

*"Heaven's Light is Our Guide"*

# Rajshahi University of Engineering & Technology

Department of Civil Engineering

4<sup>th</sup> year 7<sup>th</sup> semester examination 2016



**CE-431**

**GEOTECHNICAL ENGINEERING-III**

**MEJBAUL ISLAM**

**CE-120003**

**SEC: A**

# **Mat Foundation, Drilled Shaft, Caissons & Cofferdam**

## **SAM**

### **Mat Foundation**

1. What is mat foundation? At what situation do you suggest mat foundation instead of individual column footing? Discuss. **14,12**
2. Explain the steps performed by any engineer in selecting the best foundation for a given structure to be considered at a given site. **08**
3. What is compensated foundation? **13,07**
4. Describe in brief different types of mat foundation. **13**
5. How does the sub-soil exploration report help a Civil engineer? **11**
6. What are the design consideration of mat foundation? **10**
7. What are the design procedure of a mat foundation? **08**
8. What are the various methods of soil stabilization? Discuss. **09**

### **Drilled Shaft**

9. How can you determine load bearing capacity of drilled shaft based on settlement? Explain. **14**
10. How can you determine the load bearing capacity of drilled shafts in clay? Explain. **13,07**
11. How would you determine the load bearing capacity of a drilled shaft in sand & clay? **09,06**
12. Describe the construction procedure of drilled shaft. What are the merits and demerits of drilled shafts? **07**

### **Cofferdams**

13. What are cellular cofferdams? Why circular cell is generally preferable to the other cellular types of cofferdams? **14**
14. Describe the design procedure of cellular cofferdams. **14**
15. Discuss the advantages of diaphragm type cellular cofferdam over circular cofferdam. **12**
16. Write down the requirements of filling materials to be used in circular cofferdam. **12,10,08,07**
17. What are the possible types of failure to be analyzed for a circular cofferdam? **11,09,08,06**

### **Caisson**

1. Mention the application of caissons. **13**
2. How you would estimate the load carrying capacity of an open caisson? **14**
3. Write short notes on:
  - i. Vibroflotation, Stone columns, Wick drains, Pneumatic caisson. **12,11**
4. Describe with neat sketches the construction procedure of a box caisson. **09**
5. What are the causes of tilting a caisson during sinking? What corrective measures can be taken to resist tilting? **08,06**
6. Describe the construction procedure of a pneumatic caisson. What are the advantages and drawbacks? **08,07**
7. Differentiate between box caisson and open caisson. **07**
8. What are the different types of failure to be analyzed for concrete seal thickness of caisson? Explain. **06**

## Sheet Pile, Braced Cut, Pile Foundation & Machine foundation

### MMS

#### Sheet Pile

9. What are different types of sheet piling walls? Draw the sketches showing the pressure distribution. **14,10,09**
10. Write down the uses of sheet pile. **08**
11. What is Rowe's moment reduction theory? How can you apply it to sheet pile design? **08,06**
12. Describe the Rowe's moment reduction for anchor sheet pile walls penetrating sand. **13**
13. Differentiate between anchor sheet pile wall and cantilever sheet pile wall. **12**
14. What is tie back? How do you determine the ultimate resistance of a tie back? **12**
15. Derive the relationship to computing the depth of embedment of a cantilever sheet pile wall in clayey soil. **12,10,09,07**
16. Describe the design procedure if cantilever piling penetrating in sandy soils. **06**
17. Derive the relationships for the depth of embedment of anchor sheet pile penetrating into granular soil by free earth support method.
18. Describe the design procedure of anchored sheet pile wall in sandy soil using fixed earth support. **07**
19. Write down the design procedure of anchored sheet pile wall using equivalent beam method. **11,09,06**
20. What are the differences between anchored and cantilever sheet piles? Write down their uses. **08**

#### Braced Cut

21. Write down the function of the followings: **14, 06**
  - i. Wales.
  - ii. Strut.
  - iii. Lagging.
  - iv. Soldier beam.
  - v. Tie back.
22. How can you analyze the factor of safety of braced excavation against bottom heave? Explain. **12,10**
23. Write down the components of braced cut. **11,09**
24. Describe the design procedure of different component of braced excavation. **10**
25. Explain how can you determine lateral earth pressure on braced excavation?  
(i) Stratified soil, (ii) sand, (iii) soft clay, (iv) stiff clay. **07**
26. Draw the different types of pressure diagrams used for braced cut design. **06**

#### Pile Foundation

27. Describe the significance of pile load test. **14**
28. How can you determine the ultimate capacity of group piles in saturated clay? Discuss. **13**
29. What are the conditions where a pile foundation is more suitable than a shallow foundation? **08,07**
30. What is batter pile? Under what condition do you use pile cap? **08,07,06**
31. Write down the functions of pile cap. **06**

32. Write down under what situation do you suggest batter piles? **07**
33. What is pile cap? What are the assumptions made in the design of a pile cap? **12**
34. Under what situation do you use pile cap? **10**
35. Write short notes on:
- Laterally loaded pile. **13,11**
  - Negative skin friction. **13,11**
36. Classify piles based on their functions. **11**
37. Differentiate between cast-in place & precast piles. **11**
38. What is laterally loaded pile? How would you determine the ultimate load of a laterally loaded pile using Meyerhof's method? **10**
39. What do you mean by negative skin friction? What are the causes of negative skin friction? Write down the remedial measures of negative skin friction. **09,07**

### **Machine foundation**

40. Discuss the design criteria for reinforcement and construction details of a machine foundation. **12**
41. Discuss the criteria for design of machine foundation. **08**
42. Differentiate between:
- Damped & un-damped vibration. **13**
  - Viscous & non-viscous damping. **13**
43. Define the followings:
- Damped vibration. **12**
  - Resonance. **12**
  - Mass spring system. **12**
44. What is machine foundation? What parameters do you consider for the analysis of a machine foundation? Explain. **07,06**

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