factor of safety is 2.5. assume $C=2.5$ and $e = 0.5$ (8)
- 9 a) Explain in detail the procedure for standard penetration test. What are the corrections to be applied to the N-Value? (15)
b) What are the main objectives of the site investigation? (5)
