



SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203.



DEPARTMENT OF CIVIL ENGINEERING QUESTION BANK

SUBJECT : CE8404 - CONCRETE TECHNOLOGY
SEM / YEAR : IV / II

UNIT I - CONSTITUENT MATERIALS

Cement - Different types - Chemical composition and Properties – Hydration of cement - Tests on cement - IS Specifications - Aggregates – Classification - Mechanical properties and tests as per BIS - Grading requirements – Water - Quality of water for use in concrete.

PART – A

Q.No	Questions	BT Level	Competence
1	Write the history of cement manufacturing in India.	BT-1	Remember
2	What are the raw materials for the manufacture of cement?	BT-1	Remember
3	Describe about slurry.	BT-2	Understand
4	List the chemical composition of cement.	BT-1	Remember
5	List with chemical formula for Bogue's compounds.	BT-1	Remember
6	What is hydration of cement?	BT-1	Remember
7	What is the effect of Ca (OH) ₂ in concrete?	BT-5	Evaluate
8	What are the techniques used to study the structure of cement paste?	BT-1	Remember
9	Discuss about gel water and bound water.	BT-6	Create
10	List the types of cement.	BT-1	Remember
11	Write about OPC and different grades in it.	BT-2	Understand
12	List the advantages of Portland pozzolana cement.	BT-1	Remember
13	Write down any four properties of cement.	BT-5	Evaluate
14	What is setting time in cement?	BT-4	Analyse
15	What is GGBS? List its advantages.	BT-1	Remember
16	Write the specification of Vicat apparatus.	BT-5	Evaluate
17	Classify aggregates.	BT-5	Evaluate
18	Simplify about bulking of aggregates?	BT-3	Apply
19	Compose soundness of aggregates.	BT-6	Create
20	Identify the thermal properties of aggregates.	BT-3	Apply
21	Simplify the term elongation and flakiness index.	BT-4	Analyse
22	What are the specifications of aggregate impact test?	BT-2	Understand
23	Identify the different methods of obtaining abrasion value based on the testing apparatus	BT-3	Apply
24	Give the pH value of water to make concrete.	BT-5	Evaluate
25	Describe the effect of sea water in concrete.	BT-2	Understand

PART – B

1	Draw a flow diagram to represent the manufacturing process of cement by wet process.	BT-6	Create
2	Describe the different field tests conducted in cement.	BT-2	Understand

3	List out the salient features of i) Rapid hardening cement. ii) Sulphate resisting cement.	BT-1	Remember
4	Describe the term i) Portland slag cement. ii) Low heat cement.	BT-2	Understand
5	Explain i) Portland pozzolana cement. ii) Air entraining cement.	BT-5	Evaluate
6	Explain air permeability test.	BT-2	Understand
7	Explain the procedure to determine i) Consistency of cement. ii) Initial and final setting time.	BT-4	Analyse
8	How will you determine the compressive strength of cement?	BT-1	Remember
9	Simplify the procedure to determine the Elongation index.	BT-4	Analyse
10	Examine the test for aggregate to determine the flakiness index.	BT-4	Analyse
11	Write about the standard procedure to determine the aggregate crushing value.	BT-1	Remember
12	How will you determine the aggregate impact value?	BT-1	Remember
13	Describe the aggregate abrasion value with the specific abrasive charge and grading.	BT-3	Apply
14	Identify the impurities in the concreting water and the tolerable limits and explain briefly?	BT-3	Apply

PART – C

1	Explain the manufacturing process of cement.	BT-2	Understand
2	Elaborate the test procedures to determine i) Fineness of cement. ii) Soundness of cement.	BT-6	Create
3	Explain the general properties of aggregates.	BT-2	Understand
4	Write any three test procedures to determine the properties of aggregates.	BT-3	Apply

UNIT II CHEMICAL AND MINERAL ADMIXTURES

Accelerators – Retarders - Plasticizers - Super plasticizers - Water proofers - Mineral Admixtures like Fly Ash, Silica Fume, Ground Granulated Blast Furnace Slag and Metakaoline - Effects on concrete properties.

PART – A

Q.No	Questions	BT Level	Competence
1	Define admixture.	BT-1	Remember
2	List the conventional methods followed to obtain high workability?	BT-4	Analyse
3	What is an additive?	BT-2	Understand
4	Mention some of the chemical admixtures used in concrete	BT-1	Remember
5	Write the effects of use of extra water in concrete.	BT-2	Understand
6	Summarize the uses of plasticizer?	BT-2	Understand
7	Compile the effects of plasticizer?	BT-6	Create
8	Simplify the effects of super plasticizer on fresh concrete?	BT-4	Analyse

9	What are the factors effecting the workability?	BT-1	Remember
10	Discuss about slump loss?	BT-6	Create
11	What is the importance of super plasticizers that are used in concrete?	BT-5	Evaluate
12	Summarize the term retarders in concrete.	BT-2	Understand
13	Show the various functions of the accelerators.	BT-2	Understand
14	Outline the role of air entraining admixture.	BT-2	Understand
15	What is freezing and thawing.	BT-1	Remember
16	Criticize the reasons for the loss of homogeneity in concrete?	BT-5	Evaluate
17	What are the different methods for measuring air content of fresh concrete?	BT-1	Remember
18	What are the desirable properties of silica fume?	BT-1	Remember
19	What is meant by pozzolanic action?	BT-3	Apply
20	Identify the pozzolanic materials that are used in concrete?	BT-3	Apply
21	List the effect of fly ash on fresh concrete	BT-1	Remember
22	What the effects are for make use of silica fumes in concrete.	BT-3	Apply
23	Define Metakaolin.	BT-1	Remember
24	How is the GGBS Utilised in concrete?	BT-3	Apply
25	List the corrosion inhibiting agents.	BT-4	Analyse
<u>PART –B</u>			
1	Classify admixtures.	BT-2	Understand
2	What are the super plasticizers and classify.	BT-2	Understand
3	Explain the factors that affect the workability.	BT-2	Understand
4	Infer the effects of super plasticisers on Hardened concrete?	BT-4	Analyse
5	Write a note on i) Carboxylated acrylic Ester. ii) Multi carboxylate ether.	BT-3	Apply
6	Write short note on i) Retarders ii) Accelerators	BT-4	Analyse
7	Give detailed notes about Plasticizers and its action?	BT-6	Create
8	What are the factors that affect the amount of air entrainment?	BT-1	Remember
9	List the effect of air entrainment on the properties of concrete.	BT-1	Remember
10	Categorize the methods for measuring air content of fresh concrete and explain it?	BT-4	Analyse
11	Write a note on HVFA concrete	BT-1	Remember
12	Write a note on silica fume as an admixture	BT-1	Remember
13	Write a note on i) Rice husk ii) Surkhi	BT-5	Evaluate
14	Write a note on i) Corrosion inhibiting agents ii) Construction chemicals for water proofing.	BT-3	Apply
<u>PART –C</u>			
1	Explain about plasticizer and super plasticizers?	BT-5	Evaluate

2	Classify admixtures and explain it.	BT-2	Understand
3	Explain in detail about use of fly ash in concreting?	BT-5	Evaluate
4	Describe with the composition and specification of GGBS?	BT-2	Understand

UNIT III PROPORTIONING OF CONCRETE MIX

Principles of Mix Proportioning - Properties of concrete related to Mix Design - Physical properties of materials required for Mix Design - Design Mix and Nominal Mix - BIS Method of Mix Design - Mix Design Examples

PART – A

Q.No	Questions	BT Level	Competence
1	What is the need for studying the various properties of concrete?	BT-2	Understand
2	Define mix design.	BT-1	Remember
3	List the objectives of mix design.	BT-1	Remember
4	List the variable factors considered in the proportioning of concrete mix.	BT-1	Remember
5	Mention any four methods of proportioning.	BT-3	Apply
6	What are the basic requirements of concrete mix design?	BT-5	Evaluate
7	What are the different types of concrete mixes?	BT-6	Create
8	List out the factors affecting the choice of mix proportions	BT-1	Remember
9	What are the factors to be considered for mix design?	BT-1	Remember
10	Give the formula for calculating the target mean strength for mix design.	BT-3	Apply
11	What is the standard deviation limit for various concrete?	BT-1	Remember
12	Write the formula to obtain aggregate content in concrete.	BT-3	Apply
13	What is the required increase in strength for specific design strength when no test records are available?	BT-2	Understand
14	Differentiate average design strength and specified minimum strength.	BT-4	Analyse
15	Point out the disadvantages of nominal mix.	BT-4	Analyse
16	Explain the techniques related to mix design?	BT-4	Analyse
17	Summarize the term nominal mix and design mix.	BT-5	Evaluate
18	Compare nominal and design mix.	BT-2	Understand
19	Prepare the advantages of a design mix in comparison with normal mix	BT-2	Understand
20	What is called as honeycombing? Why it is to be prevented?	BT-2	Understand
21	Give reasons for variation in compressive strength of the samples of the same mix	BT-5	Evaluate
22	What are the factors that contribute to the concrete density?	BT-6	Create
23	Write the methods of mix design commonly used?	BT-1	Remember
24	Mention some of the physical properties of materials required for mix design	BT-2	Understand
25	Write the essential features of grading of concrete.	BT-6	Create

PART –B

1	Write down the main objectives for doing the mix design.	BT-1	Remember
2	Explain the concept of mix design.	BT-2	Understand
3	Describe about the variables in proportioning.	BT-3	Apply
4	What are the various methods of proportioning in concrete mix design?	BT-1	Remember
5	Explain the terminologies in the statistical control.	BT-2	Understand

6	Explain the mix design for the pumpable concrete.	BT-2	Understand
7	Brief the concrete mix design procedure as per Indian Standards.	BT-5	Evaluate
8	Make a list for the typical values of the standard deviation for different conditions of placing and mixing control.	BT-4	Analyse
9	What are the data's to be collected for the concrete mix design?	BT-1	Remember
10	What are the recommended values of slump for various types of constructions?	BT-1	Remember
11	Simplify the design step procedure for M25 grade concrete.	BT-4	Analyse
12	How will you calculate the physical properties of materials required for mix design?	BT-3	Apply
13	Examine the actual quantities required for the mix per bag of cement.	BT-6	Create
14	How will you calculate the cement content and aggregate contents for mix design?	BT-4	Analyse
<u>PART -C</u>			
1	Describe the BIS method of concrete design with the necessary data's stipulated.	BT-1	Remember
2	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 conforming to IS 8112 iii. Maximum nominal size of aggregates : 20 mm iv. Minimum cement content : 320 kg/m ³ 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/m ³ 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	BT-6	Create
3	Design a concrete mix by BIS method with the following data Characteristics compressive strength = 35N/mm ² Maximum size of aggregate = 20mm (angular) Fine aggregates conform to grading zone II Degree of workability = 0.80	BT-6	Create

	<p>Degree of quality control = Good, Type of exposure = Mild Specific gravity of cement = 3.14 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.</p>		
4	<p>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 conform 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 calculate the quantity of cement, sand, coarse aggregate and water required per cubic metre of concrete.</p>	BT-6	Create

<p align="center">UNIT IV FRESH AND HARDENED PROPERTIES OF CONCRETE Workability - Tests for workability of concrete - Segregation and Bleeding - Determination of strength Properties of Hardened concrete - Compressive strength – split tensile strength - Flexural strength - Stress-strain curve for concrete - Modulus of elasticity – durability of concrete – water absorption – permeability – corrosion test – acid resistance.</p>			
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PART – A

Q.No	Questions	BT Level	Competence
1	What is fresh concrete?	BT-1	Remember
2	Explain workability.	BT-2	Understand
3	What are the recommended tests for measuring workability?	BT-4	Analyse
4	Define segregation and bleeding.	BT-1	Remember
5	Mention the methods for transporting concrete.	BT-2	Understand
6	What are the compaction methods adopted concreting?	BT-3	Apply
7	What is curing? What are the methods of curing?	BT-3	Apply
8	Write down the special methods of making high strength concrete.	BT-6	Create
9	Group the different methods of finishing of fresh concrete.	BT-2	Understand
10	What is the effect of maximum size aggregate on strength?	BT-1	Remember

11	Give the relation between compressive and tensile strength	BT-4	Analyse
12	Write the relation between the compressive strength and flexural strength.	BT-4	Analyse
13	What is the main aspect for making mortar for concrete at site?	BT-3	Apply
14	What is workable concrete?	BT-5	Evaluate
15	Classify the three types of segregation.	BT-2	Understand
16	How will you calculate the bleeding water percentage?	BT-1	Remember
17	What are the factors which are affecting the setting time of concrete?	BT-1	Remember
18	Draw the stress strain curve for various concrete mixes?	BT-6	Create
19	What are the factors which are affecting the workability of concrete?	BT-2	Understand
20	What are the disadvantages of adding more water to the concrete?	BT-4	Analyse
21	How will you decide the maximum size of aggregates to be used in concrete in practical?	BT-2	Understand
22	What are the shape of aggregates available in practical?	BT-5	Evaluate
23	Write the advantages of using round shape aggregates in concrete.	BT-2	Understand
24	Define durability.	BT-1	Remember
25	Select the different methods of controlling sulphate attack.	BT-5	Evaluate

PART –B

1	Describe the four partial properties of concrete in the workability.	BT-1	Remember
2	What are the factors affecting workability?	BT-1	Remember
3	Explain the slump cone test procedure with neat sketches.	BT-2	Understand
4	Simplify the flow table test with the description about the apparatus.	BT-4	Analyse
5	Explain the procedure to conduct compaction factor test.	BT-2	Understand
6	Explain the test procedure to obtain the bleeding of concrete.	BT-5	Evaluate
7	Examine various batching methods in concreting.	BT-4	Analyse
8	Describe about slip – form technique.	BT-2	Understand
9	Explain the process of i) Membrane curing. ii) Electrical curing.	BT-1	Remember
10	Identify the bond strength of concrete in different cases.	BT-3	Apply
11	Explain the various experiments conducted on hardened concrete.	BT-3	Apply
12	Discuss the carbonation of concrete with their factors. How will u measure the depth of carbonation?	BT-4	Analyse
13	Explain the corrosion of steel and their control.	BT-1	Remember
14	Discuss about the surface treatments of concrete.	BT-6	Create

PART –C

1	Explain the process of manufacturing of concrete.	BT-2	Understand
2	What are the methods to control the corrosion of steel reinforcement?	BT-1	Remember
3	Explain the various types and causes of cracks in concrete.	BT-2	Understand
4	Discuss the effects of materials on durability.	BT-6	Create

UNIT V SPECIAL CONCRETES

Light weight concretes - foam concrete- self compacting concrete – vacuum concrete - High strength concrete - Fibre reinforced concrete – Ferrocement - Ready mix concrete – SIFCON - Shotcrete – Polymer concrete - High performance concrete - Geopolymer Concrete

PART – A

Q.No	Questions	BT Level	Competence
1	Compare light weight concrete with ordinary concrete.	BT-2	Understand
2	What are the different ways to achieve light weight concrete?	BT-1	Remember
3	What is pumice?	BT-1	Remember
4	Define light weight concrete	BT-1	Remember
5	Classify light weight concrete on the purpose for which it is used.	BT-5	Evaluate
6	Mention the properties of Exfoliated Vermiculite.	BT-2	Understand
7	List the artificial aggregates.	BT-4	Analyse
8	Define Aerated concrete.	BT-1	Remember
9	What are the different forms of aerated concrete?	BT-1	Remember
10	What are the fibres used in fibre reinforced concrete?	BT-1	Remember
11	Define aspect ratio.	BT-1	Remember
12	What are the different types of polymer concrete?	BT-2	Understand
13	What are the problems in hot weather concreting?	BT-3	Apply
14	Define Shotcrete.	BT-1	Remember
15	Identify the casting techniques of Ferro cement?	BT-3	Apply
16	Give the interpretation of i) Slump flow test. ii) J-ring test.	BT-5	Evaluate
17	Describe how the following test influences in SCC i) V funnel test. ii) L box test.	BT-5	Evaluate
18	Discuss about bacterial concrete?	BT-6	Create
19	Summarize the term Geopolymer concrete?	BT-2	Understand
20	Identify the effect of water content in the mix for the geopolymer concrete?	BT-3	Apply
21	Simplify the term SIFCON?	BT-4	Analyse
22	Define special concrete.	BT-1	Remember
23	What are the requirement of fibres used in fibre reinforced concrete?	BT-5	Evaluate
24	List the application of sulphur-infiltrated concrete.	BT-4	Analyse
25	Discuss about Density of Light weight aggregate concrete.	BT-6	Create

PART – B

1	What are the requirements, materials and production of Self compacting concrete?	BT-1	Remember
2	Differentiate Normal strength of Concrete and High strength of Concrete.	BT-4	Analyse
3	Name the materials for high strength concrete. Explain in detail.	BT-1	Remember
4	Differentiate the High strength concrete and high performance concrete. With their process, applications, and limitations.	BT-4	Analyse

5	List out the application of polymer impregnated concrete	BT-1	Remember
6	Explain about vacuum concrete and shotcrete.	BT-2	Understand
7	Explain the process of preparation of Guniting.	BT-2	Understand
8	Explain the factors effecting properties of Fibre reinforced Concrete.	BT-2	Understand
9	Discuss about Fibre Reinforced Concrete, What are the fibres used in concrete.	BT-6	Create
10	Explain the types of polymer concrete.	BT-5	Evaluate
11	Write down the application of polymer impregnated concrete in detail.	BT-3	Apply
12	Describe Ferrocement. Assess what are the casting techniques which are involved in Ferrocement?	BT-4	Analyse
13	Write about High performance concrete with advantages and applications.	BT-3	Apply
14	What is Geopolymer concrete? Explain their advantages and uses.	BT-1	Remember
<u>PART -C</u>			
1	Explain Self compacting concrete with suitable example.	BT-6	Create
2	Why ready mix concrete is not to attain the strength and durability. Explain in detail with case study	BT-1	Remember
3	When to use High Performance Concrete? Explain with any case study.	BT-1	Remember
4	What are the different types of test conducted on SCC? Explain any two in detail.	BT-1	Remember

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CE 8404 CONCRETE TECHNOLOGY QUESTION BANK

S.no	UNIT NO.		BT1	BT2	BT3	BT4	BT5	BT6	Total Questions
1	Unit-1	Part-A	7	5	4	4	3	2	25
		Part-B	4	3	2	3	1	1	14
		Part-C	-	2	1	-	-	1	4
2	Unit-2	Part-A	8	6	4	3	2	2	25
		Part-B	4	3	2	3	1	1	14
		Part-C	-	2	-	-	2	-	4
3	Unit-3	Part-A	7	6	3	4	3	2	25
		Part-B	4	3	2	3	1	1	14
		Part-C	1	-	-	-	-	3	4
4	Unit-4	Part-A	6	7	3	4	3	2	25
		Part-B	4	3	2	3	1	1	14
		Part-C	1	2	-	-	-	1	4
5	Unit-5	Part-A	9	4	3	3	4	2	25
		Part-B	4	3	2	3	1	1	14
		Part-C	3	-	-	-	-	1	4

TOTAL NO.OF QUESTIONS IN EACH PART

PART A	125
PART B	70
PART C	20
TOTAL	190