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B.TECH. DEGREE EXAMINATION, MAY 2014

Sixth Semester

Branch : Civil Engineering

CE 010 606 L06 – SOIL STABILITY ANALYSIS (Elective I) (CE)

(New Scheme – 2010 Admission onwards)

[Regular/Improvement/Supplementary]

Maximum : 100 Marks

Time : Three Hours

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Discuss briefly about the advantages and uses of Laplace's equation in soil mechanics.

2. Define Taylor's stability number.

3. Enumerate the various causes of landslides.

4. What is meant by liquefaction?

5. Comment on the reasons for underpinning.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. With neat sketches, explain any *one* method for the construction of a flow net.

7. Differentiate between the Swedish and the friction circle methods for analysing the stability of slopes.

8. Explain the instrumentation used for the prediction of landslides.

9. Enumerate the various types of shores with one *or* two sentences to describe each.

10. Briefly explain the problems encountered during the underpinning operation.

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each question carries 12 marks.

11. Draw the phreatic line for an Earth Dam with the following data :

Width of cross section of dam = 150 m, Crest of the dam = 6 m, Height of the dam = 20 m, Upstream slope = 4H : 1V, Downstream slope = 3H : 1V, Upstream water level = 8 m and there is no water on the downstream side. There is a horizontal filter 30 m wide at the base of the dam starting from the toe. The water level touches the upstream side of the dam at a horizontal distance of 80 m measured along the base of the dam from its toe. If the coefficient of permeability of the soil used in the dam is 5×10^{-4} cm/s, find the seepage flow per unit length of the dam.

Or

12. Elaborately explain the method of computation of seepage through an Earth Dam which is in an anisotropic soil condition.

13. The height of an embankment is 9 m and has a slope of 1 V : 2H. The material properties of the embankment are γ = 18.5 kN/m³, c = 15 kPa and ϕ = 12°. The slip circle passes through the toe and the centre of the circle is 35 m vertically above the toe. Find the factor of safety of the slope against sliding using Swedish circle method.

Or

14. A 7 m high embankment is required for the construction of a railway track. The soil to be used for the construction of the embankment has the following properties, γ = 18.5 kN/m³, c = 15 kPa and ϕ = 15°. Hard rocky stratum is available at a depth of 3 m below the ground level. Determine the critical maximum side slope angle for the embankment. Use Taylor's stability charts.

15. Describe the methods used for the analysis of landslides.

Or

16. Describe the safety measures used against the occurrence of landslides.

17. What is ground shaking? Describe the different modes of ground shaking.

Or

18. Explain the various methods for Seismic hazard Analysis.

19. Explain with neat sketches the various special underpinning methods.

Or

20. What do you understand by the term moving Structures ? Explain the concept with neat sketches.

(5 × 12 = 60 marks)