

B.Tech. SEM -VI (Civil) 2014 Course (CBCS) : WINTER - 2018

SUBJECT: GEOTECHNICAL ENGINEERING

Day: Friday
Date: 16/11/2018

W-2018-2452

Time: 10.00 AM TO 01.00 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 non-programmable **calculator** is allowed.

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- Q.1 a)** Explain the various soil deposits in India. (06)
- b)** Describe various types of soil structure giving examples and with neat sketches. (04)

OR

- Q.1** Describe textural classification system with neat sketch. If soil is composed of 45% of sand, 40% of silt and 15% of clay, show textural classification. (10)
- Q.2** The following results were obtained from the liquid limit test. (10)

Number of Blows	55	45	38	25	16
% Water Content	23	32	36	43	50

Find the liquid limit. Also determine plasticity index, liquidity index, and consistency index if plastic limit is 25% and natural water content is 31%.

OR

- Q.2** Describe the pycnometer method for determination of specific gravity and water content of soil with neat sketch. (10)
- Q.3** What is a flow net? What are its properties and applications? Draw a typical flow net below a sheet pile. (10)

OR

- Q.3** An unconfined aquifer has thickness of 35m. A fully penetrating 25cm diameter well in the aquifer is pumped out at a rate of 42 litres/s. The drawdown measured in two observation wells located at distances of 20m and 80m from the well are 8m and 1.2 m respectively. Determine the coefficient of permeability of the aquifer. At what distance from the well the drawdown is insignificant? (10)
- Q.4** Calculate the vertical stress distribution due to point load of 35kN at 6m depth below the point load and 4m away from the load. Use Boussinesq's and Westergaard's theory. Compare the results. (10)

OR

- Q.4** Discuss the effect of compaction on Engineering properties of soil. (10)

P.T.O.

Q.5 a) Explain the salient features of Mohr-Coulomb failure theory. **(05)**

b) A cylindrical specimen of a saturated soil fails under an axial stress of 15 kN/m^2 in an unconfined compression test. The failure plane makes an angle of 55° with the horizontal. Calculate the cohesion and angle of internal friction of the soil. **(05)**

OR

Q.5 Describe the Direct shear test with principle, apparatus, procedure, results, advantages and disadvantages including neat sketch. **(10)**

Q.6 Describe the Coulomb's wedge theory of earth pressure. **(10)**

OR

Q.6 a) Explain Rankine's earth pressure theory for cohesionless Backfill with uniform surcharge 'q'. **(05)**

b) Calculate the total active thrust on a vertical wall 4m high, retaining a horizontal sand backfill with unit weight 20 kNm^3 , angle of shearing resistance $\phi = 30^\circ$ when water table is at the bottom of the wall. **(05)**

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