Mid-West University

Examinations Management Office

Semester End Examinations 2081

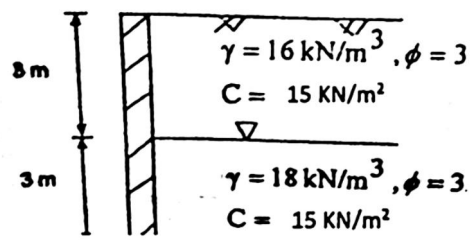
Bachelor level/ B.E. Hydropower/ 5th Semester — Full Marks: 50

Time: 3 hours — Pass Marks: 25

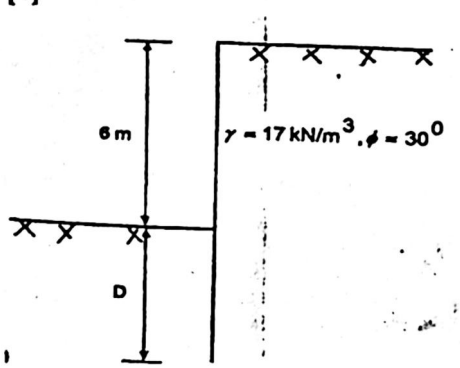
Subject: Foundation Engineering (HE454/HE304)

- *Attempt all the questions*
- *Figures in the margin indicate full marks.*
- *Assume suitable values, with a stipulation, if necessary.*
- *Candidates are required to answer the questions in their own words as far as possible.*

1. Define foundation engineering. Enlist the requirement of the foundation. **[3]**
2. Write the importance of site investigation prior to design of foundation. Describe the different stages in site investigation in details. **[5]**
3. Compute the area ratio of sampling tube given the outside diameter of 104mm and inside diameter of 96 mm. what is recovery ration, if the sampling tube is pushed into medium stiff clay at the bottom of the borehole, a distance of 570mm and the length of the sample recovered is 540 mm? **[3]**
4. Classify retaining structures. Describe stability analysis of retaining wall. **[4]**
5. Determine the active earth pressure and the total active force on the retaining wall shown in figure using Rankine's theory. Also determine the point of application. **[6]**



6. Determine the depth of embedment for the cantilever sheet pile shown in fig below. The soil has effective unit weight of 17 KN/m^3 and angle of internal friction of 30^0. Use simplified method. **[4]**



7. What are the factors affecting bearing capacity of soil? A square footing (5m*5m) carries a total load including its own weight of 10000KN. The base of the footing is at a depth of 3m below the ground surface. The soil strata at the site consist of a layer of stiff fully saturated clay 27.5 m thick overlaying dense sand. The average bulk density of the clay is 19.2 KN/m^3, and its average shear strength is 130 KN/m^2. Determine; **[1+4]**

a) Ultimate bearing capacity
b) Net ultimate bearing capacity
c) Factor of safety

8. A group of nine piles 250 mm in diameter is driven in a square grid. The piles are cast tin site and are 12 m long. the unconfined compressive strength of the clay is 70 KN/m^2. Compute the centre to centre spacing of the piles for the group efficiency factor of 1. Neglect bearing at the tip of piles and Take adhesion factor 1. **[5]**
9. What do you mean by machine foundation? Write down various empirical formula for analysis machine foundation. **[5]**
10. Explain the selection of seepage control measures for earth and rockfill dams. **[5]**
11. Define foundation soil improvement. Explain different methods of soil improvement. **[5]**

The End