

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER – OLD PAPER – S22 TO S25 – QUESTION BANK

**Subject Name & Code:**

**Concrete Technology- 3150610**

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## **Unit 1: General**

*(Historic development, Advantages, Sustainability, etc.)*

**Repeated Questions:**

**Other Important Questions:**

- **Q.** State the advantages of concrete as a construction material. **(Summer 2022, 03 Marks)**  
**(Winter 2023, 07 Marks)**
- **Q.** What modifications can a civil engineer implement to make the concrete industry more sustainable? **(Summer 2025, 04 Marks)**

## Unit 2: Ingredients of Concrete

*(Cement, Aggregates, Water, Admixtures)*

### Repeated Questions:

- **Cement Types & Composition:**
  - Enlist different types of cement. (Summer 2023, 03 Marks) (Summer 2025, 03 Marks)
  - Write down/Enlist Bogue's compounds of cement. Explain their role in the hydration process. (Summer 2023, 04 Marks) (Winter 2024, 04 Marks) (Summer 2025, 04 Marks) (Winter 2023, 04 Marks) (Summer 2022, 04 Marks)
  - Explain the function of Bogue's compound in the hydration process of cement. (Winter 2024, 04 Marks)
  - Differentiate between OPC and PPC. (Winter 2023, 04 Marks)
- **Cement Manufacturing:**
  - Explain the wet process for manufacturing of cement. (Summer 2023, 07 Marks) (Winter 2024, 07 Marks) (Winter 2022, 07 Marks)
  - Explain the step-by-step dry process of manufacturing of Ordinary Portland Cement using a flow chart. (Winter 2024, 07 Marks)
  - Plot the flow chart for dry and wet process of cement manufacturing. (Summer 2022, 03 Marks)
- **Aggregates:**
  - What is gap grading? Explain briefly. (Summer 2023, 04 Marks)
  - Write a short note on bulking of sand. (Summer 2024, 04 Marks)
  - Define the term "Bulking of fine aggregates". Explain its significance. (Winter 2022, 04 Marks)
  - Explain the bulking of sand using a graph. (Summer 2025, 07 Marks)
  - Explain the terms 'flakiness index' and 'elongation index'. (Winter 2023, 03 Marks)
  - Explain the test for the determination of aggregate crushing value. (Summer 2023, 07 Marks) (Summer 2022, 07 Marks) (Winter 2023, 04 Marks)
- **Admixtures:**
  - Enlist various admixtures used in the concrete. Explain any two admixtures in detail. (Winter 2024, 07 Marks)
  - Enlist the different admixtures used in concrete construction. Explain the function of accelerator and retarders. (Summer 2023, 04 Marks)
  - What are the purposes of admixtures in concrete? (Summer 2024, 03 Marks)
  - What are mineral admixtures? Why are they generally used? List various mineral admixtures. (Winter 2023, 07 Marks)

### Other Important Questions:

- **Cement:**
  - Explain the roles of each ingredient used in concrete. (Winter 2024, 03 Marks)
  - Write chemical composition of Ordinary Portland cement. (Winter 2022, 03 Marks)
  - Explain the role of gypsum in the hydration process of cement. (Winter 2024, 03 Marks)
  - Describe the effect of quantity of Gypsum in cement. (Winter 2022, 03 Marks)
  - Explain the precautions to be taken in storing cement. (Winter 2023, 03 Marks)
  - How can we check cement on site? Why the field testing of cement is important? (Winter 2022, 04 Marks)

- **Aggregates:**
  - Classify the coarse aggregates based on source, shape and texture. (**Summer 2022, 04 Marks**)
  - Write a brief note on: (a) Natural aggregates (b) Artificial aggregates (c) Recycled aggregates. (**Winter 2023, 03 Marks**)
  - How does strength of aggregate influence the strength of concrete? (**Winter 2023, 07 Marks**)
  - Explain Impact and crushing value of aggregate. (**Winter 2022, 03 Marks**)
- **Water:**
  - State the essential characteristics of water that can be used for mixing and curing of concrete. (**Summer 2023, 03 Marks**) (**Summer 2022, 03 Marks**)
  - State the functions of water in making concrete. (**Winter 2023, 03 Marks**)
- **Numerical:**
  - Determine the fineness modulus of the sand for which sieve result is as shown. (**Winter 2023, 07 Marks**)
  - Determine the Fineness Modulus for the given Sieve analysis performed on fine aggregate. (**Summer 2022, 07 Marks**)

## Unit 3: Fresh Concrete

*(Workability, Segregation, Bleeding, Curing, etc.)*

### Repeated Questions:

- **Workability:**
  - Define workability and discuss factors affecting workability. **(Summer 2024, 04 Marks) (Winter 2023, 04 Marks) (Summer 2025, 07 Marks)**
  - Enlist various factors affecting workability of concrete and discuss it in detail. **(Summer 2022, 07 Marks)**
  - Explain Slump cone test for measuring the workability of concrete. **(Winter 2024, 03 Marks)**
  - Explain different types of slump with figure/sketch. **(Summer 2023, 03 Marks) (Summer 2024, 04 Marks) (Winter 2022, 04 Marks)**
  - List out various tests of workability. Explain the slump cone test procedure as per the IS code. **(Summer 2025, 07 Marks)**
- **Segregation & Bleeding:**
  - Explain segregation of concrete. **(Summer 2024, 03 Marks) (Winter 2022, 03 Marks) (Winter 2023, 04 Marks)**
  - Explain segregation and bleeding of concrete. **(Winter 2022, 03 Marks)**
  - Discuss the bleeding of concrete and Enlist the remedies for bleeding. **(Summer 2025, 04 Marks)**
  - Explain the causes and prevention of segregation of concrete. **(Winter 2024, 03 Marks)**
- **Curing:**
  - Discuss different methods of curing of concrete. **(Winter 2024, 04 Marks)**
  - Write importance of curing of concrete. Explain different methods of curing procedure. **(Summer 2023, 07 Marks) (Winter 2022, 07 Marks)**
  - Explain need of curing. State different methods of curing. **(Summer 2024, 03 Marks)**
  - What is curing? List the different methods of curing, and explain any one method in detail. **(Summer 2025, 07 Marks)**
- **Compaction:**
  - What is compaction of concrete? What is the significance of compaction in concrete? **(Summer 2023, 03 Marks)**
  - Explain the importance of compaction of concrete. **(Summer 2025, 03 Marks)**
  - Enlist various methods of concrete compaction and explain their importance. **(Winter 2024, 04 Marks)**

### Other Important Questions:

- What is workability of fresh concrete. Enlist factors affecting workability. **(Summer 2023, 04 Marks)**
- What is Slump loss? Discuss various measures to control slump loss in concrete. **(Winter 2024, 07 Marks)**
- State the methods adopted for the transportation of concrete. Explain any one method. **(Summer 2022, 03 Marks)**
- Differentiate between volume batching and weigh batching in concrete mix procedure. **(Summer 2025, 03 Marks)**
- Explain volume batching and weigh batching for concrete mix. **(Winter 2022, 04 Marks)**

- In a mix design, determine the correct proportion to be used at site given moisture content. **(Winter 2023, 07 Marks)**
- Explain the precautions that should be taken during concreting in hot and cold weather conditions. **(Winter 2024, 07 Marks)**
- Write short note on cold weather concreting. **(Winter 2022, 04 Marks)**
- What precautions will you take, if concreting is to be done above 40°C? **(Winter 2023, 03 Marks)**

## Unit 4: Hardened Concrete

*(Strength, Shrinkage, Creep, Stress-Strain)*

### Repeated Questions:

- **Strength:**
  - State factors affecting compressive strength of concrete and explain any one/four in detail. **(Summer 2024, 07 Marks) (Winter 2023, 07 Marks) (Winter 2022, 07 Marks)**
  - What is the effect of water cement ratio on strength of concrete? **(Summer 2023, 03 Marks) (Summer 2024, 03 Marks)**
  - Explain the procedure for performing a compressive strength test on concrete cubes. **(Winter 2024, 07 Marks)**
- **Shrinkage:**
  - Discuss various types of shrinkage of the concrete. **(Winter 2024, 03 Marks)**
  - Define shrinkage. What are the factors affecting it and their remedial measures? **(Summer 2025, 07 Marks)**
  - What is shrinkage? Give the classification of shrinkage. **(Winter 2023, 03 Marks)**
  - Describe shrinkage of concrete. Giving the classification of shrinkage, explain harmful effects. **(Winter 2022, 07 Marks)**

### Other Important Questions:

- Briefly explain Gel-space ratio. **(Summer 2023, 03 Marks) (Winter 2022, 03 Marks)**
- Explain the test method to determine flexural strength of concrete in detail. **(Summer 2022, 07 Marks)**
- Define the terms. (i) Shrinkage (ii) Creep (iii) Durability. **(Summer 2022, 03 Marks)**
- Discuss the effect of Height/Diameter ratio on strength of concrete. **(Summer 2022, 04 Marks)**

## Unit 5: Durability & Permeability of Concrete

*(Deterioration, AAR, Sulphate Attack, Marine Environment)*

### Repeated Questions:

- **Alkali-Aggregate Reaction (AAR):**
  - Explain the Alkali-aggregate reaction. **(Winter 2022, 07 Marks) (Summer 2022, 07 Marks)**
  - Describe the factors affecting the alkali-aggregate reaction. **(Summer 2025, 03 Marks)**
- **Sulphate Attack:**
  - Explain mechanism of sulphate attack on concrete. **(Summer 2024, 03 Marks) (Winter 2023, 03 Marks)**
  - Briefly explain the sulphate attack on concrete. Also discuss the methods to control sulphate attack. **(Summer 2022, 07 Marks)**
- **Durability:**
  - Define Durability. Explain its significance. **(Summer 2024, 04 Marks)**
  - Define durability of concrete? Enlist factors affecting durability of concrete. **(Winter 2022, 07 Marks)**
  - Discuss various factors that influence the durability of concrete. **(Winter 2024, 04 Marks)**
  - List the external and internal factors affecting the durability of concrete. **(Summer 2025, 04 Marks)**

### Other Important Questions:

- How does the marine environment affect the durability of concrete? **(Winter 2024, 03 Marks)**
- Explain in brief about freezing and thawing effect of concrete. **(Winter 2022, 03 Marks)**
- Discuss the effect of freezing and thawing on concrete. **(Winter 2023, 04 Marks)**
- What is permeability of concrete? Enlist factors affecting the permeability of concrete. **(Summer 2023, 07 Marks)**
- Explain the factors affecting permeability of concrete. **(Summer 2024, 07 Marks)**
- Define Permeability of concrete. State the factors due to which concrete will have higher permeability. **(Summer 2022, 04 Marks)**
- What do you understand by the carbonation of concrete? **(Summer 2025, 03 Marks)**
- Explain following factors which contributes to cracks in concrete. (i) Plastic Shrinkage (ii) Carbonation. **(Summer 2022, 04 Marks)**
- Explain various causes of corrosion of steel in concrete and its remedial measures. **(Summer 2024, 07 Marks)**

## Unit 6: Mix Design of Concrete

*(Principles, IS Method, Acceptability)*

### Repeated Questions:

- Explain Indian Standard Mix design method as per IS:10262 with its salient features. **(Summer 2023, 07 Marks) (Summer 2024, 07 Marks)**
- Discuss the step-by-step procedure of concrete mix design as per IS:10262. **(Winter 2024, 07 Marks)**
- What do you mean by Design of concrete mix. Explain the steps for Mix Design Procedure as per relevant Indian Standards. **(Winter 2022, 07 Marks)**

### Other Important Questions:

- State the objectives of concrete mix design. **(Summer 2022, 03 Marks)**
- After designing concrete mix for first trial, how do you proceed to finalize the mix with further trial? **(Winter 2023, 03 Marks)**
- List out the factors influencing the mix proportion of concrete. **(Summer 2025, 04 Marks)**
- List the steps for selecting the mix proportion of concrete according to the I.S. code method, and explain any two steps in detail. **(Summer 2025, 07 Marks)**
- Define nominal mix and design mix for concrete. **(Summer 2022, 07 Marks)**

## Unit 7: Special Concrete and Concreting Methods

*(HSC, HPC, SCC, RMC, Underwater Concreting)*

### Repeated Questions:

- **Self-Compacting Concrete (SCC):**
  - What is self-compacting concrete? And what are the advantages and disadvantages of using it? **(Summer 2024, 07 Marks) (Winter 2023, 07 Marks)**
  - Write a short note on self-compacting concrete. **(Summer 2025, 04 Marks)**
- **Ready-Mix Concrete (RMC):**
  - Write a short note on ready-mix concrete. **(Winter 2024, 04 Marks)**
  - State the different types of special concrete techniques. Explain the ready mixed concrete with its classification. **(Summer 2023, 04 Marks)**
  - State the different types of special concreting techniques & Explain ready mixed concrete with its merits. **(Summer 2025, 07 Marks)**
- **Underwater Concreting:**
  - List various methods of concreting under water and explain 'tremie' method. **(Summer 2024, 07 Marks) (Winter 2023, 07 Marks)**

### Other Important Questions:

- Write a short note on aerated concrete. **(Summer 2024, 04 Marks)**
- Write a short note on lightweight concrete. **(Winter 2024, 04 Marks)**
- Differentiate between high-strength concrete and high-performance concrete. **(Summer 2024, 04 Marks) (Winter 2023, 04 Marks)**
- Write a note on "Fiber reinforced concrete". **(Winter 2022, 04 Marks)**
- Discuss Fiber Reinforced Concrete in detail. **(Summer 2022, 07 Marks)**
- Write explanatory notes on no-fines concrete. **(Winter 2023, 04 Marks)**
- Define Ferro cement briefly. **(Summer 2023, 03 Marks)**
- Write short note on Ferro Cement. **(Summer 2022, 04 Marks)**
- How fly ash concrete gain strength in later age? **(Summer 2023, 04 Marks)**
- What is the role of fly ash in cement industry. **(Winter 2022, 03 Marks)**

## Unit 8: Miscellaneous Topics

*(NDT, Fracture Mechanics)*

### Repeated Questions:

- **Non-Destructive Testing (NDT):**
  - Enlist various non-destructive tests of concrete and explain any one in detail. **(Winter 2024, 04 Marks)**
  - Enlist the types of NDT tests for concrete. Explain the rebound hammer test in detail. **(Summer 2023, 07 Marks) (Winter 2022, 07 Marks)**
  - Explain about rebound hammer test. **(Summer 2024, 07 Marks)**
  - Explain the basic principle on which rebound hammer works. What are its limitations? **(Summer 2023, 07 Marks) (Winter 2023, 07 Marks)**
  - State the Limitations of Rebound Hammer Test. **(Summer 2022, 03 Marks)**
  - What are the limitations of a rebound hammer test? Also, mention under which circumstances this method is useful. **(Summer 2025, 03 Marks)**
- **Other NDT Tests:**
  - Explain ultrasonic pulse velocity test. **(Summer 2024, 07 Marks)**
  - Explain the pull out test method in detail. **(Summer 2022, 07 Marks)**

### Other Important Questions:

*Fracture Mechanics topics were not directly asked in any of the provided papers.*

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