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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

SUMMER TERM END TERM EXAMINATION - AUGUST 2024

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| **Semester : V(2023-24)** | **Date :** **05-08-2024** |
| **Course Code : CIV3027\_V02** | **Time :09.30 AM to 12.30 PM** |
| **Course Name :** **Foundation Engineering** | **Max Marks :100** |
| **Program:** **B.Tech. Civil** | **Weightage :50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | | | | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 5M=20M** | | | | | | | | |
| 1 | | An earth slope is an unsupported, inclined surface of a soil mass. Earth slopes are formed for railway formations, highway embankments, earth dams, canal banks, levees, and at many other locations. Explain the types of slopes with a neat sketch. | | (CO 1) | | | [Knowledge] | |
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| 2 | | Determine the factor of safety with respect to cohesion for a submerged embankment 25 m high and having a slope of 40 degree. Cohesion is 40 kN/m2, φ is 10 degree and saturated unit is 18 kN/m3. Taylor’s stability number Sn is 0.097. | | (CO 1) | | | [Knowledge] | |
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| 3 | | Explain active and passive earth pressure with a neat sketch. | | (CO 2) | | | [Knowledge] | |
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| 4 | | Explain bearing capacity, ultimate bearing capacity, net ultimate bearing capacity, safe bearing capacity, net safe bearing capacity and allowable bearing capacity or allowable bearing pressure. | | (CO 3) | | | [Knowledge] | |
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| 5 | | A square footing 2.5 m by 2.5 m is built in a homogeneous bed of sand of unit weight 20 KN/m3 and having an angle of shearing resistance of 36 degrees. The depth of base of footing is 1.5 m below the ground surface. Calculate the safe load that can be carried by a footing with a factor of safety of 3 against complete shear failure. Take Nc=65.4, Nq= 49 .4 and Nγ=54. | | (CO 3) | | | [Knowledge] | |
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| **PART B** | | | | | | | | |
| **ANSWER ANY 4 QUESTIONS 4Q X 10M=40M** | | | | | | | | |
| 6 | An isobar is a curve joining the points of equal stress intensity. In other words, an isobar is a contour of equal stress. Tabulate and draw the Isobar of intensity 0.1 Q from the axis of the load. | | (CO 1) | | | [Comprehension] | | |
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| 7 | Rankine's earth pressure theories are useful for determining earth pressure exerted by soil on retaining walls, Derive the expression for earth pressure for cohesive soil. | | (CO 2) | | | [Comprehension] | | |
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| 8 | Determine the stresses of the vertical cut shown in figure. Also determine the maximum depth of potential crack and maximum depth of unsupported excavation. | | (CO 2) | | | [Comprehension] | | |
| 9 | A strip footing 3 m wide carries a load intensity of 400 kPa at a depth of 1.2 m in sand. The saturated unit weight of sand is 19.5 kN/m3 and unit weight above water table is 16.8 kN/m3. The shear strength parameters are c=0 and φ=350. Determine the factor of safety for the following cases of water table a) Water table is 4 m below GL (ground line), b) Water table is 1.2 m below GL, c) Water table is 2.5 m below GL and d) Water table is 0.5 m below GL. Assume Nq=41.4 and Nγ=42.4. | | (CO 3) | | | [Comprehension] | | |
| 10 | Negative skin friction occurs in friction piles and are also called as floating piles. Explain with a neat sketch friction piles. | | (CO 3) | | | [Comprehension] | | |
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| **PART C** | | | | | | | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** | | | | | | | | | |
| 11 | | A retaining wall is constructed at Presidency University campus. Determine the active earth pressure for the retaining wall shown below. Take γw=10 kN/m3 | | | (CO 2) | | | [Application] | |
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| 12 | | A. pile group consists of 9 friction piles of 30 cm diameter and 10 m length driven in clay as shown in the Figure below. (Cu= 100 kN/m2 and γ=20kN/m3. Determine the safe load for the group. Factor of Safety=3 and α=0.6 (adhesion factor). Determine the safe load for the group. | | | (CO 3) | | | [Application] | |
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| 13 | | A Pile foundation, a kind of deep foundation, can be defined as a slender column or long cylinder which are used to support the structure and transfer the load at desired depth either by end bearing or skin friction. Explain the classification according to mode of transfer of loads and material used for pile foundations. | | | (CO 3) | | | [Application] | |
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