

**B.TECH. SEM -VI (CIVIL) 2014 COURSE (CBCS) : SUMMER -
2018**

SUBJECT: GEOTECHNICAL ENGINEERING

Day: Friday
Date: 08/06/2018

S-2018-2397

Time: 02.30 PM TO 05.30 PM
Max. Marks: 60

N.B:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Assume suitable data if necessary.
- 4) Use of non-programmable **CALCULATOR** is allowed.
- 5) Draw neat labeled diagram **WHEREVER** necessary.

Q.1 a) What are the soil classification systems? Explain any one in brief. **(04)**

b) Derive with usual notation. **(06)**

$$\gamma_{sat} = (G + e)\gamma_w / (1 + e)$$

OR

a) Define and mention the formula. **(06)**

i) Water content

ii) Specific Gravity

iii) Porosity

iv) Percentage air voids

b) Explain the Geological Cycle of soil. **(04)**

Q.2 a) Explain the step by step procedure of determination of Specific Gravity of coarse grained soil. **(05)**

b) Explain the Casagrande plasticity chart with neat sketch. **(05)**

Q.3 a) What are the applications of flow net? **(05)**

b) Calculate the coefficient of permeability of a soil sample, 8cm in height and 60 cm² in cross section if a quantity of water equal to 600 ml passed in 12 minutes under an effective constant head of 60 cm. **(05)**

OR

Describe the variable head permeability test with neat sketch. Derive the formula to compute coefficient of permeability by the same. **(10)**

P.T.O.

- Q.4** a) State and explain the terms involved in Boussinesq's point load equation for vertical stress distribution. (04)
- b) Describe the field compaction methods with respect to type of soils. (06)

OR

- a) A concentrated load of 2.7 KN acts on the surface of homogeneous soil mass, Find the stress intensity at a depth of 13 meter. (06)
- i) Directly under the load.
- ii) At a horizontal distance of 6 meter using Boussinesq's equation.
- b) How will you ensure the compaction control at the time of construction of earthen dam? (04)

- Q.5** a) What are advantages and disadvantages of triaxle shear test? (05)
- b) Derive the formula to compute shear strength of soil by Vane Shear Test (05)

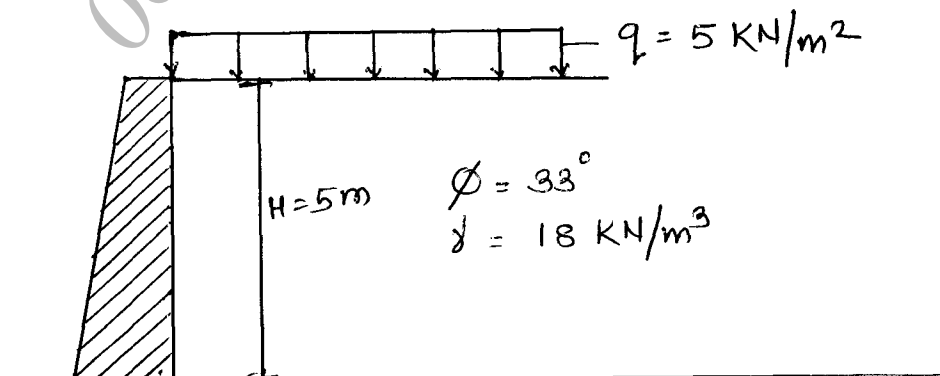
OR

- a) A specimen of clean sand, when subjected to direct shear test failed at a shear stress of 100 KN/m^2 when normal stress intensity 120 KN/m^2 and other specimen of same sand was failed at a shear stress of 120 KN/m^2 when normal stress of 150 KN/m^2 . Determine cohesion and angle of internal friction. (04)
- b) Describe the Mohr circle for C-soil, $C-\phi$ soil and ϕ - soil. (06)

- Q.6** a) Describe procedure to compute active earth pressure by Rebhann's Graphical Method with neat diagram. (06)
- b) Determine active and passive earth pressure for given data. Height of retaining wall = 12m, $\phi = 20^\circ$, $\gamma_{sat} = 22.5 \text{ KN/m}^3$. Ground water table is at the top of the retaining wall. (04)

OR

- a) What is coefficient of earth pressure 'K'. Describe Active and passive earth pressure condition. (04)
- b) Determine the active pressure and passive pressure using the following data in given figure. (06)



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