8. QUESTION BANK

UNIT-1

Part A

1. Define challenging soil.
2. What are the major problematic soils?
3. What is expansive soil? Give one example.
4. What is a collapsible soil?
5. What are the difficulties faced with soft clay?
6. How is loose sand a challenging soil?
7. Name the various soil deposits found in India.
8. Name any four ground improvement techniques.
9. What is the need for improving the ground?
10. Briefly write the role played by ground improvement in foundation engineering.
11. Define ground improvement.
12. What is compaction? When is it adopted?
13. What is dewatering? What are the various methods of dewatering?
14. When is pre-loading adopted as a ground improvement technique?
15. What is advantage of using vertical drains along with pre-loading?
16. How are heating and freezing used to improve ground?
17. What is a lime column?
18. What is vibro-compaction? In which soils is it adopted?
19. What is stone column? What are the methods of installing a stone column?
20. What are the various methods of grouting?
21. How is blasting a ground improvement technique?
22. What are the various types of geosynthetics?
23. What is soil reinforcement?
24. What are four major applications of geosynthetics?
25. What is the principle behind electro-kinetic method?
26. What do you understand from the term chemical stabilization?

Part -B

1. Explain in detail the role of ground improvement in foundation engineering.
2. (a) What are the various geotechnical problems faced with black cotton soil, laterite soil and alluvial soil deposits?
   (b) What are the factors influencing the selection of ground improvement techniques?
3. Write in brief about
   (a) Compaction
   (b) Vibro-Compaction
   (c) Pre-loading
   (d) Pre-loading with vertical drains

4. Write short notes on
   (a) Dewatering
   (b) Heating
   (c) Freezing
   (d) Lime columns
5. Write about the following.
   (a) Soil reinforcement
   (b) Chemical stabilization
   (c) Grouting
   (d) Electro-kinetic stabilization
6. (a) Explain in brief what is a stone column and how is it installed?

   (b) What are geosynthetics? What are its applications?

7. Explain in brief the various methods of ground improvement.

UNIT-2

Part – A

1. Define dewatering?
2. What is the need for drainage and dewatering?
3. What are the various methods of dewatering?
4. How are sumps and ditches used in dewatering?
5. What are the advantages of sumps and ditches in dewatering?
6. What is a well point system?
7. What are the different types of well point systems?
8. When are deep wells used for dewatering?
9. What is the principle behind vacuum dewatering?
10. What is electro-osmotic dewatering?
11. What are the various types of drains?
12. Define permeability and seepage.
13. What are the filter requirements of a filler material?
14. Write the formula for determining the flow to a fully penetrating slot in homogeneous deposit.
15. Write the formula for determining the flow to a partially penetrating slot in homogeneous deposit.

Part –B

1. Explain in detail with a neat sketch the method of dewatering using sumps and ditches stating its advantages and disadvantages.
2. Explain in detail the well point system of dewatering.
3. What is a deep well? When is it adopted? What are its merits and demerits?

4. Explain in brief the principle, equipment used, installation and operation and precautionadopted in electro-osmotic dewatering.
5. What are the various components, stages and methods of drainage? Explain in detail.
6. Compare the various dewatering systems suitability, uses, merits and demerits.
7. Explain in brief the various steps for designing a dewatering system.

UNIT-3

Part – A

1. What do you understand from the term in-situ densification?
2. What are the various methods of in-situ densification?
3. How is dynamic compaction different from static compaction?
4. What are the merits and demerits of dynamic compaction?
5. What is dynamic consolidation?
6. What are the advantages of Rapid impact compaction?
7. What is vibro-flotation?
8. What are the applications of vibro-flotation?
9. Differentiate vibro-displacement from vibro-replacement stone columns.
10. Differentiate top feed from bottom feed method.
11. How is a rammed stone column installed?
12. What is a sand compaction pile?
13. Differentiate lime pile from sand compaction pile.
14. What is the principle behind pre-compression?
15. Write the various methods of preloading.
16. What is the function of vertical drain?
17. Write the various types of vertical drains used in ground improvement.
18. Compare sand drains and wick drains.

Part –B

1. Explain in detail the method of dynamic compaction of cohesionless and dynamic consolidation of cohesive soil.
2. Write in detail the principle, operation and applications of vibro-compaction method of ground improvement.
3. How does a sand compaction pile improve the soil? Write a detailed note on its installation and functioning.
4. Write in brief about the following.
   (a) Sand drains
   (b) Wick drains
   (c) Sand wicks
   (d) Plastic wicks
5. Explain in detail about the method of pre-loading. How do vertical drains improve the functioning of pre-loading technique?
6. How is a stone column installed by vibro-displacement method?

UNIT-4

Part – A

1. Write the concept behind soil reinforcement.
2. What are the materials required for construction of a reinforced soil structure?
3. What are the different types of soil reinforcement materials?
4. What are the principle requirements of a reinforcing material?
5. Name any four applications of soil reinforcement for ground improvement.
6. Define geosynthetics.
7. What are the various types of geosynthetics?
8. Name a few raw materials that are used in the manufacture of geosynthetics.
9. How does the use of a geosynthetic as a filter differ from that of drainage?
10. Write a brief note on geosynthetics as reinforcement.
11. Define soil nailing.
12. Describe in a few words about rock bolting.

Part –B

1. With neat sketches explain in detail the various applications of reinforced earth for ground improvement.
2. Explain with the help of a flow chart the various classifications of geosynthetics in detail.
3. With the help of neat sketches, explain in detail the application of geosynthetics as a separator.
4. Geosynthetics can be used as soil reinforcement – Jusify in detail with supporting sketches.
5. How do geosynthetics function as a filter? How does it differ in its function for drainage? Explain in detail with sketches.
6. What is the role of geosynthetics in protecting soil from contamination? Descibe in detail.
7. Describe in detail about soil nailing and when is it adopted?

UNIT-5

Part – A

1. Define grouting.
2. Write the applications of grouting.
3. Write the various types of grouting.
4. What are the different types of grouts?
5. Name the different methods of grout injection.
6. What are the two methods of mechanical stabilization?
7. How is stabilization of soil achieved by cement?
8. What are the methods adopted in construction of stabilized roads?
9. What are the various stages of action in lime stabilization?
10. Write the various classes of chemicals used in stabilization of soil.

Part –B

1. Describe in detail about the various methods of grouting with neat sketches.

2. Write short notes on
   (a) Pre-grout investigation
   (b) Grout holes pattern
   (c) Selection of grout characteristics
3. Enumerate with a neat sketch the grouting plant and equipment necessary and the procedurefor carrying out grouting operations.
4. Write a detailed note on the various grout injection methods.
5. What is grout injection measurement? Why is grout monitoring necessary?
6. Describe in detail the various applications of grouting?
7. Enumerate in detail the different methods of mechanical stabilization.
8. Write a detailed note on
   (a) Portland cement stabilization
   (b) Bituminous stabilization
9. Describe in detail how chemicals are used in stabilizing the soil with the help of an example.
10. Explain in detail how an expansive soil is stabilized.

IMPORTANT QUESTIONS

Short Questions

1. What are the advantages of preloading methods?
2. Define coefficient of surcharge.
3. What do you mean by liquefaction?
4. What are solution grouts?
5. What precautions should be taken while mixing a grout?
6. How is the bearing capacity of soil affected by geotextiles?
7. Give applications of soil-lime columns.
8. What is bio technical stabilization?
9. What is the function of sand used in compaction grout?
10. Describe briefly soil nailing technique.
11. What precautions should be taken while mixing a grout.
12. What is the difference between vibro-compaction and vibro-displacement compaction.
13. What are the disadvantages of thermal methods for soil improvement
14. Name various grouting materials.
15. What are displacement piles.
16. What are the merits of dynamic compaction technique?
17. How is the depth of penetration of compaction calculated?
18. Give advantages of compaction grouting.
19. What are suspension grouts?
20. How is the permeability of soil affected by geotextiles?
21. List factors affecting selection of ground Improvement technique.
22. What are vibro techniques?
23. Discuss depth of improvement.
24. Write briefly on preloading techniques.
25. How improvement in slopes can be achieved?
26. Define stone column.

27. Write applications of grouting.

Long Answer Questions

1. Describe the vibratory probe technique for compaction.
2. What are the various dynamic compaction equipment used?
3. Explain compaction grouting. To which type of soils is it applicable. What are itsadvantages and disadvantage?
4. What are geotextiles? What design considerations should be kept in mind while usinggeotextiles in pavements?
5. Explain the jet grouting process.
6. Explain Dynamic compaction technique for soil stabilization? What are the merits of thistechnique?
7. Enumerate the effects of soil stabilization by heating
8. Explain the factors influencing the increase in strength of treated soil?
9. Write brief notes on jet grouting and its applications?
10. Is preloading method really a hydraulic modification of the ground or should it bediscussed as a mechanical modification? Explain

11 Explain various types of vibratory compactors used for compaction.

12. Explain the jet grouting process.
13. Draw a typical layout of a grouting plant. Also mention the basic items required for agrouting plant along with their functions.
14. Which lime is used for soil stabilization? What reactions take place on addition of lime towet soil? How lime is helpful in soil stabilization?
15. What are the various preloading methods used to accelerate compaction process?
16. Discuss issues concerned with dynamic compaction of ground improvement in soils.
17. Explain soil improvement by thermal treatment.
18. Write note on soil nailing.
19. Give basic mechanism of reinforced earth.
20. How the soil properties improve with use of geotextiles?
21. Explain the jet grouting process.
22. What are geotextiles? What design considerations should be kept in mind while usinggeotextiles in pavements?
23. What are the effects of soil stabilization by heating?
24. Explain in detail the Pre-loading methods for ground improvement.
25. Describe the vibratory probe technique for compaction.