

DHANALAKSHMI SRINIVASAN
COLLEGE OF ENGINEERING AND TECHNOLOGY, MAMALLAPURAM
DEPARTMENT OF CIVIL ENGINEERING -QUESTION BANK

UNIT-1-CONCRETE TECHNOLOGY

PART A

MOST IMPORTANT

1. What is meant by hydration of cement?

The silicates and aluminates of cement react with water to form a binding medium, which solidifies into a hardened mass. This reaction is termed hydration which is exothermic with approximately 120 cal /g being liberated.

2. What is meant by RMC?)

Ready mixed refers to concrete that is batched for delivery from a central plant instead of being mixed on the job site. Each batch of ready-mixed concrete is tailor-made according to the specifics of the contractor and is delivered to the contractor in a plastic condition, usually in the cylindrical trucks often known as "cement mixers."

3. What is meant by curing of concrete and why it is necessary (or) what is the necessity for curing of Concrete? ()

Curing process is designed primarily to keep the concrete moist by controlling the loss of moisture from the body of concrete, during the given period in which it gains strength. Curing also ensures to maintain an adequate temperature of concrete in its early ages, as this directly affects the rate of hydration of cement and eventually the strength gain of concrete or mortars.

4. What are the necessary tests to find the quality of fresh concrete? (May/June)

Workability, Compaction Factor Test, Slump Test, Kelly Ball test, Vee Bee Consistometer test, Flow table test

5. What is batching of concrete?)

Batching is the process of measuring concrete mix ingredients by either mass or volume and introducing them into the mixer. To produce concrete of uniform quality, the ingredients must be measured accurately for each batch. Traditionally batching is done by volume but most specifications require that batching be done by mass rather than volume.

6. What are the methods of compacting concrete? (Hand compaction: Compaction by vibration, Compaction by pressure and jolting, compaction by spinning. Various types of vibrators are internal vibrator, Table vibrator, platform vibrator, surface vibrator and vibratory roller

7. Define the term Workability of concrete. The property of fresh concrete which is indicated by the amount of useful internal work required to fully compact the concrete without bleeding or segregation in the finished product.

8. Mention any four destructive methods of testing concrete. (May/June 2013)

Compression strength test, Tensile splitting test, Flexural strength test, Concrete core test.

9. Name any four Non-destructive methods of testing concrete. (Nov/Dec 2012, 2014, May/June 2012)

Maturity test, Ultrasonic pulse velocity method, Surface hardness method, Ultra sonic tests for hardened concrete.

10. What are the raw materials used in the manufacturing of cement? (Apr/May 2011)

i) Silica, ii) Lime, iii) Alumina, iv) Sulphur trioxide, v) Iron oxide, vi) Magnesium oxide

11. List the various processes involved in the manufacturing of concrete. (Apr/May 2011)

Batching, Mixing, Transporting, Placing, Compacting, Curing, Finishing

12. What does the grade of cement denote? (Nov/Dec 2010)

It denotes the compressive strength (N/mm²) of cement in 28 days.

IMPORTANT

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13. Name any four types of cement

Ordinary Portland cement, Rapid hardening cement, Sulphate resisting cement, High alumina cement, Quick setting cement

14. Mention any four good qualities of cement

The cement should be uniform, When a small quantity of cement is thrown in water it should sink, Should be cool when felt with hand, Should be free from lumps

15. Define creep of concrete

Inelastic deformation formed under a sustained load. It is partly due to the viscous flow of cement paste but largely due to the seepage of absorbed colloidal water from cement gel.

16. What is bulking of sand?

The increase in volume of a given mass of fine aggregate caused by the presence of water is known as bulking. It is caused by the films of water which push the particles apart. Its extent depends upon the percentage of moisture present in the sand and its fineness.

17. Define segregation and bleeding

Separation of coarse aggregates from the main mass is known as segregation. Bleeding is one form of segregation, where water comes out to the surface of the concrete, being lowest specific gravity among all the ingredients of concrete.

18. Mention the methods for curing concrete

1) Ponding of water over the concrete surface 2) Covering concrete with damp earth 3) Sprinkling with water 4) covering the surface with water proof paper 5) Membrane curing 6) Chemical curing 7) Steam curing 8) Curing by infrared radiation, 9) Electrical curing

19. Name some admixtures used in concrete (Nov/Dec 2014)

Chemical Admixtures - air entrainers, water reducers, set retarders, set accelerators, super plasticizers

Mineral Admixtures- Fly ash, Ground Granulated Blast Furnace Slag (GGBS), Silica fume, micro silica

20. Write the advantages of high grade cement.

It is used for making stronger concrete.

Although they are little costlier than low grade cement, they offer 10 –20% savings in cement consumption.

Faster development of strength.

21. What are the Vibrators used for compacting?

Internal or immersion Vibrators, Surface Vibrators, Vibrating table.

22. Name some concrete chemicals?

Concrete curing compound, Polymer Bonding agent, Mould Releasing agent, Floor hardeners and Dust proofers, Guniting Aid

23. Techniques of measuring pulse velocity through concrete.

Direct transmission, Indirect transmission, Surface transmission

24. What are the properties of cement?

The important properties of good cement are

It gives strength to the masonry, It is easily workable, It is an excellent binding material

25. What are the various method of proportioning?

Arbitrary proportioning, Fineness modulus method, Maximum density method, Surface area method, Indian Road Congress ,IRC 44 method, High strength concrete mix design, Mix design based on flexural strength.

STANDARD

1. What is meant by hydration of cement? (Nov/Dec 2015)

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2. What is meant by RMC? (Nov/Dec 2015)
3. What is meant by curing of concrete and why it is necessary (or) what is the necessity for curing of Concrete? (May/June 2014, Nov Dec 2012)
4. What are the necessary tests to find the quality of fresh concrete? (May/June 2014, Nov/Dec 2010)
5. What is batching of concrete? (Nov/Dec 2013)
6. What are the methods of compacting concrete? (May/June 2013)
7. Define the term Workability of concrete. (Nov/Dec 2011)
8. Mention any four destructive methods of testing concrete. (May/June 2013)
9. Name any four Non-destructive methods of testing concrete. (Nov/Dec 2012, 2014, May/June 2012)
10. What are the raw materials used in the manufacturing of cement? (Apr/May 2011)
11. List the various processes involved in the manufacturing of concrete. (Apr/May 2011)
12. What does the grade of cement denote? (Nov/Dec 2010)
13. Mention the methods for curing concrete
14. Name some admixtures used in concrete (Nov/Dec 2014)
15. Write the advantages of high grade cement

PART –B

1. What is meant by NDT? Explain any two NDT methods in detail. (Nov/Dec 2015)
2. What are the tests which are conducted for hardened concrete and explain any two tests in detail? (May/June 2014)
3. Describe with neat sketches i) Compacting, ii) Mixing, iii) Transporting, iv) Placing of concrete. (Nov/Dec 2013)
4. Discuss briefly on different Non destructive testing techniques for checking quality of concrete. (Nov/Dec 2013, Apr/May 2010)
5. Describe the dry process of cement manufacturing with neat diagram. (May/June 2013)
6. Briefly explain the various types of cement, grades and their characteristics. (May/June 2013)
7. Enumerate any two methods of testing the fresh concrete for its workability and setting time. (Nov/Dec 2012)
8. Explain the various steps involved in manufacturing of concrete. (May/June 2012)
9. Explain any two tests for testing of fresh concrete. (May/June 2012, Nov/Dec 2014)
10. i) Explain the methods of conducting split tensile strength of concrete. (10)
ii) What are the factors affecting the workability of concrete. (6) (Nov/Dec 2011)

UNIT II-CONSTRUCTION PRACTICES
PART A

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MOST IMPORTANT

1. State the purposes of providing DPC in buildings. (Nov/Dec 2015, 2010)

When water proofing compounds is added to cement during construction it prevents leakage. It is available in powder form. It is mixed with cement by hand before cement is mixed with aggregate.

2. What are slip forms? (Nov/Dec 2015,Nov/Dec 2013))

Slip form construction is a method for building large towers or bridges from concrete. The name refers to the moving form the concrete is poured into, which moves along the project as the previously poured concrete hardens behind it. The technique has also been applied to road construction.

3. Why expansion joints and construction joints are necessary for any building construction? (May/June 2014)

An expansion joint or movement joint is an assembly designed to safely absorb the heat-induced expansion and contraction of construction materials, to absorb vibration, to hold parts together, or to allow movement due to ground settlement or earthquakes.

Construction joints are formed using some sort of bulkhead, made of wood, steel, plastic, or precast concrete. These bulkheads are often used as screed rails during placement and finishing of the slab.

4. What are the functions of foundations? (May/June 2014)

- It spread the load coming over into a larger area at a uniform rate so that the load coming over the foundation soil does not exceed the safe bearing capacity.
- Foundation transfer the nonuniform load of the superstructure evenly to the sub soil hence it minimize the differential settlement
- It provides the stability against the undermining, souring flood water and the burrowing animals.
- It provides the safety against sliding.
- It provides a level surface for the construction of the superstructure.

5. Write short notes on expansion joints. (Nov/Dec 2013)

These joints are provided to allow the expansion of the slab due to rise in slab temperature. Expansion joints also permit construction of the slab and help to reduce the warping stresses. The gap width for this type of joint is 20mm to 25mm

6. Write short notes on construction joints. (May/June 2013)

Construction joints are formed using some sort of bulkhead, made of wood, steel, plastic, or precast concrete. These bulkheads are often used as screed rails during placement and finishing of the slab.

7. What is meant by scaffolding? (May/June 2013, May/June 2012))

Scaffolding:-It is defined as the temporary structure employed in the building construction for supporting workers, materials and tools etc., during its construction alteration, demolition, painting and repair etc.,

8. What is meant by bond in masonry and draw any one type of bond for one brick thick masonry wall? (Nov/Dec 2012)

In masonry, brick **bond** describes the various styles of laying bricks to create different patterns. The bond is the method by which masonry "units" -- or bricks -- are interlocked or joined and the adhesion of mortar to the bricks.

9. Define slip forms and braced domes. (Nov/Dec 2012)

Slipform construction is a construction method in which concrete is poured into a continuously moving form. Slip forming is used for tall structures (such as bridges, towers, buildings, and dams), as well as horizontal structures, such as roadways.

10.Mention the significance of bond in masonry structures. {May/June 2012)

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Masonry is the building of structures from individual units laid in and bound together by mortar; the term masonry can also refer to the units themselves. Masonry is generally a highly durable form of construction. However, the materials used, the quality of the mortar and workmanship, and the pattern in which the units are assembled can significantly affect the durability of the overall masonry construction.

11. What is the difference between English bond and Flemish bond (Nov/Dec 2011)

- English bond is stronger than Flemish bond for walls thicker than 1 1/5 brick
- Flemish bond gives more pleasing appearance than the English bond
- Broken bricks can be used in the form of bats in Flemish bond.
- However, more mortar is required
- Construction with Flemish bond requires greater skill to comparison to English bond

12. Mention advantages of slip forms. (Nov/Dec 2010, Nov/Dec 2014)

- Careful planning of construction process can achieve high production rates
- Slip form does not require the crane to move upwards, minimising crane use
- Certain formwork systems permit construction of tapered cores and towers
- Slipform systems permit construction of tapered cores and towers

13. What are the general specifications for first class building?

Foundation and plinth. superstructure. Damp-proof course. lintels. roofing. plastering. doors and windows. distemping and colour washing. painting.

14. What are monolithic wall? Write its classifications?

Monolithic walls:- Walls built of a material requiring some kind of shuttering in the initial stages. Masonry can be classified into the following types

Stone masonry. Brick masonry. Hollow block concrete masonry. Reinforced masonry. Composite masonry.

15. Define plinth.

Plinth:- It is the horizontal course of stone or brick provided at the base of the wall above ground level. It indicates the height of the ground floor level above the natural ground level. It protects the building from dampness.

16. Write the types of scaffolding?

Types of scaffolding:- Single scaffolding or Brick layer scaffolding. Double scaffolding or Masons scaffolding. Ladder scaffolding, Cantilever or Needle scaffolding.

IMPORTANT

17. What is rubble masonry and ashlar masonry?

Rubble masonry:- Stones of irregular sizes are used. stones may be undressed or roughly dressed. using hammer having wider joints.

Ashlar masonry:- This is a costlier, high grade and superior quality of masonry. The work built from accurately dressed stones with uniform and very fine joints of about 3mm. thickness is termed as ashlar masonry.

18. Enumerate the advantages of concrete hollow block masonry. (Nov/Dec 2014)

Concrete blocks are regular in size, requiring no dressing work. Hence construction is very rapid.

- Blocks are light and therefore easy to handle.
- There is great saving in the material.
- Hollow blocks are structurally stronger than bricks.
- Thinner walls can be easily constructed, resulting in increase in the Floor area.

19. Mention the common sizes of building blocks. The common sizes of building blocks are 390x190x300 mm- standard size hollow block. 390x190x200 mm- hollow building tiles. 390x190x100 mm- hollow concrete blocks for partition.

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20. What the types of flooring commonly used.

Mud flooring, muram flooring, cement concrete flooring, mosaic flooring, tiled flooring, marble flooring

21. Define damp proof course., what are its causes of dampness.

Definition: The courses which are laid to check the entry of water or moisture into the building are called damp proof courses.

Causes:-faulty design of structure faulty construction or poor workmanship use of poor quality materials in construction.

22. What are the condition for filters?

Condition for filter:-

- It should remove harmful particles from air.
- It should be workable under different velocity. It should have very low frictional resistance.
- It should not cause contamination of incoming air. it should be easy to clean.

23. Define fire resistance

Fire Resistance:- It is the time during which an element of structure fulfils its function in building safely in the event of fire of known intensity. Fire resistance is also defined as an index of fire safety of buildings.

24. Define acoustics

Acoustics:-The term acoustics is defined as the science of sound, and it describes the origin, propagation and sensation of sound.

25. What are the conditions for good acoustics of an auditorium:-Conditions for good acoustics of an auditorium?

The initial sound should be of adequate intensity or loudness. It is important for a speaker to be heard over a long distance. The sound produced should be evenly spread over the whole area covered by audience. If the sound is not evenly distributed echoes will be established. The initial sound should be clear and distinct.

For music hall, the initial sound should reach the audience with same frequency and intensity. All undesired sound should be reduced.

STANDARD

1.State the purposes of providing DPC in buildings. (Nov/Dec 2015, 2010

2.What are slip forms? (Nov/Dec 2015,Nov/Dec 2013))

3.Why expansion joints and construction joints are necessary for any building construction? (May/June 2014)

4.What are the functions of foundations? (May/June 2014)

5.Write short notes on expansion joints. (Nov/Dec 2013)

6.Write short notes on construction joints. (May/June 2013)

7.What is meant by scaffolding? (May/June 2013, May/June 2012))

8.What is meant by bond in masonry and draw any one type of bond for one brick thick masonry wall? (Nov/Dec 2012)

9.Define slip forms and braced domes. (Nov/Dec 2012)

10.Mention the significance of bond in masonry structures. {May/June 2012

11.What is the difference between English bond and Flemish bond(Nov/Dec 2011)

12.Mention advantages of slip forms. (Nov/Dec 2010,Nov/Dec 2014)

13.What are the general specifications for first class building?

14.What are monolithic wall? Write its classifications?

15.Define plinth.

16.Write the types of scaffolding?

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PART – B

1. With neat sketches explain the different types of stone masonry in detail. (Nov/Dec 2015, Nov/Dec 2013)
2. Describe in detail the construction practices to be followed for acoustics and fire protection. (Nov/Dec 2015, 2014, May/June 2012))
- 3.i) Compare the English bond and Flemish bond (6) (May/June 2014)
ii) Draw a neat sketch showing the alternative layers for a full brick masonry in English bond and Flemish bond. (10) (May/June 2014)
- 4.i) Why expansion joints are required in building construction? (4) (May/June 2014)
ii) Draw a neat sketch for expansion joint at foundation level and expansion joint at roof level and explain it in detail.(12) (May/June 2014)
5. What are the different roofs finishes? Explain with neat sketches. (Nov/Dec 2013)
- 6.Explainwith neat sketches any four types of bonds in brick masonry (Nov/Dec 2014)
- 7.Briefly explain with neat sketches about i) Concrete hollow block masonry ii) Domes iii) Sequence of construction activities (May/June 2013)
- 8.Briefly explain different types of stone masonry in building construction. (May/June 2012, 2013)
9. Write short notes with neat sketches on i) Flint walling ii) Polygonal rubble masonry iii) Square rubble Masonry iv) random rubble built to courses (Nov/Dec 2012)
- 10.Explain in detail about the fabrication and erection of steel roof truss for an industry of 15 m wide and 40m length. (Nov/Dec 2012)
- 11.Explain the different types of joints in buildings with sketches.(Nov/Dec 2010)

UNIT III-SUB STRUCTURE CONSTRUCTION
PART A
MOST IMPORTANT

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1. What is a cofferdam? When is it used ? (May/June 2014)

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? (Nov Dec 2015)

Caisson has come to mean a box like structure, round or rectangular, which is sunk from the surface of either land or water to some desired depth.

Caissons are of three types: (a) Box caisson (b) open caisson (c) Pneumatic caissons

3. What is a sheet pile? (Nov/Dec 2015)

Sheet piles are thin piles, made of plates of concrete, timber or steel, driven into the ground for either separating members or for stopping seepage of water. They are not meant for carrying any vertical load. They are driven into ground with help of suitable pile driving equipment, and their height is increased while driving, by means of addition of successive instalments of sheets.

4. Define box jacking and pipe jacking. (May/June 2014)

Box jacking is a non –intrusive method beneath existing surface infrastructure. It is frequently used where an existing road or rail tracks is an embankment and space exists for the structure to be cast at the side. It enables traffic flows to be maintained disruption

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.

5. Write a note on sinking coffer dam. (Nov/Dec 2013)

A cofferdam is defined as a temporary structure which is constructed. So, as to remove water/soil from an area and make it possible to carry on the construction work under reasonably dry conditions.

6. Enlist different de-watering techniques (Nov/Dec 2013)

Ditches, Well point system, Shallow well system, Deep wall system, Vacuum method (forced flow method), Electro osmosis method

7. What are the two types of anchoring system for the cable in case of suspension bridge? (May/June 2013)

In Suspension bridge the main cables attached to the ground (black squares) and in other case it is attached to the end of the road deck

8. Define shoring for deep excavation. (May/June 2013)

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.

9. What is meant by shoring for deep cutting. (Nov/Dec 2012)

shoring, form of prop or support, usually temporary, that is used during the repair or original construction of buildings and in excavations. Temporary support may be required, for example, to relieve the load on a masonry wall while it is repaired or reinforced.

10. Define well foundations and caisson foundation. (Nov/Dec 2012)

Well foundation is a type of deep foundation which is generally provided below the water level for bridges.

Caisson foundation is also known as pier foundation. Caisson is a cylinder or hollow box that is sunk into the ground to a specified depth by auguring a deep hole into the strata. The cylinder or box is then back filled with concrete, thus creating the foundation

IMPORTANT

11. What are the components of well foundation?

The components of the well foundations are,

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a) Well curb b) Cutting edge d) Steining

12. 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. e) sealing the bottom of the caisson to exclude water and soil.

13. What are the uses of sheet piles?

The uses of sheet piles are,

For preventing leakage of pile material and water.

For preventing the structure from shocks ,vibrations, etc.,.

For deep excavations to enclose soils to prevent lateral crust or pressure.

14. 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.

15. What is an 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.

16. 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.

17. 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.

18. 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.

19. 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.

20. What are the methods used for tunnel driving?

Following are the methods generally used for driving a tunnel,Full face heading,Heading and bench method,Drifts method,Pilot tunneling

21. What is mucking?

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

22. 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. The drift provides ventilation while driving the main tunnel. It reduces the consumption of explosives.

23. Explain about cement grouting .

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Uses .In this method, cement grout which is a mixture of cement , standard 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:The grouting procedure can be used in stopping leakages from rock.

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.

24. 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.

25. 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.

STANDARD

- 1. What is a cofferdam? When is it used ? (May/June 2014)**
- 2. What is a caisson? What are the types of caisson? (Nov Dec 2015)**
- 3. What is a sheet pile? (Nov/Dec 2015)**
- 4. Define box jacking and pipe jacking. (May/June 2014)**
- 5. Write a note on sinking coffer dam. (Nov/Dec 2013)**
- 6. Enlist different de-watering techniques (Nov/Dec 2013)**
- 7. What are the two types of anchoring system for the cable in case of suspension bridge? (May/June 2013)**
- 8. Define shoring for deep excavation. (May/June 2013)**
- 9. What is meant by shoring for deep cutting. (Nov/Dec 2012)**
- 10. Define well foundations and caisson foundation. (Nov/Dec 2012)**

PART – B

1. Explain the procedure involved in underwater construction of diaphragm walls and basement. (Nov/Dec 2015, May/June 2012)
2. Explain the process of dewatering with neat sketch. Also write the uses of standby

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equipment for underground open excavation. **(Nov/Dec 2015, 2010)**

3. Explain the construction techniques applied for driving diaphragm walls and sheet piles with neat sketches. **(Nov/Dec 2014)**

4. Explain the construction techniques involved in underwater construction with neat sketches. **(Nov/Dec 2014)**

5.What are the available pile drilling techniques and explain in detail about any two methods of pile drilling techniques? **(May/June 2014)**

6.What is meant by well foundation and caisson foundation and explain in detail about any two methods of pile drilling technique? **(May/June 2014)**

7.What is meant by well foundation and caisson foundation and explain in detail about the construction of well foundation and caisson foundation. **(May/June 2014)**

8.Brief about different types of piling techniques applied in the sub surface construction. **(Nov/Dec 2013)**

9.Describe with neat sketch about the underground open excavation. **(Nov/Dec 2013)**

10.Discuss briefly different types of coffer dams with neat sketches **(May/June 2013, May/June 2012)**

11.Describe with neat sketch about the technique of pile driving. **(May/June 2013)**

12.Explain with neat sketches techniques for box jacking, pipe jacking and tunnelling. **(Nov/Dec 2012)**

UNIT-IV-SUPER STRUCTURE CONSTRUCTION

PART A

MOST IMPORTANT

1.Mention the reasons for using special forms for shells (Nov/Dec 2015, May/June 2012)

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Thin shell structures are also called as plate and shell structures. They are light weight constructions using shell elements which are curved and hence they require special forms.

2. What are the precautions to be taken while erecting light weight components on tall structures? (Nov/Dec 2015, May/June 2012)

3. What is meant by launching girders? (May/June 2014)

For erection of large beams in buildings or bridges, temporary girders are used. Such girders are called launching girders. Launching girders are usually of steel as it would be light compared to concrete girders.

4. Define articulated structures and space decks. (May/June 2014, Nov/Dec 2013)

Articulated structures A structure in which relative motion is allowed to occur between parts, usually by means of a hinged or sliding joint or joints

If deck space is available, homeowners may choose to include a seating area for outdoor couches and benches.

5. Write a short note on braced domes. (Nov/Dec 2013)

A dome being curved in two directions provides theoretically most efficient shapes able to cover large areas. Braced domes are composed either of members lying on a surface of revolution or of straight members with their connecting points lying on a surface. They possess great stiffness.

6. Write notes on offshore platform (May/June 2013)

The uses of offshore platform are:

- Connect the offshore pipeline grid.
- Provide an efficient means to platform maintenance
- Locate compression, separation, production handling and other facilities.
- Conduct drilling operations during the initial development phase of an oil and Natural gas property.
- Oil & gas exploration
- Navigation aid towers.
- Bridges and causeways

7. What is the necessity of space decks? (May/June 2013)

If *deck space* is available, homeowners may choose to include a seating area for outdoor couches and benches.

8. What is meant by pre-stressing in concrete structures? (Nov/Dec 2012)

In concrete structures, prestress is introduced by stretching steel wire and anchoring them against concrete. Therefore, the prestressing systems should comprise essentially a method of stretching the steel and a method of anchoring it to the concrete. Different systems are adopted for pre-tensioning and post tensioning.

9. What is the function of launching girders? (Nov/Dec 2012)

The launching girder works right as its name suggests. By means of LG, precast or cast in situ (rare cases) bridge deck segments are placed on piers without any staging arrangement below.

IMPORTANT

10. What are bridge decks?

In bridges, the structure supporting the carriageway is called decks. The bridge deck transfers the load to the piers or abutments. The bridge decks can be classified as slabs, T-beam and slab, or composite decks. In composite decks, beams are pre-stressed or of steel and the slabs would be concrete cast in situ.

11. What are offshore platforms?

Offshore platforms are structures constructed in the ocean to explore or to produce oil and

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gas from the sources found below the sea. Offshore platforms are in steel or in concrete.

12. What are Jacket platforms?

The steel offshore platforms are called Jacket platforms. They are vertical towers constructed with steel tubular members supporting the deck, where the machinery for drilling or processing oil or gas is located. They are connected to the ocean floor by means of piles.

13. What are gravity towers?

In concrete construction, the offshore platforms are called Gravity towers which consist of concrete circular shafts supporting the processing platforms. The offshore platforms are subjected to loads from ocean waves.

14. What is a bow-string bridge?

In this type of bridge, the horizontal thrust is resisted by the horizontal ties. The supports take up only the vertical reaction. They, therefore require thinner sections. Bow-string girders of R.C.C are commonly adopted for arch bridges having span of 30m to 45m. At various points along the length of a tie beam, vertical posts or suspenders connecting the tie beam to the arched rib are provided. The flooring is resting on the tie beam and transfers its load to the arch through the suspenders. The flooring may be of simple slab or beam and slab construction.

15. What are cable-stayed bridges?

These bridges provide a larger width for purposes of navigation by eliminating intermediate piers. They consist of cables provided above the deck and are connected to the towers. The deck in case of cable stayed bridges is either supported by a number of cables meeting in a bunch at the tower (fan form) or by joining at different levels on the tower (harp form).

16. What are chimneys?

Chimneys are structures used to escape the gases to such a height that the gases do not contaminate the surrounding atmosphere. The cross sectional area of the chimney is kept large enough to allow the passage of burnt gases.

17. What are the various loads acting on a chimney?

1. Self weight of masonry chimney, 2. Weight of lining 3. Wind pressure 4. Seismic forces

18. How is lining made in chimney?

The material used for lining should be capable of withstanding high temperature upto 2000 F. The fire bricks are used for lining in brick masonry chimneys. The fire brick lining must be free to expand and contract independently of the main chimney. The height of lining depends on the purpose of chimney.

19. What are the various types of chimneys?

R.C.C chimney, Brick chimney, Self supporting stacks, Guyed steel stack

20. What are the forms used in the construction of chimney?

Jump forms, Slip forms

21. What are cooling towers?

Cooling Towers are used to cool the water that is used to recondense the steam that is used to generate electricity.

22. What are shells? How are shells classified ?

Shells are three dimensional structures constructed as storage tanks or roof for large column free areas, such as exhibition halls, sports complex or theatres.

- Singly curved shells like cylindrical shells
- Doubly curved or spherical shells

23. What are the systems of prestressing?

Freyssinet System, Magnel-blaton System, Lee-Mc. Call or stress steel system

24. What are the advantages of prestressed cement concrete?

- It is possible to take the full advantage of compressive strength of concrete and high

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tensile strength of the steel used.

- 15 to 30% of the concrete is saved.
- 60 to 80% of the steel is saved.
- Pressressed concrete members are thinner in section and hence there is greater reduction of the self weight of the member.

25. How are domes erected?

Domes are usually erected with a central temporary support on which the supporting ring rests. If the span is greater than 40 – 50m, the tower of an erecting frame serves as the support.

STANDARD

- 1. Mention the reasons for using special forms for shells (Nov/Dec 2015, May/June 2012)**
- 2. What are the precautions to be taken while erecting light weight components on tall structures? (Nov/Dec 2015, May/June 2012)**
- 3. What is meant by launching girders? (May/June 2014)**
- 4. Define articulated structures and space decks. (May/June 2014, Nov/Dec 2013)**
- 5. Write a short note on braced domes. (Nov/Dec 2013)**
- 6. Write notes on offshore platform (May/June 2013)**
- 7. What is the necessity of space decks? (May/June 2013)**
- 8. What is meant by pre-stressing in concrete structures? (Nov/Dec 2012)**
- 9. What is the function of launching girders? (Nov/Dec 2012)**

PART B

1. What are the advantages of using belt conveyors for transporting materials?. Describe the construction of a typical belt conveyor installation. **(Nov/Dec 2015)**
2. Explain the procedure involved in the erection of braced domes and space decks. **(Nov/Dec 2015, May/June 2013, Nov/Dec 2010)**
3. Explain in detail about any four types of bridge deck slab with a neat sketch. **(May/June 2014)**
4. i) What are the merits and demerits of shell roof construction?(4)**(May/June 2014)**
ii) What is meant by prestressed concrete and explain in detail about various method of prestressing? (12)
5. Discuss the process of in-situ pre-stressing in high rise structures **(Nov/Dec 2013, 2010, (May/June 2013))**
6. Write detail notes on (i) Launching girders (ii) Bridge decks (iii) Off shore platforms **(Nov/Dec 2013)**
7. Explain the the support structures required for heavy equipments and conveyors. **(May/June 2012 Nov/Dec 2011))**
8. Discuss in detail the construction techniques and equipments used for constructing heavy decks. **(Nov/Dec 2014)**
9. What is meant by articulated structures and explain the procedure for erecting articulated structures? **(Nov/Dec 2012)**
10. What is the necessity for off shore platforms and how it is erected with a neat sketch showing the foundation details? **(Nov/Dec 2012)**
11. Explain the method of erecting light weight components for tall structures. **(Nov/dec 2014, 2011)**

UNIT-V-CONSTRUCTION EQUIPMENT

PART A

MOST IMPORTANT

- 1. What are the advantages of using trenchers? (Nov/Dec 2015)**

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- The advantages of using trenchers are
- It is a faster and cheaper method of trenching
- It digs only as much as is necessary
- It is a continuous process and is not like that of back hoe excavator

2. Define dredging. (Nov/Dec 2015)

Dredging is the process of excavating from river bed, lake or sea for the purpose of deepening them. It is an important operation in navigation canals, harbours, dams etc. The types of dredgers are Dipper dredger, Ladder dredger and Suction dredger

3. Differentiate between single acting and double acting hammer. (Nov/Dec 2015)

Single acting hammer:

In a single acting hammer a heavy ram is lifted up by steam or compressed air but dropped by its own weight. The energy of a single acting hammer is equal to the weight of the ram times the height of fall.

Double-acting hammer:

The double-acting hammer employs steam or air for lifting the ram and for accelerating the downward stroke. The energy of a double-acting hammer is equal to the (weight of the ram \times mean effective pressure \times the effective area of ram) \times 1 times the height of fall.

4. Name any four earthwork equipments. (May/June 2014 Nov/Dec 2013)

Crawler mounted excavator, Truck mounted excavator, Self propelled, Excavators barge or rail

5. What is meant by dredging and trenching? (May/June 2014)

A trench is a type of excavation or depression in the ground that is generally deeper than it is wide (as opposed to a wider gully, or ditch), and narrow compared to its length.

Dredging is the process of excavating from river bed, lake or sea for the purpose of deepening them. It is an important operation in navigation canals, harbours, dams etc.

6. When are the scrapers used? (Nov/Dec 2013)

Scrapers are used in construction work, mainly in leveling operations, and in the mining industry. They are classified according to the type of propulsion (motorized or tractor drawn), the method of loading or unloading (gravity or mechanical), the parameters of the scoop, the type of drive, and other features.

7. Write a short note on material handling equipment. (May/June 2013)

Scrapers, Loaders, Face Shovels, Backhoe, Draglines

IMPORTANT

8. What are the types of drilling equipment?

The types of drilling equipment are

Percussion drills and Rotary drills

Rotary drills are further classified as Pressure drilling and Abrasion drilling

9. Define scrapers and frontend waders (Nov/Dec 2012)

Scrapers are multiple-units of tractor-truck and blade-bucket assemblies with various combinations to facilitate the loading and hauling of earthwork. Major types of scrapers include

single engine two-axle or three axle scrapers, twin-engine all-wheel-drive scrapers, elevating scrapers, and push-pull scrapers.

10. Name any four equipments which is used for dredging, tunnelling. (Nov/Dec 2012)

Dredging equipments

Mechanical Dredgers:

Bucket ladder dredge, Grab dredge, Dipper and backhoe dredge

Hydraulic Dredgers:

Plain suction dredge, Cutter dredge, Trailing suction hopper dredge

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Tunnelling equipments:

Jumbos drilling rigs, Boring machines, Tunnel boring machines, Microtunneling boring machines.

11. Give a list of construction equipments needed in the construction of tall structures. . (May/June 2012)

Derricks, Tower crane,

12. Mention the various operations involved in grading?

The various operations involved in grading are Grading ,spreading , finishing and levelling, Ditch digging , cutting , bank cutting , earthen road maintenance , earthen road construction and , repairing gravel road

13. What are the factors affecting the selection of drilling equipment?

The factors affecting the selection of drilling equipment are the nature of terrain , required depth of holes , rock hardness , the size of the project and the purpose for which holes are required.

14. Write short note on skimmers.

These excavators are rigged using a universal power unit for surface stripping and shallow excavation work up to 300 mm deep where a high degree of accuracy is required They usually require attendant haulage vehicles to remove the spoil and need to be transported between sites on a low loader. Because of their limitations and the availability of alternative machines, they are rarely used today.

15. What is dredging?

Dredgers are used for excavation from riverbed, lake or sea for purpose of deepening them. Dredging is an important operation in navigation canals, harbours, dams etc.

16. What is motor grader?

Motor graders are used for leveling and smoothing the earthwork, spreading and leveling the base courses in the construction of roads and airfield. It can be used for land reclamation, snow clearance, gravel road repairing, mixing of stabilizing materials such as tar, asphalt, cement and lime, maintaining quarry roads etc.

17. List out the material handling devices

1. Lifting and lowering devices (Vertical motion)

Block and tackle, Winches, Hoists, Elevators, Pillar crane, Overhead cranes

2. Transportation devices (horizontal motion)

Wheel barrows and hand truck, Narrow-gauge mine rail road, Tractors and trailers, Skids, Pipe line

3. Combination devices (Lifting and lowering plus Transportation)

Spiral chute, Lift track, Crane truck, Forklift truck, Conveyors of various types

4. Aerial transport

Cable ways, Rope ways

18. What are the parameters to be examined while blasting for quarrying?

While blasting for quarrying or excavation, the following parameters are to be examined. Spacing of the drill holes, Diameter of the drill holes, Depth of the drill holes, Burden of the rock at the toe, Burden of the rock at the crest, Degree of fragmentation desired and Strength of the explosives to be used

19. What are the objectives of ventilation system in a tunnel?

The main objects of ventilation system in a tunnel are

1. to provide fresh air for workers 2. to remove poisonous gases and fumes produced by explosion

3. to remove the dust caused by drilling, blasting mucking and other operations performed in the tunnel.

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20. What is a tractor? Mention its types?

Tractor is an earthmoving equipment which converts engine energy into tractive energy. The two types of tractors are crawler or tract type and wheel or pneumatic type

21. Define compaction?

Compaction is defined as the process of densifying or increasing the unit weight of a soil mass through the application of static or dynamic force, with the resulting expulsion of air.

22. Define surface load?

Surface load is defined as the ration of total applied load and the total contact area of the minimum number of feet which come simultaneously in contact with even ground without penetration.

23. What are the factors influencing compaction?

The factors which influence compaction are

Static weight, number of vibratory drums, roller speed, drum diameter, frequency and amplitude, driven or non driven drum, centrifugal force and total applied force

24. What are the various types of conveyors?

The various types of conveyors are belt conveyor, roller conveyor, chain or cable conveyor, pipe line conveyor, screw conveyor and elevating conveyor

25. What are the advantages of using belt conveyors?

The advantages of using belt conveyors are

It is capable of handling light or heavy, fine or coarse, wet or dry material, It can handle, thousands of tons of material per hour for several kilometres, It can handle not materials up to 1600c, It operates without noise.

STANDARD

1. What are the advantages of using trenchers? (Nov/Dec 2015)

2. Define dredging. (Nov/Dec 2015)

3. Differentiate between single acting and double acting hammer. (Nov/Dec 2015)

4. Name any four earthwork equipments. (May/June 2014 Nov/Dec 2013)

5. What is meant by dredging and trenching? (May/June 2014)

6. When are the scrapers used? (Nov/Dec 2013)

7. Write a short note on material handling equipment. (May/June 2013)

9. Define scrapers and frontend waders (Nov/Dec 2012)

10. Name any four equipments which is used for dredging, tunnelling. (Nov/Dec 2012)

Dredging equipments

11. Give a list of construction equipments needed in the construction of tall structures. . (May/June 2012)

12. Write short note on skimmers.

13. What is dredging?

14. What is a tractor? Mention its types?

15. Define compaction?

16. Define surface load?

17. What are the various types of conveyors?

18. What are the advantages of using belt conveyors?

PART B

1. What is meant by tunnelling? Explain the features of the equipment used fir tunnelling operation. (Nov/Dec 2015)

2. Write in detail about the various factors to be considered in the selection of equipment for

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earthwork. **(Nov/Dec 2015)**

3. What are the factors that influence the selection of equipments for earthwork. Explain the types of earthwork equipments. **(Nov/Dec 2014)**

4. Explain in detail about any four types of earthwork equipments with a neat sketch. **(May/June 2014)**

5. What are the types of material handling equipments and explain with a neat sketch about any four material handling equipments? **(May/June 2014)**

6. Describe the equipments involved in the material handling and erection of structures. **(Nov/Dec 2013)**

7. Mention various types of equipments for dredging, trenching and tunnelling. **(Nov/Dec 2013)**

8. Explain the factors governing the selection of equipment for earthwork. **(Nov/Dec 2014, May/June 2013)**

9. Mention various types of earthwork equipments and also give their uses. **(May/June 2013)**

10. Explain in detail about batching mixing and concreting for mass concrete works and how it is undertaken in recent days. **(Nov/Dec 2012)**

11. Explain in detail about various types of earth work equipments with the special purpose usage for each equipment. **(Nov/Dec 2012)**