**E. G. S. PILLAY ENGINEERING COLLEGE, NAGAPATTINAM.**

**DEPARTMENT OF CIVIL ENGINEERING**

**IMPORTANT ANNA UNIVERSITY QUESTIONS**

**CE6502 & FOUNDATION ENGINEERING**

 **Year/Sem: III/V** Subject Incharge:M.Anbarasan

**PART - A**

**UNIT -I**

1. What are the information obtained in general exploration? (may-june 2013)

2. Define significant depth? (may-june 2011)

3. What are the types of soil samples?(nov-dec-2012)

4. What is the difference between disturbed and undisturbed soil sample?

5. What are the disadvantages of wash boring? (may-june-2012)

6. What are design features that affect the sample disturbance? (nov-dec-2013)

7. What are the corrections to be applied to the standard penetration number? (nov-dec-2014)

8. What are various methods of site exploration? (nov-dec-2011)

9. What are the methods of boring? (nov-dec-2012)

10. Define area ratio? (nov-dec-2014)

11. Define liquefaction of sand? (may-june-2014)

12. How will you reduce the area ratio of a sampler? (nov-dec-2013

**UNIT -II**

1. What are components of total foundation settlement? (may-june-2014)

2. What are the types of shear failure? (may-june-2011)

3. What are assumptions in Terzaghi’s bearing capacity theory?

4. List out the methods of computing elastic settlements?

5. What are the limitation of Terzaghi’s analysis?

 6. Define ultimate bearing capacity? (may-june 2013)

 7. Define net ultimate bearing capacity ? (may-june 2013)

 8. Define allowable bearing capacity? (nov-dec-2013)

9. Write the expression for correction due to dilatancy submergence?

10.What are the requirements for a stable foundation? (may-june 2010)

11. What are the factors which depends depth? (may-june 2008)

12 .Define net pressure intensity? (may-june 2005)

13. What are the zones used in the Terzaghi’s bearing capacity analysis for dividing thefailure envelope of the soil.? (may-june 2015)

14. Write the ultimate bearing capacity equation for the general shear failure of soil in Terzaghi’s analysis for a strip footing.

15. Define Shallow foundation. (may-june 2010)

16. Write down the equation for estimating the elastic settlement based on the theory of elasticity.? (may-june 2011)

18. When will the total settlement be completed in the case of cohesion-less soil? (nov-dec-2013)

 19. Define differential settlement(may-june-2014)

20. What type of shear failure of soil is more likely to happen in the case of very dense soil? (may-june 2011)

 21. Write the ultimate bearing capacity equation for the general shear failure of soil in Terzaghi’s analysis for a square footing. (may-june-2014)

 22. Write down the reduction factors for water table level to be applied in the ultimate bearing capacity equation. (nov-dec-2013)

23. Draw the pressure distribution diagrams under a footing on cohesion less and cohesive soils.

24. When will the Consolidation settlement get completed?

25. Define Deep foundation

 26. For which type of foundation, Terzaghi’s bearing capacity equation is applicable. Why? (may-june 2013)

**UNIT –III**

1. Under what circumstances, a strap footing is adopted? (may-june-2012)

2. What is a mat foundation? (nov-dec-2013)

3. Where mat foundation is used? (nov-dec 2012)

4. Define spread footing? (may-june-2012)

5. What are types of foundation?

6. What are the footings comes under shallow foundation?

7. What are the footings comes under deep foundation? (nov-dec-2011)

8. Define floating foundation? (nov-dec-2013)

9. What is mean by proportioning of footing? (nov-dec-2011)

10. What are the assumptions made in combined footing?

**UNIT –IV**

1. List out the type of pile based on material used?(nov-dec 2014)

2. How is the selection of pile carried out?

3. What is mean by group settlement ratio?

4. What are the factors consider while selecting the type of pile? (nov-dec 2014)

5. What are the type of hammer? (may-june 2013)

6. What is pile driver?

7. What are methods to determine the load carrying capacity of a pile?

8. What are the two types of dynamic formulae?

9. What is meant by single-under reamed pile?

10. Write down the static formulae?

11. Define modulus of subgrade reaction? (may-june 2013)

12. Find the group efficiency using Feld’s rule for 9 piles in a group. (nov-dec 2014)

13. A pile group consisting of four piles is in a square pattern with equal spacing in both the directions. Find the c/c spacing in terms of the diameter of the piles, if efficiency of the group is 75% as per Converse-Labarre formula. (nov-dec-2011)

**UNIT -V**

1.Define conjugate stresses? (nov-dec 2014)

2. How do you check the stability of retaining walls?

3. Define angle of repose ? (may-june 2013)

4. Define theory of plasticity? (may-june – 2012)

5. What are assumption in coulomb wedge theory?(may-june – 2012)

6. How to prevent land sliding? (may-june 2013)

7. Write down any two assumptions of Rankine’s theory?

8. Distinguish Coloumb’s wedge theory from Rankine’s theory?

9. Make an estimate of lateral earth pressure coefficient on a basement wall supports soil to a depth of 2 m. Unit weight and angle of shearing resistance of retained soil are 16 kN/m3 and 32° respectively. (nov-dec 2014)

10. Draw the lateral earth pressure diagram of clay depends for active condition. (nov-dec-2011)

**PART – B**

**UNIT –I**

1. Explain any two methods of site exploration in detail? (may-june – 2012)

2. Explain wash boring method of soil exploration? (nov-dec 2014)

3. Explain the arrangements and operations of stationary piston sampler?

4. Explain about standard penetration test? (may-june – 2012)

5. Explain any two important types of samplers(may-june 2013)

6. Explain with neat sketch auger boring method of soil exploration. (may-june 2013)

7. Explain dynamic cone penetration test. (nov-dec 2014)

8. Describe the salient features of a good sub-soil investigation report? (may-june 2011)

**UNIT –II**

1. What is shallow foundation? Explain its types? (may-june 2011)

2. What is settlement? What are the components of settlement? Distinguish between them? (may-june 2013)

3. Explain the test to be conducted for find out the bearing capacity? (may-june – 2012)

4. What is bearing capacity? What are the factors affecting bearing capacity? what are improving factors of bearing capacity? (may-june 2010)

5. A Strip footing of width 3m is founded at a depth of 2m below the ground surface in a (c-ø) soil having a cohesion c = 30 kN/m2 and angle of shearing resistance \_ = 35o. The water table is at a depth of 5m below ground level. The moist weight of soil above the water table is 17.25 kN/m2. For ø = 35o, Nc = 57.8, Nq = 41.4 and Nγ = 42.4

Determine (i) the ultimate bearing capacity of th soil

(ii) the net bearing capacity of soil

(iii) the net allowable bearing pressure and the load/m length

for a FS = 3. Use the general shear failure theory of Terzaghi. (may-june – 2011)

6. Size of an isolated footing is to be limited to 1.5 metres square. Calculate the depth at which the footing should be placed to take a load of 200 kN, with a factor of safety 3.The soil is having angle of internal friction for ø = 30o. The weight of the soil is 21 kN/m3. Bearing capacity factor for = 30o, Nq=22 and Nγ = 20. (may-june – 2010)

7. Calculate the settlement of a structure founded on a clay. Thickness of clay stratum is 6m at 10m below from the ground level. The overlaying layer is sand upto ground level. Water table is at 6m from the ground level. Unit weight of sand above the water table is 18 kN/m3 and below water table it is 21 kN/m3. Specific gravity of the clay is 2.75, natural moisture content of the clay is 40% and its liquid limit is 45%. Increase in

overburden pressure at the centre of the clay structure, due to proposed construction of the building is 100 kN/m2. (may-june 2013)

8. Explain Terzaghi’s analysis of bearing capacity of soil in general shear failure. (may-june – 2010)

9. A Strip footing of width 3m is founded at a depth of 2m below the ground surface in a (c- ø ) soil having a cohesion c = 30 kN/m2 and angle of shearing resistance = 35o.The moist weight of soil above the water table is 17.25 kN/m2.For \_ = 35o, Nc = 57.8, Nq = 41.4 and N\_ = 42.4

For ø = 25o, Nc = 25.1, Nq = 12.7 and N\_ = 9.7

The water table is at a depth of 5m below ground level. Determine

(i) the ultimate bearing capacity of the soil

(ii) the net bearing capacity of soil

(iii) the net allowable bearing pressure and the load/m length for a FS = 3.

Assume the soil fails in local shear . (may-june – 2010)

10. A Strip footing of width 3m is founded at a depth of 2m below the ground surface in a

(c- ø \_) soil having a cohesion c = 30 kN/m2 and angle of shearing resistance = 35o.

The moist weight of soil above the water table is 17.25 kN/m2.

For \_ = 35o, Nc = 57.8, Nq = 41.4 and N\_ = 42.4

For \_ = 25o, Nc = 25.1, Nq = 12.7 and N\_ = 9.7

If the water table occupies any of the positions(nov-dec – 2010)

(i) 1.25 m below Ground Level or

(ii) 1.25 m below the base level of the foundation,

What will be the net safe bearing pressure?

Assume \_sat = 18.5 kN/m3, \_ (above WT) = 17.5 kN/m3, Factor of Safety = 3(may-june – 2012)

11. Explain different types of shear failures of soil with neat sketch(may-june 2009)

12. Compute the consolidation settlement by oedometer test data method

13. A footing rests at a depth of 1m has a size of 3m x 1.5m and it causes a pressure increment of 200 kN/m2 at its base. The soil profile at the site consists of sand for the top 3 m, which is underlined by a clay layer of 3m. Water table is at a depth of 2.5m

from the ground surface. The unit weight of sand layer above and below water table are 16kN/m3 and 18 kN/m3 respectively. The unit weight of clay is 15 kN/m3. The initial void ratio is 0.8 and compression index is 0.3. Determine the consolidation settlement at the middle of the clay layer. Assume 2:1 pressure distribution and consider the variation of pressure across the depth of the clay layer.

14. Compute the safe bearing capacity of a square footing 1.5 m x 1.5 m located at a depth of 1 m below the ground level in a soil of average density 20 kN/m3. ø = 20°, Nc = 17.7, Nq = 7.4 and N\_ = 5. Assume a suitable factor of safety and that the water table is very deep. Also compute the reduction in safe bearing capacity of the footing

if the water table rises to the ground leve(may-june 2011)l.

**UNIT –III**

1. What are the different types of raft foundations? (may-june 2012)

2. State the design requirement of a foundation? (nov-dec 2010)

3. Briefly explain about the structural design of spread footing (may-june-2011)

4. Briefly explain how proportioning and structural design of trapezoidal combined footing is done with diagram(may-june 2012)

5. Derive the relation between the dimensions of trapezoidal combined footing and unequal column loads Q1 and Q2? (nov-dec 2013)

6. A trapezoidal footing is to be produced to support two square columns of 30 cm and 50 cm sides respectively. Columns are 6 meters apart and the safe bearing capacity of the soil is 400 kN/m2. The bigger column carries a load of 500 kN and the smaller carries a load of 3000kN. Design a suitable size of the footing so that if does not extend beyond the face of the columns. (nov-dec 2011)

**UNIT –IV**

1. Explain the method of determining the load carrying capacity of a pile?

2. What are the cased cast in-situ concrete piles? (may-june 2012)

3. What are the uncased cast in-situ concrete piles?

4. What are different types of piles and their functions?

5. What are group capacity by different method

6. What are the various factors influencing the selection of pile?

7. Explain briefly cyclic load test on pile. (nov-dec 2013)

8. A pile is driven with a single acting steam hammer of weight 15kN with a free fall of 900mm. The final set, the average of the last three blows, is 27.5mm. Find the safe load using the Engineering News formula(nov-dec 2011).

9. A group of 16 piles of 50 cm diameter is arranged with a center to center spacing of 1.0 m. The piles are 9m long and are embedded in soft clay with cohesion 30kN/m. Bearing resistance may be neglected for the piles. Adhesion factor is 0.6. Determine the ultimate load capacity of the pile group. (nov-dec 2011,13)

**UNIT -V**

1. Explain the active and passive states of earth pressure acting on a retaining wall. (may-june 2011)

2. Explain the Coulomb wedge theory with neat sketches(apr-may 2014)

3. Explain the Rebhann’s graphical method for active earth pressure calculation(nov-dec 2014)

4. Explain the Culmann’s graphical method and the effect of line load(nov-dec 2013)

5. Explain the Rankine’s theory for various backfill condition to calculate active state earth pressure. (apr-may 2014)

6. A retaining wall is 4 metres high. Its back is vertical and it has got sandy backfill upto its top. The top of the fill is horizontal and carries a uniform surcharge of 85 kN/m2. Determine the active earth pressure on the wall per metre length of wall. Water table is 1m below the top of the fill. Dry density of soil = 18.5 kN/m3. Moisture content of soil above water table = 12%. Angle of internal friction of soil = 30°, specific gravity of soil particles = 2.65. Porosity of backfill = 30%. The wall friction may be neglected. (nov-dec 2014)