Printed Pages: 02 **Sub Code: NCE 501**

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B TECH
(SEM-V) THEORY EXAMINATION 2018-19
GEOTECHNICAL ENGINEERING

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. What are the building blocks of clay minerals?
b. List out common laboratory methods to determine water content.
c. Define corrections in hydrometer analysis.
d. What are consolidation characteristics?
e. Define pore pressure.
f. What are the uses of method of Drilling?
g. Define local shear failure.
h. Where mat foundation will be provided?
i. What is meant by gradation?
j. Define inclined backfill.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. A soil has a bulk density of 2 gm/cc and water content of 12.5%. Determine the water content if the soil the soil partially dries to a density of 1.96 gm/cc and the void ratio remain unchanged.
b. What is the use of particle size distribution curve? With the help of particle size distribution curve.
c. A shear box test on clean sand give a failure stress of 70 KPa when the normal stress was 200 KPa. Draw the Mohr circle and Mohar envelop and find the principal stress at fand the orientation of the principal planes.
d. Define the terms (i) Quick sand condition (ii) Exit gradient (ii) UU Test
e. Explain the consolidation phenomenon using Terzaghi's spring analogy.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) Describe the variable head method for determining the permeability of soil.
(b) A layer of saturated clay 4 mtr thick is overlain by sand 5 m deep the water being 3 m. below the surface. The saturated unit weights of the clay and sand are 19 and 20 kN/m^3. Determine the values of total vertical stress at the bottom and interface layers. Also plot their variations.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Determine the values of effective stress in case of a submerged soil mass.
(b) The insitu void ratio of a granular soil deposits is 0.50. The maximum and minimum soil ratios of the soil were determined to be 0.75 and 0.35. Gs=2.67 also determine the relative density and relative compaction of the deposit.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) What are the sand drains? Why these are provided? What are the effects of settlement?

(b) The following data were recorded ib a constant head permeability test. Inofpermeameter =75 cm. Head loss over a sample length of 18 cm=24.7 cm. Quantity of water collected in 60 sec=626 ml, porosity of the soil sample was 44%, Calculate the coefficient of permeability of the soil. Also Determine the seepage velocity during the test.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) What are the assumptions of Boussines equation for stress distribution? Discuss the limitations of the equations.

(b) A rectangular area 2mx4m carries a uniform load of 8 t/m2 at the ground surface .find the vertical pressure at 5 m below the centre and corner of the loaded area.

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Describe the stages in sub-surface explorations and what are the purposes of Site Investigation.

(b) How will you calculate the bearing capacity as per Indian Standard method? Show and explain the effect of water table on bearing capacity equation by Terzaghi.