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| **Scheme of Valuation/Answer Key**  (Scheme of evaluation (marks in brackets) and answers of problems/key) | | | | | |
| **APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  V SEMESTER B.TECH (S) DEGREE EXAMINATION, MAY 2019 | | | | | |
| **Course Code: CE305** | | | | | |
| **Course Name: GEOTECHNICAL ENGINEERING - II** | | | | | |
| Max. Marks: 100 | | |  | Duration: 3 Hours | |
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| **PART A** | | | | | |
|  |  | ***Answer any two full questions, each carries 15 marks.*** | | | Marks |
| 1 | a) | Eqn. for vertical stress(σZ) beneath centre of circular footing --- 3 marks  Calculation steps --- 1½ marks  depth at which σZ reduces to 10% of the applied pressure= 1.854B ---3 marks | | | (7½ ) |
|  | b) | Kp1 & Kp2 = 3 & 5.828 ---- 1 mark Eqn. for passive pressure ---- 1 mark  Calculation steps --- 1½ marks  4 values of passive pressure – 2 marks   |  |  |  |  |  | | --- | --- | --- | --- | --- | | z (m) | 0 | 3-dz | 3+dz | 5 | | passive pressure (kPa) | 0 | 144 | 279.8 | 512.9 |   total passive earth pressure = 1008.7 kN/m ----2 marks | | | (7½ ) |
| 2 | a) | any 4 major limitations of Boussinesq’s theory ----6 marks  reason for the theory to be still in use ---1½ marks | | | (7½ ) |
|  | b) | Ka = 0.26 ---- 1 mark Eqn. for active pressure ---- 1 mark  Calculation steps --- 1½ marks  5 values of pressure [3due to soil; 2 due to water] – 2½ marks   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | z (m) | 0 | 2 | 5 |  | z (m) | 2 | 5 | | active pressure exerted by the soil (kPa) | 0 | 8.31 | 15.48 |  | Lateral. Pressure exerted by water (kPa) | 0.0 | 29.43 |   total active earth pressure = 88.1kN/m ---1½ marks | | | (7½ ) |
| 3 | a) | Sketch showing rectangular footing & the areas to be considered – 3½ marks  the (m,n) combinations to be used = (1,1.5) & (1,0.25) --- 4 marks | | | (7½ ) |
|  | b) | Any 6 major assumptions in Rankine’s theory --- 7½ marks. | | | (7½ ) |
| **PART B** | | | | | |
| ***Answer any two full questions, each carries 15 marks.*** | | | | | |
| 4 | a) | soil types for which LSF can be expected ---4 marks  typical pressure versus settlement curve for LSF --- 3½ marks.. | | | (7½ ) |
|  | b) | Definition sketch – 2marks  Calculation steps --- 1½ marks  Distance to the C.G. of footing from axis of 850kN column = 2.1m --- 1 mark  Ans: L=4.7m -- 1½ marks B=2m -------1½ marks | | | (7½ ) |
| 5 | a) | 1. Both are strip footings ------ 2 marks 2. Eqn. for net safe bearing capacity (qns)of strip footing ------ 2 mark s   . Calculation steps --- 1½ marks   1. (qns)A/ (qns)B = 1.67 ------ 2 marks | | | (7½ ) |
|  | b) | * Mentioning any 3 methods for rectification of tilts in a well foundation---- 3 marks * 3 neat sketches------ 4½ marks | | | (7½ ) |
| 6 | a) | 1. Definition of Gross UBC, Net UBC, Net SBC ------ 6 marks   definition of Allowable bearing capacity ----.1½ marks | | | (7½ ) |
|  | b) | Any 2 situations where raft foundations are preferred------ 4 marks  concept of floating foundation------ 3½ marks | | | (7½ ) |
| **PART C** | | | | | |
| ***Answer any two full questions, each carries20 marks.*** | | | | | |
| 7 | a) | * Skin friction capacity of friction pile in sands * = K× tan δ × perimeter of pile × area of effective pressure diagram---- 3 marks * Effective overburden pressure diagram --- ---- 2 marks * Calculation steps --- 2 marks * ultimate load on the pile=370.9 kN---- 3marks. | | | (10 ) |
|  | b) | any 2 merits of auger boring method ---- 2 marks  soil types for which the method is applicable---- 3 marks  Mentioning any 2 types of augers ---- 2 marks  Neat sketch of any one type of auger – 3 marks | | | (10 ) |
| 8 | a) | * UBC of a single friction pile = [α. c. As] ---- 2 marks * UBC of the Block = [c. As] --- 2 marks * Calculation steps --- 2 marks * UBC a single friction pile = 471.2 kN---- 1 mark * Length of pile block= 2.2m ---- 1marks * UBC of the Block = 4400 kN ---- 1 marks * UBC of the PILE GROUP = 4241kN ---- 1 marks | | | (10 ) |
|  | b) | Meaning of free vibration -------- 4 marks  Brief discussion of any 3 methods for vibration isolation. ---- 6 marks | | | (10 ) |
| 9 | a) | Meaning of negative skin friction (Qnsf)---- 3 marks  Sketch --- 2 marks  (Qnsf) = [α. c. As] ---- 3 marks  (Qnsf) = 29.45kN---- 2 marks | | | (10 ) |
|  | b) | * dilatancy correction –- 2 marks * soil types/soil states for which the correction is applied ( fine sands and silts; below WT; N˃15) ---- 6 marks -- * Eqn.for dilatancy correction --- 2 marks | | | (10) |
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