COURSE CODE (CREDITS): 18B11CE514

MAX. MARKS: 15

COURSE NAME: Foundation Engineering

COURSE INSTRUCTOR: Ashok Kumar Gupta

MAX. TIME: 1 Hour 00 Minute

Note: All questions are compulsory. Marks are indicated against each question in brackets.

Q 1. A strip footing is to be designed to carry a gross foundation load equals 800 kN/m run at a depth of 0.7m in a gravelly sand stratum. Appropriate shear strength parameters are c = 0 and Ø = 40 degrees. Assume that the water table exists at the foundation level. The sand unit weights above and below the water table are 17 and 20 kN/m^3, respectively. Using Terzaghi bearing capacity equation with a safety factor of three, considering shear failure only, determine the width of the footing. (5)

Q 2. A footing 2 m square is located at a depth of 4 m in stiff clay of unit weight 21 kN/m^3. The undrained strength of clay at a depth of 4 m is given by the parameters c_u = 120 kPa and $Ø_u$ = 0. For FoS = 3 with respect to bearing capacity failure, determine the gross foundation vertical load that the footing can carry using the Skempton method. (5)

Q 3. A standard plate-load test was performed with a plate of 0.3 × 0.3m at a depth of 1.0m below the ground surface in a highly cohesive soil with Ø = 0 . The water table was located at a depth of 5 m below the ground surface. Failure occurred at a load of 4500 kg. The foundation level will be located at the same depth of the test. The total unit weight of the cohesive soil above water table y = 19 kN/m3. Using the Terzaghi general bearing capacity equation, what would be the net ultimate bearing capacity for a 1.5 m wide continuous footing? (5)