DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY,
LONERE – RAIGAD -402 103
Winter Semester Examination – December - 2019

Branch: Civil Engineering **Sem.:- V**
Subject with Subject Code:- BTCVC 503 Soil Mechanics **Marks: 60**
Date:- 13/12/2019 **Time:- 3 Hr.**

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Instructions to the Students

1. Each question carries 12 marks.
2. Attempt **any five** questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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(Marks)

Q.1. a) Explain the three phase system of soil with neat diagram (06)

b) Explain the structure of the following soil minerals; (a) Montmorillonite, (b) Illite with neat diagram (06)

Q.2. a) What is bulk, dry, saturated and submerged unit weight of the soil? Also state the difference between bulk unit weight and bulk dry density (06)

b) Explain the plasticity chart as per IS 1498 Part I with neat drawing and detailing (06)

Q.3. a) Explain Constant head laboratory permeability test with neat diagram and equation to determine the co-efficient of permeability. (06)

b) A falling-head permeability test was performed on sample of clean, uniform sand. One minute was required for the initial head of 100 cm to fall to 50 cm in the stand pipe of the cross-sectional area 1.50 cm^2. If the sample was 4 cm in diameter and 30 cm long, calculate the coefficient of permeability of the sand. (06)

Q.4. a) Explain the procedure to conduct direct shear test on a soil specimen with neat diagram and representative results graphs. (06)

b) The following results were obtained from a consolidated-undrained ($C\bar{U}$) test on a normally consolidated clay. Plot the strength envelope in terms of total stresses and effective stresses and determine the strength parameters. (06)

Sample No.	Cell Pressure (kN/m^2)	Deviator Stress (kN/m^2)	Pore water pressure (kN/m^2)
1	250	152	120
2	500	300	250
3	750	455	350

Q.5. Solve any two of the following (06)

a) Explain the consolidation phenomenon with the help of spring analogy.

b) The following results were obtained from a Standard Compaction test on a sample of soil, the volume of the mould used was 950 ml. Make necessary calculations and plot the compaction curve and obtain the maximum dry density and the optimum moisture content.

Water content (%)	12	14	16	18	20	22
Mass of wet soil (kg)	1.68	1.85	1.91	1.87	1.87	1.85

(06)

Q.6. a) State and explain the active, at rest and passive state of earth pressure. Also calculate the active, at rest and passive earth pressure for soil with angle of internal friction equal to 33°. (06)

b) Determine the active pressure on the retaining wall shown in following fig. Take $\gamma_w = 10$ kN/m^3 (06)

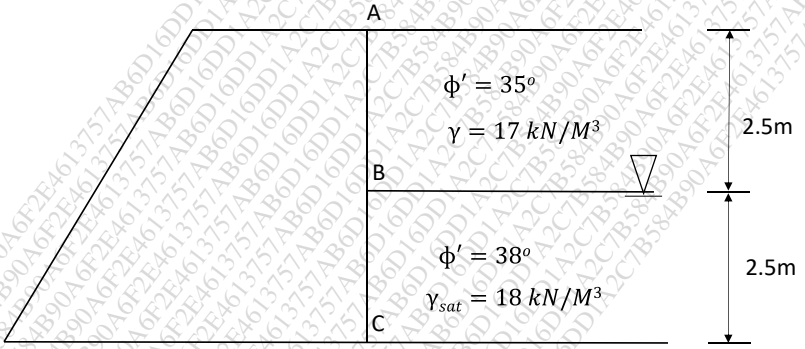

Fig. (a)

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