Paper Code: CE-501	ROLL NO									

B.Tech (ODD SEMESTER)Examinations 2015-16

CE-501 GEOTECHNICAL ENGG I

Max Time : 3 Hrs Max marks: 100

NOTE :ATTEMPT ALL QUESTIONS

Q1 Attempt any FOUR parts 5X4=20

a Discuss physical and chemical weathering in formation of soils .

b Explain structures of clay minerals .

c Write any FIVE methods of water content determination of soils and explain any two .

d One cubic mt of wet soil weighs 19.80 Kn . If the specific gravity of particles is 2.70 and water content 11% find the void ratio, dry density and degree of saturation of soil.

e Define Liquidity index, relative density, Toughness index and shrinkage limit

f Following observations were obtained in test :
Wt of core cutter 1060 g
Volume of core cutter 995 cc
Wt of core cutter + wet soil 3030g
Water content of soil 16% find dry unit wt, void ratio, and degree of saturation . take SG as 2.70

Q2 Attempt any FOUR parts 5X4=20

a Explain well graded, poorly graded and uniformly graded soil

b Discuss phenomeona of capillary rise in soils. Also discuss indirect methods of determining permeability.

c Differentiate between discharge velocity and seepage velocity. On what factors does permeability depends ?

d Discuss pumping out test in unconfined acquifer ?

e A bed of sand consists of three layers of equal thickness. The k value of top middle and bottom layers is $4x10^{-4,}$ $6x10^{-2}$ and $4x10^{-4}$. Find out horizontal and vertical permeability of strata.

f Explain quick sand condition.. determine critical gradient.Give guidelines for design of filters .

Q3 Attempt any TWO parts 10X2=20

a Draw the neutral and effective stress at a depth of 15m below ground surface. Soil consists of top layer 5 and bottom layer 12 m .WT is 3m below ,SG is 2.65 . Moisture content of upper layer 5% and e 0.7 . Assume any other data suitably.

b Derive equation for finding void ratio by height of solid method and explain
Following:
(i) Coefficient of compressibility

(ii) Coefficient of volume change
(iii) Compression index

c An undisturbed sample of clay 44 mm thick consolidated 50% in 30 minutes under both end drainage condition..The soil in field is 4.0 m thick . How long will it take to consolidate 65% with single drainage Take $T_{50\%}$ =0.196

Q4 Attempt any TWO parts 10X2=20

a A cylindrical sample of dry sand was tested in triaxial test. Failure occurred under a cell pressure of 120 KN/m2 and deviator stress of 400 KN/2 .Find
(i) Angle of shearing resistance
(ii) Values of normal and shear stresses on failure plane

b A cantilever wall of 7m retains sand having e=0.5, Ø =30^0 G=2.7 .Using rankine theory find active earth pressure at base when back fill is dry,saturated and submerged. Also determine resultant force in active case .

c Write comparison between Rankine and Coloumb theory of earth pressure .

Q5 Attempt any TWO parts 10X2=20

a Explain following

(i) Types of sampling tubes and explain split spoon and piston samplers
(ii) Method of conducting SPT

b The inner dia of sampling tube and that of cutting edge are 70mm and 68 mm. Their outer dia are 72mm and 74 mm respectively. Find inside clearance, outside clearance and area ratio. Also find corrected N value for SPT conducted in fully submerged sand . In field it was found to be 40 at depth of 6m . The average saturated unit wt of soil was 21 KN/m3 . Apply all corrections

c Discuss effect of water table on bearing capacity of soils and explain Terzaghi s theory of soil failure