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| Name: |  UPES UNIVERSITY WITH A PURPOSE |
| Enrolment No: | |

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Foundation Engineering
Program: B Tech Civil Engineering
Course Code: CIVL3005

Semester: V
Time 03 hrs.
Max. Marks: 100

Instructions: use of IS 6403, 2911 allowed

SECTION A

| S. No. | Question | Marks | CO |
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| Q 1 | Where are isolated footings generally used? | 4 | CO1 |
| Q 2 | Write a note on pile group spacing. | 4 | CO2 |
| Q 3 | Define cutting edge and specify its use. | 4 | CO2 |
| Q 4 | How consolidation test is used to understand expansive soils? | 4 | CO3 |
| Q 5 | How ground improvement used to solve foundation-engineering issues? | 4 | CO4 |

SECTION B

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| Q 6 | A continuous strip footing of width 0.75 mt is to be placed 3 m below the ground surface. The footing would be subjected to a load 15 kN/m ² . The subsoil is clayey, sandy silt with saturated unit weight of 1800kg/m ³ , and $c' = 10\text{kN/m}^2$ and $\phi = 22^\circ$. compute the magnitude of load carrying capacity of the footing. Use IS: 6403-1981 recommendation. | 10 | CO1 |
| Q 7 | Find the ultimate load capacity of piles in sandy soil of diameter 1.0 meter with a cross sectional area at tip of 10% of the area of the pile, $\gamma = 16\text{ kN/m}^3$, $\phi = 12^\circ$, $\delta = 1^\circ$, $K_1 = 1.1$ are the properties of the soil . | 10 | CO2 |
| Q 8 | What are the design considerations for machine foundations? OR Explain the basement and foundation problems related to expansive soils. | 10 | CO3 |
| Q 9 | Describe the necessity of development of modern foundation engineering. | 10 | CO4 |

SECTION-C

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| Q 10 | A 2.5m X 2.5 m square footing rests at a depth of 2.6 m below the ground surface. The soil properties are as follows: $\phi = 10^\circ$, $\gamma = 17.7\text{ kN/m}^3$, $\gamma' = 7.8\text{ kN/m}^3$, for $\phi = 20^\circ$, $N_c = 17.7$; $N_q = 7.4$; $N_\gamma = 5.0$. If there is a percentage variation of 10 % in bearing capacity if the water table falls from a depth of 3 m. to a depth of 6.0 m below the ground surface what is the value of cohesion. $q = 0$. | 20 | CO1 |
| Q 11 | Explain the application of vertical drains in geotechnical engineering with neat sketches and specifications. OR Illustrate the modern construction techniques used in shallow foundations. | 20 | CO4 |