Register No.: ..... Name: .....

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SIXTH SEMESTER B.TECH DEGREE EXAMINATION (R), MAY 2023

(2020 SCHEME)

Course Code : 20CET394

Course Name: Earth Dams and Earth Retaining Structures

Max. Marks : 100 **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Describe the classification of earth dams.
2. Distinguish between homogenous and zoned type earth dams.
3. Define phreatic line. Why is it necessary to predict the position of phreatic line?
4. List the methods of measurement of pore pressure.
5. What is the significance of capillary tension in earth pressure computation?
6. State the assumptions in Rankine's theory.
7. Differentiate between a flexible and rigid retaining wall.
8. How will you check the stability of a gravity retaining wall?
9. What is the meant by free earth support and fixed earth support in the case of anchored sheet pile walls?
10. How is cantilever sheet piling different from anchored sheet piling?

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Discuss the criteria for the selection of a type of dam. (9)
    b) Explain Terzaghi's filter design criteria. (5)

OR

12. a) Suggest some measures to control seepage through the dam. (8)
    b) Describe the basic details necessary for the design if an earth dam. (6)

MODULE II

13. Explain Casagrande method of determining the phreatic line in an earth dam without filters with the help of a neat sketch. (14)

OR

14. a) Describe how you will evaluate the stability of a slope using Swedish slip circle method. (8)

b) Which are the critical stability conditions of a dam? Explain. (6)

MODULE III

15. a) A retaining wall 10m high retains a cohesionless soil having an angle of internal friction of 30°. The surface of the soil is level with the top of the wall. The top 3 m of the fill has a unit weight of 20 kN/m^3 and that of the rest is 30 kN/m^3. Find the magnitude per meter run and point of application of the resultant active thrust. Assume same φ for both strata. Draw the pressure distribution diagram also. (8)

b) An unsupported excavation is to be made in a clay layer. If γ = 18 kN/m^3, c = 30 kN/m^2 and φ = 10°. Calculate the maximum possible unsupported depth. Also draw the active pressure distribution diagram. (6)

OR

16. a) List the assumptions in Coulomb's earth pressure theory. (5)

b) Describe the trial wedge method for computation of earth pressure. (9)

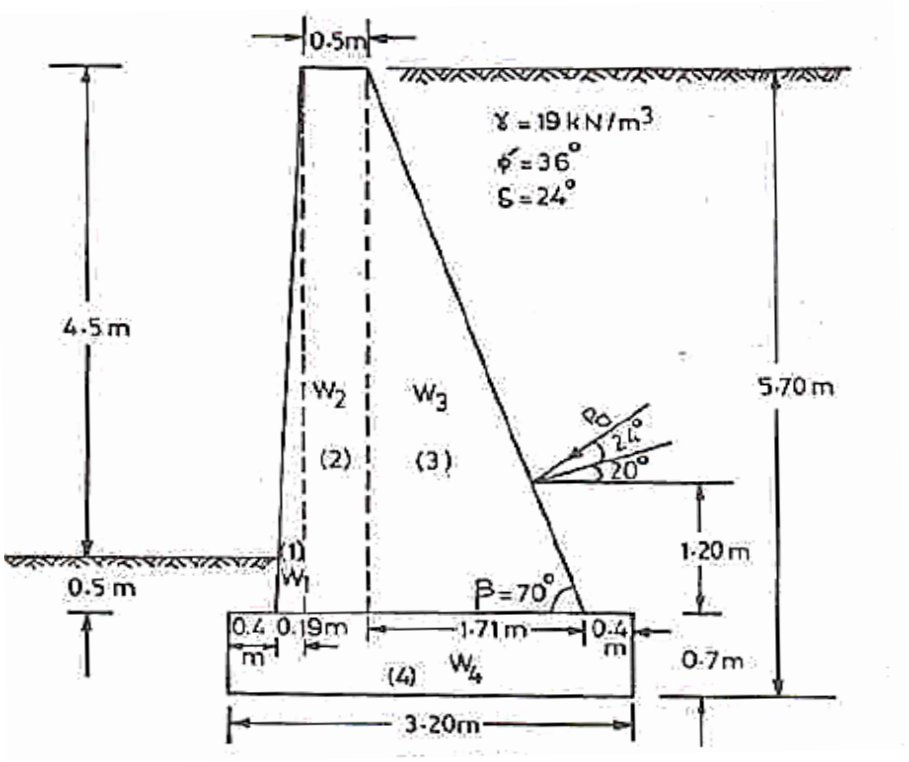
MODULE IV

17. a) A retaining wall 3.6 m high supports a dry cohesionless backfill with a plane ground surface sloping upwards at a surcharge angle of 10° from the top of the wall. The back of the wall is inclined to the vertical at a positive batter angle of 9°. The unit weight of backfill is 18.9 kN/m^3 and φ = 30°. Assuming a friction angle of 12°, determine the total active thrust by Rebhann's method. (8)

b) Explain friction circle method. (6)

OR

18. Check the stability of a gravity retaining wall shown in figure. Take allowable soil pressure = 600 kN/m^2. Use Coulomb's theory. (14)



MODULE V

19. a) Describe the construction of diaphragm walls. (7)
    b) Enumerate Rowe's moment reduction method. (7)

OR

20. a) Which are the different types of coffer dams? Discuss in detail the step by step procedure for the construction of a cellular coffer dam. (8)
    b) Sketch the pressure distribution diagram of a cantilever sheet pile wall in cohesive and cohesionless soil. (6)

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