Navrachana University
School of Engineering & Technology
End-Semester Examination May 2023
B. Tech Civil Engineering
3rd Year and 6th Semester
Geotechnical Engineering –I and CE-214

Date: 19-05-2023
Time: 2 pm to 4 pm

Marks: 40

Instructions:

- ➔ Write each answer on a new page
- ➔ Use of calculator is permitted
- ➔ Any other relevant instruction

Q. No.	Details	Marks	CO	BTL
Q.1	**Short Questions (Any 10)** 1. Amount of Immediate consolidation is higher in _____. (a) Cohesive soils (b) Cohesionless soils (c) organic soils (d) None of the above 2. Define Stream lines. 3. In the Unconfined compression test (UC test) the maximum deviatoric stress at which the sample fails IS 1200 kPa. Determine the undrained cohesion (c_u) of the cohesive soil. (a)100 kPa (b) 600 kPa (c) 125 kPa(d) 200 kPa 4. Dispersed structure of soil possesses higher load carrying capacity as compared to the flocculated structure (True/ False) 5. Define the Liquid limit of soil 6. Permeability of clayey soil be evaluated by performing a constant head permeability test. (True/ False) 7. For soil classified as CH_____test should be recommended to obtain the shear strength parameters. (True / False) 8. $\sigma_d = \sigma_1 - \sigma_3$ (True / False) 9. Define Over Consolidated soil 10. The core of an earthen dam is generally compacted wet of optimum (True/ False) 11. Clay particles are visible through naked eyes. (True/ False)	10	1,2,3,4	1,2,3
Q.2 (a)	Explain in detail the Vibro-flotation type of compaction in detail	5	2	1,2,3

Q2 (b)	Explain the Constant head permeability test in detail. **OR**	5	2	1,2,3
Q2 (b)	Explain the Characteristics of Flow Net in detail	5	2	1,2,3
Q.3 (a)	State the assumptions in Terzaghi's theory of 1D consolidation.	5	3	2,3,4
Q.3 (b)	State the limitations of the Direct shear and Unconfined compression tests in detail.	5	4	2,3,4
Q.3 (b)	**OR** Derive the relationship between major and minor principal stress according to Mohr-Coulomb failure criterion.	5	4	2,3,4
Q.4	A layer of soft clay 4m thick is present below a newly constructed building. The overburden pressure over the center of the clay layer is 300 kPa. The increase in the pressure due to construction is 100 kPa. Calculate the settlement. Take Cc = 0.50 and e_0 = 1.35.	**5**	**4**	2,3,4,6
Q.5	An unconfined compression test was conducted on an undisturbed sample of clay. The sample had a diameter of 38 mm and 76 mm long. The load at failure measured by the load cell was 35 N and the axial deformation of the sample at failure was 18 mm. Determine the unconfined compressive strength and the undrained shear strength of the clay. **OR**	**5**	**3**	2,3,4,6
Q.5	The major and minor principal stresses at failure in cohesionless soil sample, are 80 kPa and 40 kPa respectively. Determine the (i) angle of shearing resistance (ϕ) (ii) the inclination of failure plane to major principal plane (iii) Normal and Shear stresses at failure.	**5**	**4**	2,3,4,6

---------End of Question Paper---------