APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIRST SEMESTER M. TECH DEGREE EXAMINATION
Civil Engineering
(Geomechanics & Structures)
04CE6313—Critical State Soil Mechanics

Max. Marks: 60   Duration: 3 Hours

PART A
Answer All Questions
Assume any missing data, if any
Each question carries 3 marks

1. Explain soil elasticity.

2. What is meant by yielding?

3. What is critical state line?

4. What is hypo elasticity?

5. Explain over consolidated behavior of clay.

6. Explain normality condition.

7. What is hyper elasticity?

8. What is flow rule?

PART B
Each question carries 6 marks

9. Explain Taylors Model for dilation based on critical state concept..

OR

10. Prove that for an ideal elastic material, volumetric strains are stress variant p' and separated from q' and shear strains are connected to q' separated from p'.

11. Explain work hardening theory.

OR

12. In a triaxial test , soil sample was subjected to isotropic consolidation under effective consolidation pressure of 150 kPa. The specific volume at this stage is 1.9. After the consolidation, deviator stress applied till failure. At critical state deviator stress and pore pressure are 240 kPa and 60 kPa respectively. Calculate the values of q' and p' at failure if the same sample is subjected to drained test. Assume $\lambda=0.2$

13. Explain critical state lines for granular soils.

OR

14. Explain the relationship between undrained shear strength, water content and critical state parameters.

15. Explain how fall cone test can be used to determine λ and plastic limit.

OR

16. Discuss in detail complete state boundary surface.

17. Describe the salient features of cam clay and modified cam clay models.

OR

18. Describe yield surface and explain yield surface for one model.

19. Explain the application of elasto-plastic model for circular load on clay foundation.

OR

20. Explain about principal stress ratio in soil about to fail.