

KATIHAR ENGINEERING COLLEGE, KATIHAR

CIVIL ENGINEERING, 3rd Year (Semester-VI)

Subject: Soil & Rock Mechanics

Max. Marks: 05

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Assignment-II

Q.1 A cylindrical sample of soil having cohesion of 0.8 kg/cm^2 and angle of internal friction of 20° , is subjected to a cell pressure of 1 kg/cm^2 . The maximum deviator stress ----- kg/cm^2 at which the sample will fail and the angle made by the failure plane with the axis of sample is -----degree.

Q.2 An embankment 5 m high is made up of soil whose effective stress parameter are $c' = 50 \text{ kN/m}^2$ and $\phi' = 16^\circ$ and $\gamma = 16.2 \text{ kg/m}^3$. The pore pressure parameters as found from triaxial test are $A = 0.4$ and $B = 0.92$. The shear strength of the soil----- kN/m^2 at the base of the embankment just after the soil has been raised from 5m to 8 m. Assume that dissipation of pore pressure during the stage of construction is negligible and that the lateral pressure at any point is one half of the vertical pressure.

Q.3 In an unconfined compression test, a sample of clay 100 mm long and 50 mm in diameter fails under a load of 150 N at 10% strain. The shearing resistance of the soil is ----- kN/m^2 if shear resistance taking into account the effect of change in cross section of the sample.

Q.4 Two samples of a soil were tested in a triaxial machine. The all-round pressure maintained for the first was 2 kg/cm^2 and failure occurred at additional axial stress of 7.7 kg/cm^2 , while for the second these values were 5 kg/cm^2 and 13.7 kg/cm^2 respectively. The value of cohesion (in kg/cm^2) and angle of internal friction (in degree) are respectively

- (a) 2, 25 (b) 1.902, 28 (c) 1.068, 30 (d) 1.042, 35

Q.5 A vane shear of 7.5 cm diameter and 11 cm length was used to measure the shear strength of soft clay. If torque of 600 kg-cm was required to shear the soil, the value of shear strength of soil (in kg/cm^2) is ----- . The vane was then rotated rapidly to cause remoulding of the soil. The torque required in the remoulded state was 200 kg-cm then sensitivity of the soil is -----

Q.6 A cohesionless soil with void ratio of 0.6 and specific gravity of solids = 2.65 exists at a site where water table is located at a depth of 2 m below the ground surface. Assuming the value of coefficient of earth pressure at rest is 0.5 then the value of lateral earth pressure at a depth of 5 m below the ground surface is ----- kN/m^2 .

Q.7 A vertical excavation was made in a clay deposit having unit weight of 22 kN/m^3 . It caved in after digging reached 4 m depth. Assuming $\Phi = 30^\circ$, the value of cohesion in kN/m^2 is -----

Q.8 The consolidated drained shear tests on silt yielded the following data:

Sr.No.	σ_3 (N/mm^2)	σ_1 (N/mm^2)
1.	0.2	0.46
2.	0.4	0.88

If the material is used as a backfill for smooth vertical retaining wall of 10 m height. The active force before the tension crack is ----- kN/m and after the tension crack is ----- kN/m . Take Unit weight of soil is 1.6 g/cc .

Q.9 A 4 m high vertical wall supports a saturated cohesive soil ($\Phi=0$) with horizontal surface. The top 2.5 m of the backfill has bulk density of 17.6 kN/m^3 and apparent cohesion of 15 kN/m^2 . The bulk density and apparent cohesion of the bottom 1.5 m is 19.2 kN/m^3 and 20 kN/m^2 respectively. If tension crack develops, the total negative active thrust (in kN/m) is ----- and the total active force on the wall is ----- kN/m

Q.10 A 20 m high vertical retaining wall supports a cohesionless fill of unit weight 1.8 t/m^3 . The upper surface of the fill rises from the edge of the wall at an angle of 10° to the horizontal. Assuming Φ to be 30° and angle of wall friction = 20° then total active thrust on the wall in t/m is

- (a) 142.4 (b) 122.4 (c) 162.4 (d) 172.4