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CE 8404 CONCRETE TECHNOLOGY
TWO MARK QUESTION AND ANSWERS

UNIT-I CONSTITUENT MATERIALS

1. Define hydration of cement?
   Cement in dry state has no bonding property. When mixed with water react Chemically and becomes a bonding agent. These reactions are called hydration.

2. What is meant by Surkhi?
   Surkhi is fine powdered under burnt bricks. It is also known as artificial pozzolona

3. Define setting of cement
   When water is added to cement, hydration takes place immediately as it continuous, cement paste which is plastic becomes stiff and rigid known as setting of cement.

4. What are pozzolona?
   These are siliceous materials which, while having no cementations values within themselves, will chemically react with calcium hydroxide at ordinary temperature and in the presence of moisture to form compounds possessing cementitious properties.

5. Name any 2 natural pozzolonas.
   Clay and shales, opalinc cherts, diatomaceous earth, volcanic tuffs and pumicites.

6. Name any 2 artificial pozzolonas.
   Surkhi, fly ash, blast furnace slag, silica fume, rice husk ash, metakaoline.

7. What is natural cement?
   Natural cement is manufactured by burning and then crushing the natural cement stones. Natural cement stones are such stones which contain 20 to 40% of argillaceous matter i.e. clay, and remaining content mainly calcareous matter which is either calcium carbonate alone or a mixture of calcium carbonate and magnesium carbonate.

8. What is artificial cement?
   Artificial cement is manufactured by burning approximately proportioned mixture of calcareous and argillaceous materials at a very high temperature and then grinding the resulting burnt mixture to a fine powder.

9. What is the function of gypsum in the manufacture of cement?
   In order to delay the setting action of cement, when mixed with water, a little percentage of gypsum is added in the clinker before grinding them to fine powder.

10. What is known as clinker?
    Artificial cement is manufactured by burning approximately proportioned mixture of calcareous and argillaceous materials at a very high temperature and then grinding the resulting burnt mixture to a fine powder. The burnt mixture of calcareous and argillaceous matter is known as clinker.

11. What are the constituents of ordinary cement?
    Alumina or clay, silica, lime, iron oxide, magnesia, sulphur trioxide, Alkalies, calcium sulphate (gypsum).

12. What are the harmful constituents of cement?
    Alkalies which are oxides of potassium and sodium, and magnesium oxide are the harmful constituents of cement.

13. What are ball mills?
    Ball mills are used for grinding the clinkers. The ball mills consist of 2 to 2.5m diameter steel cylinder. The clinkers to be ground are fed into the cylinder and the cylinder is rotated about its horizontal axis to carry out the grinding action.

14. What are the types of cement?
    Ordinary Portland cement, rapid hardening cement, low heat cement, blast furnace slag cement, sulphate resistant cement, air entraining cement, white and coloured cement, high alumina cement, pozzolanic cement, super sulphate cement, expansive cement, quick setting cement, water repellant cement, water proofing cement.

15. What are the 2 methods of manufacture of cement
    Dry process
    Wet process

16. Define mortar.
    The mortar is a paste like substance prepared by adding required amount of water to a dry mixture of sand or fine aggregate with some binding material like clay, lime or cement.

17. Define lime mortar.
    If lime is used as a binding material, the resulting mortar is known as lime mortar.

18. Define mud mortar.
    When clay is used as a binding material, the resulting mortar is known as mud mortar

19. What is known as bulking of sand?
    Bulking of sand means increase in its volume. Fine aggregates or sands, increase in volume when they possess some moisture. Bulking is due to formation of a thin film of water around the fine

aggregate or sand particles. Thickness of water film goes on increasing with more and more moisture and consequently increase in volume continues. But after certain percentage of water, volume of sand starts decreasing with increasing amount of water. At certain percentage of water, increase in volume completely vanishes and volume occupied by sand becomes equal to the volume of dry sand.

20. What are the types of mortars?
    Mud mortar
    Lime mortar
    Gauged mortar

21. What is meant by grading of aggregates?
    Grading of aggregate means particle size distribution of the aggregate. If all the particle of an aggregate were of one size, more voids will be left on the aggregate mass. Properly graded aggregate produces dense concrete and needs smaller quantities of fine aggregate and cement. Grading determines the workability of the mix, which controls segregation, bleeding, water-cement ratio, handling, placing, and other characteristics of the mix.

22. What are the methods of proportioning of concrete mixes?
    Arbitrary standard method
    Minimum voids method
    Fineness Modulus method
    Maximum density method

23. Define Abram's water cement law.
    According to Abram's water cement law, the strength of concrete depends on the water cement ratio used.

24. Define bleeding.
    The tendency of water to rise to the surface of freshly laid concrete is known as bleeding.

25. Define laitance.
    Water rising to the surface during bleeding carries with it, particles of sand and cement, which on hardening form a scum layer known as laitance.

26. What are the steps adopted to control bleeding.
    - ❖ By adding more cement
    - ❖ By using more finely ground cement
    - ❖ By using little air entraining agent
    - ❖ By increasing finer part of fine aggregate
    - ❖ By properly designing the mix and using minimum quantity of water.

27. Define Segregation.

The tendency of separation of coarse aggregate grains from the concrete mass is called segregation.

28. What are the methods adopted to avoid segregations of concrete.
    - Addition of little air entraining agents in the mix.
    - Restricting the amount of water to the smallest possible amount.
    - Concrete should not be allowed to fall from larger heights.

29. Define workability.
    Workability is that property of concrete which determines the amount of internal work necessary to produce full compaction. It is a measure with which concrete can be handled from the mixer stage to its final fully compacted stage.

30. What are the factors affecting workability.
    - Quantity of water in the mix
    - Proper grading of the aggregate mix
    - Ratio of fine aggregate and coarse aggregate
    - Maximum size of coarse aggregates
    - Method of compaction of concrete

31. What are the factors affecting proportioning of concrete mixes?
    - Water cement ratio
    - Cement content
    - Temperature
    - Age of concrete
    - Size, shape and grading of aggregate
    - Curing

32. Define mixing of concrete.
    The process of mixing cement, water, fine aggregate and coarse aggregate in suitable proportion is known as mixing of concrete.

33. What are the methods of consolidation or compaction of concrete?
    Hand compaction
    Machine compaction – i) Internal vibrators
    ii) Form vibrators
    iii) Surface vibrators

34. Define curing of concrete.
    Curing is the operation by which moist conditions are maintained on finished concrete surface, to promote continued hydration of cement.

35. What are admixtures?

Admixtures are ingredients other than cement, fine aggregate and coarse aggregate to improve the quality of concrete. The addition of an admixture may improve the concrete with respect to its strength, hardness, workability, water resisting power etc.

36. What are the types of concrete used?
Plum concrete, light weight concrete, air-entrained concrete, no-fines concrete, vaccum concrete, water-proof concrete, reinforced cement concrete, pre-stressed concrete, cellular or aerated concrete, foamed concrete, pre-cast concrete.

37. Mention the test adopted to test the properties of cement in laboratories?
    a. Fineness
    b. Consistency test
    c. Setting time
    d. Soundness
    e. Compressive strength

38. Mention the test adopted to test the properties of cement in field?
    a. Open the bag and take a good look at the cement, there should not be any visible lumps
    b. Thrust your hand into the cement bag should feel cool feeling
    c. Take a pinch of cement and feel between the fingers. It should give a smooth feeling not a gritty feeling
    d. Take a hand full of cement and throw it on a bucket full of water, the particle should float for sometime before they sink.

39. Mention the test adopted to test the quality of water?
    a. Determination of acids and alkalis
    b. Determination of total solids.

UNIT II CHEMICAL AND MINERAL ADMIXTURES

1. What are admixtures?
Admixtures are ingredients other than cement, fine aggregate and coarse aggregate to improve the quality of concrete. The addition of an admixture may improve the concrete with respect to its strength, hardness, workability, water resisting power etc.

2. Define chemical admixtures
Chemicals mixed with concrete ingredients and spread throughout the body of concrete to favourably modify the moulding and setting properties of concrete mix known as chemical admixtures.

3. Define Mineral admixtures
It is a siliceous materials used to strengthen the durability properties that is classified as pozzolanic or cementitious materials. It acts as by-product agent. E.g.: fly ash

4. What is accelerators
   Accelerators reduce the setting time and produce early removal of forms and speed up hardening. The common accelerators are $cacl_2$, Al_2cl, Nacl, Na_2SO_4.

5. What is the purpose of retarders?
   Retarders increases the setting time of concrete mix and reduce the water cement ratio. Up to 10% water reduction is achieved.

6. Define plasticizers
   Plasticizers are defined as chemical admixtures added to wet concrete mix to impart adequate workability properties.

7. Mention the types of plasticizers
   a. Finely divided minerals
   b. Air entraining agents
   c. Synthetic derivatives

8. Define superplasticizers
   Super plasticizers produce extreme workability and achieve reduction of water content without loss of water cement ratio i.e workability.

9. Mention few mineral admixtures.
   a. Fly ash
   b. Silica fume
   c. Rice husk ash
   d. Metakaoline
   e. GGBFS

10. What are the various admixtures used other than chemical and mineral admixtures/
    a. Gas forming and expansive chemicals
    b. Pigments
    c. Antifungal admixtures
    d. Curing compounds
    e. Sealants
    f. Flooring
    g. Guniting aids.

11. Name the admixtures available in India?
    a. Plasticizers
       (a) Conplast P211- Water reducing plasticizers
       (b) Conplast P509- Water reducing plasticizers/High performance plasticizers
    b. Super Plasticizers
       i. Conplast SP337- High workability aid
       ii. Conplast SP430- High range water reducer

12. What is the difference between Accelerator and Retarder?

Accelerator	Retarder
a. It reduce the time for the mix to change from the plastic to the hardened state	a. The function of retarder is to delay or extend the setting time of cement paste in concrete. These are helpful for concrete that has to be transported to long distance,.
b. . Set accelerators have relatively limited use, mainly to produce an early set.	b. helpful in placing the concrete at high temperatures
c. Calcium chloride is the most effective accelerator and gives both set and hardening characteristics. However, is limited due to acceleration of corrosion of steel reinforcement and decrease resistance of cement paste in a sulfate environment. For this reason, it should not be used in concrete where any steel will be embedded but may be used in plain unreinforced concrete. Chloride-free accelerators are typically based on salts of nitrate, nitrite, formate and thiocyanate.	c. The commonly known retards are Calcium Ligno-sulphonates and Carbohydrates derivatives used in fraction of percent by weight of cement.

UNIT III-PROPORTIONING OF CONCRETE MIX DESIGN

1. What is proportioning of concrete mix

   Concrete Mix Proportioning is the science of deciding relative proportions of ingredients of concrete, to achieve the desired properties in the most economical way.

2. What is the principle of mix proportioning?

   Its an art rather than a science

   Attaining predefined requirements

   a. *Workability of fresh concrete*
      i. *Placing*
      ii. *Compacting*
      iii. *Finishing*
   b. *Strength of hardened concrete at a specified age*

   Durability under specific exposure conditions

c. Freeze thaw cycles
d. Sulphate water
e. Natural agents

3. What are the factors considered for mix design?
Compressive strength
Workability
Durability
Maximum nominal size of aggregate
Fineness Modulus and zone of aggregate
Quality Control

4. Mention the properties related to mix design
a. Durability
b. Workability
c. Strength
d. High strength concrete

5. Describe the physical properties of materials required to mix design
a. Cement
b. Aggregate
c. Water
d. Admixtures

6. Define Nominal mix

In the past the specifications for concrete prescribed the proportions of cement, fine and coarse aggregates. These mixes of fixed cement-aggregate ratio which ensures adequate strength are fixed out of prior experience are termed nominal mixes. These offer simplicity and under normal circumstances, have a margin of strength above that specified. However, due to the variability of mix ingredients the nominal concrete for a given workability varies widely in strength.

7. Define Standard Mix

The nominal mixes of fixed cement-aggregate ratio (by volume) vary widely in strength and may result in under- or over-rich mixes. For this reason, the minimum compressive strength has been included in many specifications. These mixes are termed standard mixes. IS 456-2000 has designated the concrete mixes into a number of grades as M10, M15, M20, M25, M30, M35 and M40. In this designation the letter M refers to the mix and the number to the specified 28 day cube strength of mix in N/mm^2.

8. Define Design mix

In these mixes the performance of the concrete is specified by the designer but the mix proportions are determined by the producer of concrete, except that the minimum cement content can be laid down.

This is most rational approach to the selection of mix proportions with specific materials in mind possessing more or less unique characteristics.

The approach results in the production of concrete with the appropriate properties most economically. However, the designed mix does not serve as a guide since this does not guarantee the correct mix proportions for the prescribed performance.

For the concrete with undemanding performance nominal or standard mixes (prescribed in the codes by quantities of dry ingredients per cubic meter and by slump) may be used only for very small jobs, when the 28-day strength of concrete does not exceed 30 N/mm^2.
No control testing is necessary reliance being placed on the masses of the ingredients.

9. List out the advantages of Design mix
   a. Properties of all materials are used.
   b. Cement content is low and hence the mix design is economical.

10. List out the disadvantages of nominal mix
    a. Nominal mix does not say which type of sand, cement, aggregate to be used.
    b. High cement is required which leads to high cost.
11. Brief the principles of mix design
    Attaining predefined requirements
    a. *Workability of fresh concrete*
       i. *Placing*
       ii. *Compacting*
       iii. *Finishing*
    b. *Strength of hardened concrete at a specified age*
    c. Durability under specific exposure conditions

UNIT -1V FRESH AND HARDENED PROPERTIES OF CONCRETE

1. Define workability.
   Workability is the property of concrete which determines the amount of internal work necessary to produce full compaction. It is a measure with which concrete can be handled from the mixer stage to its final fully compacted stage.

2. List out the requirements of fresh concrete.
   a. Mixability
   b. Stability
   c. Mobility
   d. Compactability
   e. Finishability

3. List out the Factors affecting Workability?
   a. Water content
   b. Mix proportion
   c. Size of aggregate
   d. Shape of aggregate
   e. Surface texture

f. Grading
g. Admixture

4. Define bleeding.
   The tendency of water to rise to the surface of freshly laid concrete is known as bleeding.

5. Define laitance.
   Water rising to the surface during bleeding carries with it, particles of sand and cement, which on hardening form a scum layer known as laitance.

6. What are the steps adopted to control bleeding.
   - ❖ By adding more cement
   - ❖ By using more finely ground cement
   - ❖ By using little air entraining agent
   - ❖ By increasing finer part of fine aggregate
   - ❖ By properly designing the mix and using minimum quantity of water.

7. Define Segregation.
   The tendency of separation of coarse aggregate grains from the concrete mass is called segregation.

8. What are the methods adopted to avoid segregations of concrete.
   - ▪ Addition of little air entraining agents in the mix.
   - ▪ Restricting the amount of water to the smallest possible amount.
   - ▪ Concrete should not be allowed to fall from larger heights.

9. Mention the methods to measure the workability?
   a. Slump Test
   b. Compaction Factor
   c. Vee-Bee Consistometer
   d. Kelly Ball Penetration test
   e. Flow table Test
   f. Vibrating table

10. Mention the values of different type of slump.

    T rue slump - up to 125mm from top

    Shear slump - up to 150 mm from top

    Collapse slump -150-225mm

12. List out the usage of slump values
    - ➢ Slump 0 – 25 mm are used in road making
    - ➢ 10 – 40 mm are used for foundations with light reinforcement
    - ➢ 50 - 90 for normal reinforced concrete placed with vibration

13. Define compaction factor?
    Compaction Factor is the ratio of the weight of partially compacted concrete to the weight of the concrete when fully compacted in the same mould.

14. Define Vee-bee consistometer
    Consistometer is based on consistency test which is a mechanical variation of the simple slump test which includes determination of the workability of concrete. Measures consistency of concrete in terms of time required to transform by vibration a frustum of fresh concrete sample into a cylinder. This time is called VB time.

15. What is the use of flow table method
    Flow table indicates consistency and proneness to segregation. It is used for aggregate of size <40mm. The flow is determined by = {D-250/250}*100.

16. What is batching?
    Batching is the correct measurement of various materials used in the concrete mix. It can be either volume or by weight.

17. How is weight batching is obtained
    Weight batching is more accurate and hence preferred weighing can be done by
    a. Simple spring balance
    b. Platform weighing machines
    c. Automatic weighing machines

18. How is mixing operation is done in concrete
    a. Hand Mixing
    b. Machine Mixing
        a) Tilting type
        1. Charging by hand
        2. Charging by machine
        b)Non tilting type
        1. Continuous mixer
        2. Pan mixer
        3. Truck mixer

19. What is the purpose of compaction?
    Compaction is done to eliminate air voids in concrete.

20. What is hardened concrete and mention the factors influence its strength
    Hardened concrete gives an overall idea about the quality of concrete. It depends on
    a. Water cement ratio
    b. Degree of compaction
    c. Age of concrete
    d. Richness of mix

e. Curing of concrete
f. Temperature of concrete.

21. Define curing
    a. Curing is done to keep the concrete saturated until the water filled space in concrete is filled up by the product of hydration.
    b. Curing is done to prevent the loss of water by evaporation and to maintain the process of hydration.

22. Define shrinkage
    Volume change due to loss of moisture affects durability and strength, causes cracks in concrete at different stage due to alkali aggregate reaction, sulphate action, Settlement of fresh concrete is shrinkage.

23. Define creep.
    When a concrete member is loaded it deforms to a certain extent as soon as the load is applied. When the load is kept constant, the deformation increases with time. This increase in strain under sustained stress is called creep of concrete.

24. Mention the test conducted to test the properties of hardened concrete.
    a. Compression Testing Machine
    b. Flexure Strength Testing Machine
    c. Lateral Extensometer
    d. Split Tensile Test
    e. Shear strength
    f. Bond strength

25. List out the factors affecting the results of strength test.
    a. Size and shape of aggregate
    b. Condition of casting
    c. Moisture condition
    d. Bearing condition
    e. Rate of loading

26. Weigh Batching vs Volumetric Batching

Weigh Batching	Volumetric Batching
100% traceability and compliance with ISO 9000 quality requirements.	Batch records may not tie up with actual dosage as flow meter inaccuracy cannot be recorded.
Scales are properly calibrated and traceable to national and international standards and tolerances. Batch computers hold a record of	Flow meters are not calibrated in the strict compliance sense. Supply companies simply do a check and issue a dosage check

what has been weighed ensuring traceable confirmation of the volume dispensed.	document. Although the batch computer holds a record of what has been requested from the flow meter there is physically no confirmation that what was requested is what has been dispensed.
Admixtures are pre-weighed then held in the hoppers ensuring rapid discharge with no impact on batch cycle.	Admixtures are batched directly into concrete mix, which could slow batching cycle
Admixtures can be dosed at any stage of batching and in multiple dumps – thereby achieving optimal performance.	Admixtures are difficult to batch at certain stages of the batching sequence
Calibration is "hands off" and automated and can be executed after every batch if required.	Calibration is cumbersome and messy; the frequency is reduced due to the inconvenience.
New Admixtures can be added to the scale simply	New Admixtures require a full admixture line, and possibly an extra controller.
Large quantities of admixture (up to 225l) can be dispensed rapidly and accurately into the batch, ensuring optimal dosing and no delays in the batch cycle.	Dispensing large volumes can cause increased inaccuracy, an inability to dispense at optimal time in the batch cycle and delay the batch cycle time.
The batching hoppers are continually emptied and cleaned after each batch.	Reliability can be hindered by the efficiency and cleanliness of the pulse meter.
The weighing of the liquid ensures an accurate dosage, continuous self calibration maintains accuracy.	To ensure accuracy a second pulse meter or sight glasses is often needed or requested.

UNIT – V SPECIAL CONCRETE

1. What is the density of concrete?
   The density of concrete varies between 2200 to 2600 kg/m^3

2. Define light weight concrete.
   The concrete is said to be light weight concrete whose density is between 300 to 1850 kg/m^3

3. Define High density concrete
   The concrete is said to be High density concrete whose density is between 3360 to 3840 kg/m^3.

4. Name some of the natural light weight aggregate
   a. Pumice
   b. Diatomite
   c. Scoria
   d. Volcanic cinders
   e. Saw dust
   f. Rice husk

5. Name some of the artificial light weight aggregate
   a. Brick bat
   b. Foamed slag
   c. Cinder, clinker
   d. Bloated clay
   e. Sintered fly ash
   f. Exfoliated vermiculite
   g. Expanded perlite

6. Where does high density concrete is applicable.
High density concrete is used as radiation shielding agent and it has satisfactory mechanical property.

7. Mention the applications of sulphur infiltrated concrete
   a. Pre cast industry
   b. Fencing post
   c. Sewer pipes
   d. Railway sleepers

8. Define Guniting or Shotcrete?
It is defined as a mortar conveyed through a hose and pneumatically projected at a high velocity on to a surface.

9. Describe high density concrete.
The high density concrete it must have unit weight ranging from about 3360 kg/m3 to 3840 kg/m3 . It which about 50% higher than the unit weight of conventional concrete.

10. Define Fibre reinforced concrete.
It is defined as the addition of small closely spaced and uniformly dispersed fibres to concrete would act as crack arrester and would substantially improve its static and dynamic properties. This type of concrete is known as “fibre reinforced concrete”.

11. Mention the types of fibres used in fibre reinforced concrete.
   - Steel fibres
   - Polypropylene fibres

- Nylons
- Asbestos
- Coir
- Glass
- Carbon.
-

12. Define aspect ratio.

Fibre is small piece of reinforcing material possessing certain characteristic properties They can be circular or flat .The fibre is often described by a convenient parameter is called as "aspect ratio".

13. What are the factors affecting the properties of fibre reinforced concrete?

- Type of fibre
- Fibre content
- Orientation and distribution of fibres
- Mixing and compacting techniques of concrete
- Size and shape of aggregate.

14. What are the applications of fibre reinforced concrete?

- The fibre reinforced concrete is tied overlays in air field
- Using road pavements
- Industrial floorings
- Manufacturing of precast products (pipes, boats, beams, wall & roof panels).

15. Simplify the term SIFCON?

Slurry infiltrated fibrous concrete

- The cement slurry is introduced over the steel fibres
- The strength of the sifcon is higher than normal FRC
- The fibre content is limited to 2%-5%

16. Define vaccum concrete.

Vacuum concrete is the type of concrete in which the excess water is removed for improving concrete strength

It was first invented by Billner in United states in 1935.

Reducing the final water-cement ratio of concrete before setting, to control strength and other properties of concrete.

17. Define Geo-Polymer concrete?

Hardened cementations paste made from flyash and alkaline solution.

Combines waste products into useful product.

Setting mechanism depends on polymerization.

Curing temp is between 60-90 degree celcius i.e. room temperature.

18. Define Ready Mix Concrete (RMC)?

Ready mix concrete is concrete whose components are proportioned away from the construction site for delivery to the construction site by the truck in a ready-to-use-condition."

19. Explain briefly self Compacting Concrete(SCC)"

Self compacted concrete is highly engineered concrete with much higher fluidity without segregation and is capable of filling every corner of formwork under its self weight .
Thus SCC eliminates the vibration for the compaction of
concrete without affecting its engineering properties.

20. What are the advantages of RMC ?

Quality assurance
Elimination of manual errors
Mass production of concrete possible
Water cement ratio maintained
Reduced material wastage
Labour cost saved
Design mix as per IS standards resulting in standard deviation and improved characteristics.

QUESTION BANK (PART B & C)

UNIT –I CONSTITUENT MATERIALS

1. Explain the hydrated structure of cement.
2. Explain different physical and chemical properties of OPC with the details of tests to determine these properties
3. Define hydration of cement. Explain the mechanism involved in the hydration.
4. Write a note on the products of hydration of cement. Explain the significance of each.
5. List out and explain the functions of Bouges compounds.
6. Explain the general classification of cements.
7. Explain each type indicating their composition and use for different applications.
8. Give the general classification of aggregates.
9. What is the importance of shape and texture of aggregates on the strength and workability of concrete.
10. Explain the deleterious substances in aggregates.
11. Explain the different tests on aggregate to determine (i) strength (ii) toughness (iii)hardness
12. What is meant by grading of aggregates. Explain the significance of grading of aggregate on the strength of concrete.
13. .Write a short note on (i)fineness modulus (ii)thermal properties of aggregates.
14. How does the grading of aggregates affect the water requirement of the mix.
15. What are the requirements for water to be used for curing concrete.
16. Is drinking water is always suitable as mix water for concrete?

UNIT-II CHEMICAL AND MINERAL ADMIXTURES

1. What is the difference between an additive and admixture?
2. Explain the classification of admixtures
3. Explain the action of plasticizers. What are the uses of plasticizers. Give examples.
4. Explain different types of mineral admixtures, indicating their composition and applications
5. Distinguish between accelerator and retarders with their application.
6. Explain the effects of superplasticizers. Also list out the disadvantages of using plasticizers.
7. What are the major miscellaneous admixtures available in the market.
8. What is creep? Discuss its importance in concrete structures. What are the factors affecting creep?
9. Explain the effect of water cement ratio on the strength of concrete.
10. What is meant by shrinkage of concrete? Describe the factors affecting the shrinkage of concrete.
11. What are the super plasticizers and classify.
12. Write short note on i) Retarders ii) Accelerators
13. Categorize the methods for measuring air content of fresh concrete and explain it?
14. Write a note on i) Rice husk ii) Surkhi
15. Explain about plasticizer and super plasticizers?
16. Explain in detail about use of fly ash in concreting?
17. Describe with the composition and specification of GGBS?

UNIT- III PROPORTIONING OF CONCRETE MIX

1. Define mix design. Enlist the factors affecting the choice of mix proportion. Explain the concept of mix design.
2. What are the various methods of proportioning in concrete mix design?
3. Explain the mix design for the pumpable concrete.
4. Brief the concrete mix design procedure as per Indian Standards.
5. Define mix design. Enlist the factors affecting the choice of mix proportion.What are the recommended values of slump for various types of constructions?

6. Simplify the design step procedure for M25 grade concrete.
7. Describe the BIS method of concrete design with the necessary data's stipulated.
8. Design of M20 concrete mix as per IS:10262-2009, Concrete mix proportioning-guidelines

    i. Grade designation: M20

    ii. Type of cement: OPC 43 grade confirming to IS 8112

    iii. Maximum nominal size of aggregates: 20 mm

    iv. Minimum cement content =: 320 kg/m3

    v. Maximum water cement ratio =: 0.55

    vi. Workability: 75 mm (slump)

    vii. Exposure condition: Mild

    viii. Degree of supervision: Good

    ix. Type of aggregate: Crushed angular aggregate

    x. Maximum cement content: 450 kg/m3

    xi. Chemical admixture: Not recommended

    xii. Specific gravity of cement: 3.15 Coarse aggregate: 2.68 Fine aggregate : 2.65

    xiii. Water absorption Coarse aggregate: 0.6 percent Fine aggregate: 1.0 percent

    xiv. Free (surface) moisture Coarse aggregate: Nil (absorbed moisture full) Fine aggregate: Nil xv. Sieve analysis Coarse aggregate: Conforming to Table 2 of IS: 383 Fine aggregate : Conforming to Zone I of IS: 383

9. Design a concrete mix by BIS method with the following data

    Characteristics compressive strength = 35N/mm2

    Maximum size of aggregate = 20mm (angular)

    Fine aggregates confirm to grading zone II

    Degree of workability = 0.80

    Degree of quality control = Good,

    Type of exposure = Mild

    Specific gravity of cement = 3.14 S

specific gravity of coarse aggregate = 2.80

Specific gravity of fine aggregate = 2.58

Water absorption (i) Coarse aggregate = 1.9% (ii) Fine aggregate = nil Water cement ratio = 0.48

Assume any other data if necessary. Also calculate the quantity of cement, sand, coarse aggregate and water required per cubic metre of concrete.

10. Design a concrete mix by BIS method with the following data

Characteristics compressive strength = 15 N/mm2

Maximum size of aggregate = 20mm (angular)

Fine aggregates confirm to grading zone II

Degree of workability = 0.90

Degree of quality control = Good,

Type of exposure = Mild

Specific gravity of cement = 3.14

Specific gravity of coarse aggregate = 2.85

Specific gravity of fine aggregate = 2.65

Water absorption (i) Coarse aggregate = 1.9% (ii) Fine aggregate = nil Water cement ratio = 0.48

Assume any other data if necessary. Also calculates the quantity of cement, sand, coarse aggregate and water required per cubic metre of concrete.

UNIT –IV FRESH AND HARDENED PROPERTIES OF CONCRETE

1. Explain workability and what are the factors affecting workability?
2. Explain the tests to determine the workability of concrete?
3. Explain the slump cone test procedure with neat sketches.
4. Simplify the flow table test with the description about the apparatus.
5. Explain the procedure to conduct compaction factor test.
6. Explain the various experiments conducted on hardened concrete.

7. Explain the process of manufacturing of concrete.
8. Discuss the effects of materials on durability.
9. Explain the factors affecting the modulus of elasticity of concrete. Explain stress-strain curve of concrete.
10. Explain the tests conducted for durability
11. What is meant by segregation and bleeding of concrete.List and explain the causes and describe the preventive measures.

UNIT V SPECIAL CONCRETE

1. What are the requirements, materials and production of Self compacting concrete?
2. Differentiate Normal strength of Concrete and High strength of Concrete.
3. Name the materials for high strength concrete. Explain in detail.
4. Differentiate the High strength concrete and high performance concrete. With their process, applications, and limitations.
5. Explain about vacuum concrete and shortcrete.
6. Explain the process of preparation of Gunite.
7. Explain the factors affecting properties of Fibre reinforced Concrete.
8. Discuss about Fibre Reinforced Concrete, What are the fibres used in concrete.
9. Describe Ferrocement. Assess what are the casting techniques which are involved?
10. Write about High performance concrete with advantages and applications.
11. What is Geopolymer concrete? Explain their advantages and uses.
12. Explain Self compacting concrete with suitable example.
13. Why ready mix concrete is not to attain the strength and durability. Explain in detail with case study
14. When to use High Performance Concrete? Explain with any case study.
15. What are the different types of test conducted on SCC? Explain any two in detail
16. What is ready mix-concrete? Explain advantages of its use. Explain its production. Give the classification.