COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(CE-09003)   Geotechnical Engineering

Course: B.Tech   Branch: Civil Engineering

Semester: Sem V

Year: 2014-2015   Max.Marks:60

Duration: 3 Hours   Time:- 2 P.M.to 5 P.M.   Date: 29 Nov 14

Instructions: MIS No. [   ]

1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

Q.1 A. What is particle size distribution curve? What is its use in soil Engineering?   05

     B. A compacted cylindrical specimen 50 mm dia x 100 mm length is to be   05
         prepared from oven dry soil. If the specimen is required to have a water
         content of 15% and the percentage air voids of 20%, calculate mass of soil
         and water required for the preparation of the sample. Take G=2.69.

Q.2 A   How would you determine the average permeability of soil deposit consisting   05
         of a number of layers?

     B   A pumping out test was carried out at a level site, where 9 m of clay overlies   05
         a stratum of sand   1.5 m thick. The sand stratum is underlain by an
         impermeable rock stratum. When steady state was reached the rate of flow
         was found to be 15 litres /sec. The water levels in two observation wells
         located at radial distances of 6 m and 15 m from axis of main well were 5m
         and 4.5 m below ground surface. Compute the coefficient of permeability of
         the sand stratum.

Q.3 A List and explain factors affecting compaction?   05

     B What is a compaction curve? Give salient features. What is a zero air void
   line?   05

Q.4 A On which types of soils unconfined compression test is conducted? Explain   05
        with the help of Mohr Circle how shear strength parameters are determined
        in this type of test?

     B The following table gives data obtained from triaxial compression test   05
        conducted under undrained conditions on two specimens of same soil sample.
        The diameter and height are 40 mm and 80 mm respectively for both samples.

Specimen No	1	2
Cell pressure (kN/m^2)	200	300
Deviator load at failure (N)	852	924
Increase in volume at failure (cm^3)	1.5	2.5
Axial compression (mm)	7	9

Q.5 A Write the expression for factor of safety against sliding for infinite slope for   05
        cohesionless soil and cohesive soil?

     B An unsupported slope is shown in fig. Determine the factor of safety against   05
        sliding for the trial slip surface. Take C=50 kN/m^2 and ϕ=0.The weight of the
        wedge ABD is 2518 KN and acts at horizontal distance of 11 m from the
        vertical AO.
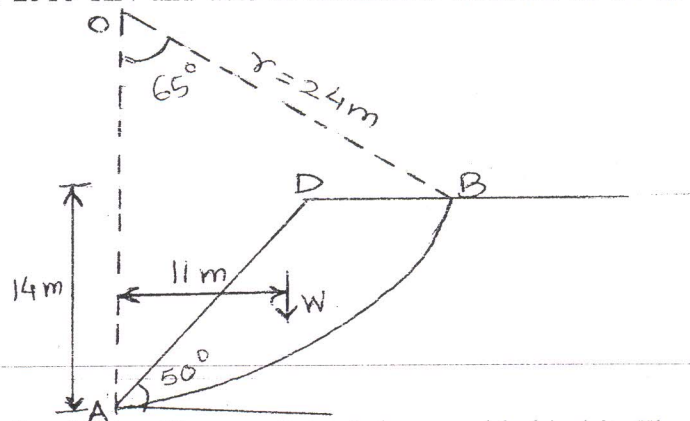
Q.6 A A vertical wall 8 m high with smooth back has sand behind it. The sand has   05
        ϕ−30^0, γ−18 KN/m^3. What will be active earth pressure distribution and
        total active force acting on the wall. If there is water table behind the wall at 3
        m below the surface of the sand. The saturated unit weight of sand is 21
        KN/m^3. Take γ_w=10 KN/m^3

     B Explain Westgaard Analysis.   05