

III Year 1 Semester

Name of the Faculty: Sohang Debnath

Class: III, I SEM

Course Name: Concrete Technology

Course Code: A50116

Academic Year: 2017-18

COURSE OBJECTIVES:

- To create awareness on the different types of cement and aggregates used in construction field
- To study the behaviour of concrete in its fresh state and hardened state
- To study the reasons behind creep and shrinkage of concrete
- To know about the procedures in concreting
- To understand special concrete and their use

COURSE OUTCOMES:

- The students are able to test various concrete materials as per IS code after studying the subject
- Students are able to identify the defects of concrete in both fresh and hardened state and able to prescribe genuine remedies for the defects
- Students are able to analyse the types of creep in concrete and the nature of the defect.
- Students will have a knowledge of various types of concreting and its field application
- Students will have the idea of various types of special concrete and their manufacturing process

UNIT 1

SHORT QUESTIONS:

1. List out the various properties of cement?
2. Write short notes on structure of hydrated cement.

3. Explain the term grade of cement.
4. Write about continuous grading of aggregates?
5. What is Sieve analysis?
6. What are the factors affecting the rate of alkali-aggregate reaction?
7. What is meant by grading of aggregate?
8. Briefly explain the surface texture of aggregates?
9. What do you mean by quick setting cement?
10. Write a note on setting time of cement?

LONG QUESTIONS:

1. Explain Bouges compounds? Give the chemical composition of cement? How are the Bouges compounds calculated?
2. Discuss about heat of hydration of cement?
3. With reference to the mineral composition, explain the role of fly ash and silica fume in hydration of cement?
4. Explain the various stages in the manufacturing of cement with a neat diagram?
5. Describe the chemical composition of OPC explaining the need of each compound?
6. Explain the role of C_3S and C_3A on the properties of cement?
7. Explain in details about water reducers as an admixture in concrete?
8. Write short notes on alkali-aggregate reaction?
9. Describe particle shape and texture of aggregate?
10. Write a brief note on Aggregate crushing value test?

OBJECTIVE QUESTIONS:

1. The compound which is responsible for the later strength in cement is.
 - (a) C_3A
 - (b) C_2S
 - (c) C_3S

(d) C_4AF

2. Which grade of cement contains more shrinkage effect?

(a) 33 grade

(b) 43 grade

(c) 53 grade

(d) none of the above

3. Generally the specific gravity of cement is,

(a) 2.6

(b) 3.1

(c) 2

(d) 1.2

4. Which type of aggregate increases workability of concrete?

(a) Flaky

(b) Round

(c) Well graded

(d) Gap graded

5. The normal consistency required for portland cement is,

(a) 10%

(b) 20%

(c) 30%

(d) 50%

6. The process which is widely used in the manufacture of cement is _____

7. The chemical compound responsible for the early strength of cement is _____

8. The main function of plasticizers is to improve _____

9. Fineness modulus for medium sand is _____

10. Bulking of sand increases with _____

UNIT 2

SHORT QUESTIONS:

1. Define workability of fresh concrete?
2. Write a note on quality of mixing water?
3. What is the role of compaction on the properties of concrete?
4. What is the principle behind the performance of VEE- BEE consistency test?
5. What do you mean by Surface Vibrator?
6. What is the effect of time in workability of concrete?
7. What is the effect of temperature in workability of concrete?
8. What is the difference between segregation and bleeding?
9. Write about internal and external vibrators?
10. Write a note on setting time of concrete?

LONG QUESTIONS:

1. Explain the factors affecting the workability of concrete?
2. Explain the compaction factor test with a neat sketch?
3. Discuss the flow table test for measurement of workability of concrete?
4. Explain the measures for reducing segregation and bleeding of fresh concrete?
5. What is the effect of vibration on strength and durability of concrete?
6. Explain the different stages involved in the manufacturing of concrete?
7. Explain how setting time of fresh concrete is determined?
8. Write short note on Curing of concrete?
9. How does temperature effect the flowability of concrete?
10. Write a brief note on Slump effect on concrete?

OBJECTIVE QUESTIONS:

1. The time dependent phenomenon in concrete is,
 - (a) Shrinkage
 - (b) Creep
 - (c) Strength
 - (d) All of the above
2. The shrinkage of concrete is mainly due to the change of,
 - (a) Volume
 - (b) Surface area
 - (c) Length
 - (d) Cross-sectional area
3. Segregation in concrete results in,
 - (a) Surface scaling
 - (b) Laitance
 - (c) Honey-combing
 - (d) None of the above
4. For under water constructions, the setting time of concrete is,
 - (a) Less
 - (b) More
 - (c) Cannot be determined
 - (d) None of the above
5. Modulus of elasticity of concrete increases with
 - (a) Age of concrete
 - (b) Better compaction
 - (c) Higher water-cement ratio

(d) None of the above

6. Workability of concrete is independent of _____
7. The Concrete factor is the ratio of _____
8. Improper compaction of concrete leads to _____ structure.
9. Rich mix is _____ subjected to bleeding than lean mix.
10. Aggregates with less number of voids is said to be _____

UNIT 3

SHORT QUESTIONS:

1. How do you determine the original water-cement ratio?
2. Differentiate between free w/c ratio and effective w/c ratio?
3. Name few standard organisations relating to the test of concrete?
4. What do you mean by dynamic modulus of concrete?
5. Define Abram's Law with required equation?
6. What is the peculiarity of poisson's ratio for concrete?
7. Write a short note on creep of concrete?
8. What are the factors affecting the measurement of pulse velocity?
9. What is the effect of water-cement ratio on the strength of concrete?
10. Write a note on tensile strength of concrete?

LONG QUESTIONS:

1. Explain the gel/space ratio method of strength estimation of concrete?
2. Estimate the strength of concrete of concrete using Abram's Law and Gel/space ratio at 28 days for 750 grams of cement with 0.3, 0.5, 0.65 water/cement ratio on full and 60 percent hydration?
3. Explain the maturity concept method of estimating strength of concrete?
4. Explain the factors affecting the strength of hardened concrete?

5. Explain the relation between compression and tensile strength of concrete?
6. Explain the different types of curing methods of concrete?
7. Explain the split tensile test on cylinder and cubes with neat sketches?
8. What are the different non-destructive method of testing concrete and also mention their uses?
9. What are the factors affecting the creep and shrinkage of concrete?
10. Explain about carbonation and shrinkage of concrete?

OBJECTIVE QUESTIONS:

1. The inner ingredients of a concrete mix are,

- (a) Water
- (b) Cement
- (c) Entire Mix
- (d) Aggregates

2. The permeability of concrete reduces with,

- (a) Strength of cement paste
- (b) Decrease in porosity
- (c) Carbonation of concrete
- (d) All of the above

3. Presence of algae in concrete results in,

- (a) Air entrainment increases
- (b) Reduces strength
- (c) Bond strength reduces
- (d) All of the above

4. Under water concreting is carried by,

- (a) Cofferdam method
- (b) Dripping method

(c) Tremie method

(d) None of the above

5. For footing, minimum slump provided is _____ mm.

(a) 25

(b) 50

(c) 75

(d) 100

6. The concept of water-cement ratio was introduced by _____

7. Compressive strength is defined as _____

8. Tensile strength of concrete is determined by _____ test.

9. Increase in age of cement tends to _____ in water cement ratio.

10. The size of cube used for determining compressive strength of concrete is _____

UNIT 4

SHORT QUESTIONS:

1. How do you convert to mix proportion by weight into volumetric proportion?

2. What are the advantages of quality control?

3. Explain in brief about quality assurance?

4. Write down the acceptance criteria for compressive strength of concrete mix design?

5. What are the factors affecting the choice of mix proportions?

6. Give the acceptance criteria for flexural strength of concrete mix design?

7. What do you mean by quality control of concrete?

8. Define durability of concrete?

9. List out the factors affecting the durability of concrete?

10. Write a note on BIS method of mix design?

LONG QUESTIONS:

1. Discuss about various parameters to be considered in designing a durable concrete mix ?
2. What are the measures to be taken to make mix proportioning economical and scientific?
3. Explain in brief the various factors affecting the durability of concrete?
4. Describe about prescriptive type of concrete mixes and performance oriented concrete mix?
5. List out the different methods used for proportioning concrete mixes and explain any three?
6. What are the BIS provisions for water used in concrete?
7. Write short note on Durability of concrete?
8. Design M35 grade concrete mix for the following data using BIS method:

CA: 16 mm crushed granite

FA: River sand confirming to zone III

Workability: medium

Quality Control: medium

Exposure: moderate

Cement: OPC 53 grade

Water absorption by CA: 3%

Free surface moisture in FA: 3%

9. Design a M30 grade concrete mix using BIS method for moderate exposure and good quality control. The workability required is 0.85 CF. Maximum size of coarse aggregate is 20 mm graded as per IS specifications and the five aggregates confirm to zone III. The specific gravities of cement, sand and coarse aggregate are 3.02, 2.67 and 2.67. Cement is OPC 53 grade. Water absorption by CA is 2% and moisture content in FA is 6%. Assume any other data suitably?

10. Design M25 grade concrete mix for the following data using BIS method:

CA: 20 mm crushed granite

FA: River sand confirming to zone IV

Workability: 120 mm slump

Quality Control: fair

Exposure: severe

Cement: OPC 53 grade

Water absorption by CA: 2.9%

Free surface moisture in FA: 5%

OBJECTIVE QUESTIONS:

1. Factors affecting the mix design of concrete is,

- (a) Slump
- (b) Durability
- (c) water/cement ratio
- (d) both (b) and (c)

2. The mortar most suitable for construction work in water logged area is,

- (a) Mud mortar
- (b) Cement mortar
- (c) Lime mortar
- (d) Gauged mortar

3. After storage, the strength of cement will,

- (a) Remain same
- (b) Increases
- (c) Decreases
- (d) Cannot be determined

4. When a concrete mix is too wet, it causes

- (a) Excess laitance at top
- (b) Low density
- (c) Segregation
- (d) All of the above

5. The factor responsible for the quality of compaction is,
- (a) Strength of concrete
 - (b) Durability of concrete
 - (c) Density of concrete
 - (d) All of the above
6. The ratio of shear stress to shear rate in flow of concrete is _____
7. Alkali aggregate reaction is also called as _____
8. The compressive strength is _____ for low water cement ratio.
9. The maintenance cost of the structure can be reduced by employing _____ process.
10. Acid attack in concrete is common when pH value is less than _____

UNIT 5

SHORT QUESTIONS:

1. What are the applications of light weight concrete?
2. Explain about cellular concrete?
3. What are the properties of high density concrete?
4. What are the advantages of self compacting concrete?
5. What are the features of self compacting concrete?
6. List out the various types of light weight aggregates used in concrete construction?
7. What do you mean by no fines concrete?
8. What do you mean by polymer concrete?
9. List out the various types of polymer concrete?
10. What do you mean by SCC?

LONG QUESTIONS:

1. What is the role of special concretes in the modern construction industry? Discuss.
2. Explain the classification of light weight aggregates?
3. Explain in the characteristics of light weight concrete?
4. Write short notes on high density concrete?
5. Explain any two tests for determining fresh properties of SCC?
6. Explain in detail about fibre reinforced concrete?
7. What are the advantages of using fibre reinforced concrete? Briefly explain how the concrete attains this property?
8. What are the various applications of high performance concrete?
9. What are the various requirements of self-compacting concrete?
10. Explain in detail about high strength and performance concrete?

OBJECTIVE QUESTIONS:

1. Aerated concrete is suitable for applications such as,
 - (a) Filler wall
 - (b) Fire protection
 - (c) Wall insulation
 - (d) All of the above
2. By using light weight concrete the self weight of the structures will,
 - (a) Remain same
 - (b) Increases
 - (c) Decreases
 - (d) Increases and decreases
3. The following fibre has proved to be most successful of all fibres in manufacturing of fibre reinforced concrete,
 - (a) Steel
 - (b) Carbon

(c) Polyethylene

(d) Polypropylene

4. High strength concrete has a grade of

(a) M10 to M20

(b) M25 to M55

(c) M60 to M85

(d) None of the above

5. The permeability phenomenon of no fines concrete is,

(a) High

(b) Low

(c) Medium

(d) partially higher and lower

6. The compressive strength of cellular concrete is _____

7. High density concrete is also known as _____

8. The flow of fresh concrete is termed as _____

9. High strength concrete has strength greater than _____ MPa.

10. Efflorescence in cement is caused due to an excess of _____