

**UNIT-III (SUB STRUCTURE CONSTRUCTION)**

1) What is a cofferdam? When it used ?

Cofferdam is a temporary structure constructed to exclude water from the site to construct a permanent sub-structure, without the interface of water. It is used when the well foundation is to be carried in running water.

2) What is a caisson? What are the types of caisson?

It is a special type of foundation used for the construction of bridge piers in v prevent ery deep water, where it is either difficult to construct a cofferdam or to prevent its leakage.

Types:

- a) Box caisson
- b) Open caisson
- c) Pneumatic caisson

3) What are the components of well foundation?

The components of the well foundations are,

- a) Well curb
- b) Cutting edge
- d) Steining

4) What are the operations involved in open caisson method of foundation?

The open caisson method of foundation consists of the following operations:

- a) constructing or fabricating the caisson and preparing site to receive it.
- b) placing the caisson over the site of the pier.
- c) excavating the soil from the interior of the caisson and advancing the d) caisson so that its cutting edge is at or below the bottom of the excavation and continuing this process until the foundation in the hard stratum is reached.
- d) sealing the bottom of the caisson to exclude water and soil.

5) What are the uses of sheet piles?

The uses of sheet piles are,

- a) For preventing leakage of pile material and water.
- b) For preventing the structure from shocks ,vibrations, etc.,
- c) For deep excavations to enclose soils to prevent lateral crust or pressure.

6) What is a shoring?

Shoring is a temporary structure used to support tilted or endangered walls .The walls might have been endangered due to unequal settlement of foundation, removal of adjoining structures or making large opening in the walls.

7) What is meant by pipe jacking?

Pipe jacking is a method of installing a pipe under roadway , railway or highways without using an open cut trench .The pipe jacking procedure uses a casing pipe of sheet or reinforced concrete ie, jacked through the soil.

8) What is dewatering? Where it is used?

Dewatering means removal of excess water from the saturated soil. It is used where the water table is very high or in the case of deep excavations the foundation trenches for buildings and other structures, are filled with seeped water.

9) What is a under-ream pile?

It is a pile with one or more bulbs in its vertical shaft .These bulbs are known as under-reams and it increases the bearing capacity of the soil.

10) Write about spacing of piles?

For piles to be driven on hard stratum the minimum center to center spacing is 2.5 times the pile diameter. In case of friction piles minimum spacing of 3 times the diameter of the pile shaft is provided. In case of loose soil filled up area or sand the minimum center to center spacing is twice the pile diameter.

11) Explain about suspended scaffolding.

During repair cleaning and painting various types of working platforms are required at various levels which can be easily provided and removed. Such types of platforms can be suspended by ropes or chains from parapet wall of buildings or cantilever beams placed at the top of the structure. This types of working are called suspended scaffolding.

12) Write about centering and shuttering?

Centering is a temporary structure used for the construction of arches , whereas shuttering is a temporary structure used for the construction of R.B. or R.C.C. structures such as beam ,slab ,balcony ,porch ,etc ., . Centering are wooden shaped frames and shuttering are known as mould.

13) What is a Kent ledge?

In well sinking ,to overcome the increased skin friction and the in weight of the well due to buoyancy, additional loading is applied on the well . It is called Kent ledge.

14) What are the methods used for tunnel driving?

Following are the methods generally used for driving a tunnel,

- a) Full face heading
- b) Heading and bench method
- c) Drifts method
- d) Pilot tunneling

15) What is mucking?

The operation of removal of excavated material in tunneling operation is called mucking.

16) What are the advantages of drift method?

Drift method of tunnel excavation has the following advantages:

- a) It helps to determine the region of bad rock or excessive ground water before actually taking up the full excavation, so as to enable to take up the corrective measures.

- b) The drift provides ventilation while driving the main tunnel.
- c) It reduces the consumption of explosives.

17) Explain about cement grouting .Uses .

In this method, cement grout which is a mixture of cement , sand and water is used. The process consists of making a number of holes in ground and then filling these holes by cement grout under pressure. This process is continued till no grout is coming up through the hole.

Uses:

- a) The grouting procedure can be used in stopping leakages from rock.
- b) It can also be used to fill the voids in soil so as to strengthen the soil and to make the rock or soil water tight.

18) Write the situations under which pile foundation is recommended.

The pile foundation is recommended for the following situations:

- a) When spread footing ,raft and grillage foundations are uneconomical.
- b) When heavy concentrated loads are to be transmitted by the foundations.
- c) Where there is scouring in the soil near the foundations.
- c) Where the soil is made up and of a compressible nature.

19) Write the essential features of a pump to be used for dewatering.

The pump to be used for dewatering process should have the following features:

- a)The pump should be portable so that it can be easily moved as and when required.
- b)The pump should be capable of handling water mixed with impurities such as sand, earth, etc.,.
- c)The pump should be of strong make.

20) What is the equipment used for driving a pre-cast pile in a sandy soil?

The equipment used for driving a pre-cast pile in a sandy soil is a hammer. Hence maximum stresses are developed at the top due to direct strokes and at the point in overcoming the resistance to penetration. Therefore additional reinforcement is provided.

### **PART-B**

- 1) Explain the method of sinking a pneumatic Caisson
- 2) Describe the various methods of dewatering system
- 3) Describe in detail about piling techniques and its types
- 4) What do you mean by shoring? Describe in brief various types of shores
- 5) Describe in detail about the piling techniques and its types
- 6) Explain the methods of dewatering foundations excavations

- 7) Describe the various methods of underwater concreting operations system
- 8) Describe the various methods employed to bring a tilted well to position while constructing a well foundations
- 9) Explain in detail about sinking of cofferdam and diaphragm walls

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