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SUBJECT CODE NO:- E-59
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E.(Civil) Examination Nov/Dec 2017
Geotechnical Engineering
(REVISED)

[Time: Three Hours] **[Max.Marks:80]**

Please check whether you have got the right question paper.

N.B
1) Q.1 from section A & Q.6 from section B are compulsory solve any two from each section from remaining
2) Assume suitable data if required state it clearly

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Section A

Q.1
a) Define coefficient of curvature & coefficient of uniformity 10
b) What is zero air void line?
c) Enlist different modes of soil water
d) Enlist the names of three important clay mineral
e) State Darcy's law
f) Define soil thixotropy
g) Define effective pressure
h) What is discharge velocity & seepage velocity

Q.2
a) The following data refer to a sample of soil 08
- Percent passing 4.75mm IS sieve = 64
- Percent passing 75 μ IS sieve = 6
- Coefficient of curvature = 2.7 coefficient of uniformity = 7.5
- Plasticity index = 2.5%

Classify the soil as per IS classification
b) Derive the formula to compute the height of capillary rise in soil 07

Q.3
a) Determine the average horizontal & vertical permeability coefficients of a soil deposit made up of three horizontal strata each 1m thick if the coefficient of permeability are $1X10^{-1}$mm/s , $3X10^{-2}$mm/s & $8 X 10^{-3}$mm/s respectively for the three layers 07
b) Write a short note on the corrections to be applied to hydrometer testing 08

Q.4
a) Derive the relationship between bulk unit weight of a soil, specific gravity & degree of saturation 08
b) Explain step wise procedure to determine field density of loose soil strata with neat sketch 07

Q.5 a) Explain graphical method to construct flow net & its application to isotropic soil 07

b) What are the Atterberg limits? Explain plasticity limit why plasticity index for sandy soil is zero? 08

OR

Write shorts notes (any three) 15

a) Assumptions made in Terzaghi's theory?
b) Differentiate between standard proctor test & modified proctor test
c) Explain five factors affecting the compactor
d) How compaction of soil is controlled in field?
e) IS classification

Section – B

Q.6 Attempt any three 10

a) What are advantages of triaxial test.
b) Explain earth pressure on retaining wall
c) A soil sample has voids ratio 0.5 find porosity
d) What should be the value of surcharge intensity to have zero active pressure intensity at the tip of wall in cohesive soil
e) The void ratio & specific gravity of a soil are 0.65 & 2.72 respectively find the degree of saturation in percent corresponding to water content of 20%
f) Which test should be conducted? for a saturated cohesive soil if a triaxial shear test yields the angle of internal friction $\Phi = 0$ (zero)

Q.7 a) In an unconsolidated undrain triaxial test, it is observed that an increase in cell pressure from 150KPa to 250KPa loads to a pore pressure increase of 80KPa it is further observed that an increase of 50KPa in deviatoric stress results in an increase of 25KPa in the pore pressure find the value of skemptions pore pressure parameter 08

b) Explain new marks influence chart preparation & usage 07

Q.8 a) Explain shear characteristics of sand 07

b) In an uncontained compression test, a sample of sandy clay 8cm long & 4cm in diameter fails under a load of 120N at 10% strain compute the shearing resistance taking into account the effect of change in cross section of sample 08

Q.9 a) Show graphical representation or graph between C & Φ for 07

1) Sandy soil
2) Clayey soil
3) Moist sand

b) Under what circumstances following shear tests use? Specify reasons 08

1) Shear box
2) Vane shear test
3) Unconfined compression test

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Q.10 Attempt any three 15

a) Explain plastic equilibrium in soils
b) Differentiate between coulomb's theories & Rankine's theory
c) What are the factors affecting the stability of soil
d) Discuss graphical method for active earth pressure
e) Differentiate finite & infinite slope

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