

II B. Tech II Semester Regular/Supplementary Examinations, April/May - 2017
CONCRETE TECHNOLOGY
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

1. a) Write about accelerators and retarders. (4M)
- b) What is the effect of time and temperature on workability? (4M)
- c) Write about Gel space Ratio (3M)
- d) What is creep? What are the factors influencing creep? (4M)
- e) What is the durability of concrete? (3M)
- f) Write about RMC and SCC. (4M)

**PART -B**

2. a) What are the main compounds in Portland cement and explain their properties? (8M)
- b) Mention the different tests to be conducted on aggregate and explain about impact and crushing tests. (8M)
3. a) Write about segregation and bleeding. (8M)
- b) What are the factors affecting workability? (8M)
4. a) Explain the relation between compression and tensile strength. (8M)
- b) Describe the importance of curing and explain the different methods of curing. (8M)
5. a) Write the factors effecting the modulus of elasticity (6M)
- b) What is shrinkage of concrete? Explain about classification of shrinkage. (10M)
6. a) Write the design steps of a mix design by IS code method. (12M)
- b) What is the quality control of concrete? (4M)
7. a) Define light weight concrete and explain in detail the classification of light weight concrete. (8M)
- b) Write about high density concrete and SIFCON (8M)

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PART -A

1. a) Explain the different laboratory tests of cement. (4M)
- b) Explain the various steps in the manufacture of concrete. (4M)
- c) What is Abram's law? (3M)
- d) What is the importance of Non-Destructive tests? (3M)
- e) What are the factors in the choice of mix proportions? (4M)
- f) Write about Fibre reinforced concrete. (4M)

PART -B

2. a) Explain different methods of measurement of moisture content of aggregates. (8M)
- b) Explain briefly the physical properties of ordinary Portland cement. (8M)
3. a) Explain the various steps in the manufacture of concrete. (6M)
- b) Mention the different tests which are commonly adopted to measure workability and explain about any two tests. (10M)
4. a) Explain the Maturity concept of concrete. (6M)
- b) Write about Flexure test and Split tensile test of concrete. (10M)
5. a) Write about elastic properties of concrete. (6M)
- b) What is the relation between creep and time? What is the effect of creep on concrete? (10M)
6. Design a concrete mix of M30 grade. Take standard deviation of 5Mpa. The specific gravities of coarse aggregate and fine aggregate are 2.75 and 2.62 respectively. The bulk density of coarse aggregate is 1610 kg/m³ and fineness modulus of aggregate is 2.70. A slump of 60 mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using IS code method. Assume any missing data. (16M)
7. a) Write the difference between High performance concrete and High Density concrete. (8M)
- b) What are the different types of polymers? What is polymer concrete? (8M)

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**PART -A**

1. a) What is bulking of sand? (4M)
- b) What are the fresh properties of concrete? (4M)
- c) What are the codal provisions of NDT? (3M)
- d) Write brief note on flexural strength of concrete. (4M)
- e) Define durability of concrete. (3M)
- f) Write about cellular concrete. (4M)

**PART -B**

2. a) What is the soundness of cement and how it is tested? (6M)
- b) What is alkali aggregate reaction? What are the factors promoting alkali aggregate reaction? (10M)
3. a) Define workability. Write the factors influencing the workability. (12M)
- b) Write about mixing and vibration of concrete. (4M)
4. a) What are the various Non-destructive methods of testing concrete? (6M)
- b) Explain the different tests of hardened concrete. (10M)
5. a) Write the thermal properties of concrete. (8M)
- b) Define creep and explain how creep is measured? (8M)
6. Design a concrete mix of M35 grade. Take standard deviation of 5Mpa. The specific gravities of coarse aggregate and fine aggregate are 2.76 and 2.63 respectively. The bulk density of coarse aggregate is 1610 kg/m<sup>3</sup> and fineness modulus of aggregate is 2.72. A slump of 60mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using IS code method. Assume any missing data. (16M)
7. Write about the following (16M)
  - i) Self compacting concrete.
  - ii) Fibre reinforced concrete
  - iii) Light weight concrete
  - iv) Ready mix concrete

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PART -A

1. a) Write short note on grading and surface area of aggregate. (4M)
- b) What is shotcrete concrete? (3M)
- c) What are the factors affecting strength of concrete? (4M)
- d) Write about dynamic modulus of elasticity. (4M)
- e) Write about quality control of concrete. (3M)
- f) What are the different types of special concrete? Write about any one. (4M)

PART -B

2. a) What are the different types of plasticizers and superplasticizers? (6M)
- b) What is fineness modulus? How is sieve analysis conducted for FA and CA (10M)
3. a) What are the steps in the manufacture of concrete? (8M)
- b) What is the quality of water mixing in concrete? (8M)
4. a) What is the relation between compression and split tensile strength? (8M)
- b) What are the different Non Destructive Tests? Also, write the codal provisions of NDT. (8M)
5. a) Discuss the relation between modulus of elasticity and strength. (8M)
- b) Define shrinkage and types of shrinkage. (8M)
6. Design a concrete mix of M25 grade. Take standard deviation of 4MPa. The specific gravities of coarse aggregate and fine aggregate are 2.72 and 2.60 respectively. The bulk density of coarse aggregate is 1610 kg/m³ and fineness modulus of aggregate is 2.74. A slump of 60mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using IS code method. Assume any missing data. (16M)
7. a) What are the different types of fibres? What are factors affecting properties of FRC. (10M)
- b) Write about High Performance Concrete (6M)

II B. Tech II Semester Supplementary Examinations, Nov/Dec - 2016
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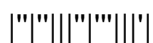
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PART -A**[22M]**

1. a) Write about Hydration of cement?
- b) What is meant by Compaction?
- c) What is NDT?
- d) Explain about Modulus of elasticity?
- e) Write about Gel space ratio
- f) What is Shotcrete?

PART -B**[3×16=48M]**

2. Bring out a detailed discussion on Alkali Aggregate reaction? Discuss the factors promoting and methods to control.
3. a) Explain workability of concrete?
b) Explain the Vee-bee method of determining workability with neat sketches
4. a) Explain with neat diagram non-destructive testing of concrete using Rebound Hammer Method.
b) What are the techniques of measuring pulse velocity through concrete and factors affecting the measurement of pulse velocity?
5. a) Explain dynamic modulus of elasticity.
b) Explain procedure for determining dynamic modulus of elasticity using Ultrasonic pulse velocity equipment
6. Design mix proportions with the following data using IS code method. Characteristic compressive strength of concrete 30 Mpa. 20mm Maximum size of round aggregate. Moderate degree of workability. Specific gravity of cement 3.15 specific gravity of coarse and fine aggregates 2.65. Zone III sand. Good quality control.
7. a) Explain salient features of cellular concretes.
b) Explain relation between strength and density of high pressure steam cured aerated concrete



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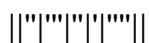
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**PART -A**

1. a) What is alkali aggregate reaction? (4M)
- b) What is segregation and bleeding? (4M)
- c) What is water cement ratio and Abram's law? (4M)
- d) What is creep of concrete? (3M)
- e) What is durability of concrete? (3M)
- f) What is FRC? What are the different types of fibres? (4M)

**PART -B**

2. a) Write about retarders, accelerators and plasticizers. (8M)
- b) Write about gap graded and well graded aggregate. (8M)
3. a) Define workability. What are the different methods for measuring the workability? (10M)
- b) What are the different steps in the manufacture of concrete? (6M)
4. a) What are the different tests of hardened concrete? (10M)
- b) What are the factors affecting the strength? (6M)
5. a) What is the relation between creep and time of concrete? (8M)
- b) What are the different types of shrinkage? (8M)
6. Design a concrete mix for characteristic strength of 30MPa at 28 days with a standard deviation of 4MPa. The specific gravity of FA and CA are 2.60 and 2.70 respectively. A slump of 50mm is necessary. The specific gravity of cement is 3.15. Assuming the necessary data design the mix as per IS code method. (16M)
7. Write about (16M)
  - (a) Light weight aggregate concrete
  - (b) Self consolidating concrete
  - (c) Nofines concrete



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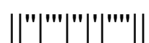
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PART -A

1. a) What are the different types of tests for finding the physical properties of cement? (4M)
- b) What is shotcrete concrete? (3M)
- c) What is maturity concept? (4M)
- d) What is the modulus of elasticity and dynamic elasticity of concrete? (4M)
- e) What is the quality control of concrete? (3M)
- f) What are the different types of polymer concretes? (4M)

PART -B

2. a) Write about bulking of aggregate and soundness of aggregate. (8M)
- b) What are the different types of admixture? Write about flyash and silica fume, (8M)
3. a) Define workability and what are the factors affecting workability? (8M)
- b) What are the steps in the manufacture of concrete? (8M)
4. a) What is the relation between compressive strength and tensile strength of concrete? (10M)
- b) What are the different NDT tests? (6M)
5. a) What is creep of concrete and what are the factors affecting creep? (10M)
- b) What are the different factors affecting shrinkage of concrete? (6M)
6. Design a concrete mix for characteristic strength of 35MPa at 28 days with a standard deviation of 4MPa. The specific gravity of FA and CA are 2.65 and 2.75 respectively. A slump of 40mm is necessary. The specific gravity of cement is 3.15. Assuming the necessary data design the mix as per IS code method. (16M)
7. Write about (16M)
 - (a) High density concrete
 - (b) Self healing concrete
 - (c) No fines concrete



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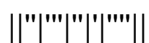
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**PART –A**

1. a) What is setting time of cement and how is it found practically? (4M)
- b) What is curing of concrete? (3M)
- c) What is gel space ratio? (3M)
- d) What is creep of concrete? What are the factors affecting creep? (4M)
- e) What are the acceptance criteria for a mix design? (4M)
- f) What is fibre reinforced concrete? (4M)

**PART –B**

2. a) What is the effect of particle shape and texture on the strength of the aggregate? (8M)
- b) What are admixtures? Write about chemical admixtures and mineral admixtures. (8M)
3. a) What is segregation and bleeding of concrete? (6M)
- b) What are the factors effecting workability? (10M)
4. a) Write about split tensile strength and flexural strength of concrete? (8M)
- b) What are the different NDT tests? What are the codal provisions? (8M)
5. a) What is the relation between creep and time? (8M)
- b) What are the factors affecting creep of concrete? (8M)
6. Design a concrete mix for characteristic strength of 25MPa at 28 days with a standard deviation of 4MPa. The specific gravity of FA and CA are 2.62 and 2.74 respectively. A slump of 40mm is necessary. The specific gravity of cement is 3.12. Assuming the necessary data design the mix as per IS code method. (16M)
7. Write about (16M)
  - (a) High performance concrete
  - (b) Self compacting concrete
  - (c) SIFCON





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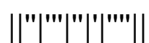
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PART -A

1. a) What are the thermal properties of aggregates? (3M)
- b) What is ready mixed concrete? (4M)
- c) What is water cement ratio? (4M)
- d) Write about Poisson's ratio of concrete. (3M)
- e) What are the different factors in the choice of mix proportions? (4M)
- f) What is shotcrete concrete? (4M)

PART -B

2. a) Write about bulk density and moisture absorption of aggregates? (8M)
- b) What are different types of cement? What is hydration of cement? (8M)
3. a) What are the properties of fresh concrete? What are the different tests of workability? (12M)
- b) Write about water used in concrete? (4M)
4. What the different tests are of hardened of concrete? Explain in detail. (16M)
5. Write about elasticity, creep and shrinkage of concrete. (16M)
6. Design a concrete mix for characteristic strength of 30MPa at 28 days with a standard deviation of 4MPa. The specific gravity of FA and CA are 2.65 and 2.75 respectively. A slump of 60mm is necessary. The specific gravity of cement is 3.15. Assuming the necessary data design the mix as per IS code method. (16M)
7. Write about (16M)
 - (a) High Density concrete
 - (b) Self compacting concrete
 - (c) Cellular concrete.



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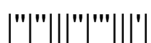
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PART-A

1. a) What is meant by the water of hydration?
- b) Define workability of concrete?
- c) Define poisson's ratio?
- d) Define creep of concrete?
- e) Write short note on cellular concrete (4M+4M+4M+4M+6M)

PART-B

2. a) What are the reactions of hydration of the main compounds in portland cement?
- b) What is meant by surface texture of aggregate? (8M+8M)
3. a) How is the compacting factor measured?
- b) What are the factors affecting the workability of concrete? (8M+8M)
4. a) Explain in detail the factors influencing the strength results in case of hardened concrete.
- b) Write a brief note on Flexure strength of Concrete. (8M+8M)
5. a) Describe the role of aggregate in creep of concrete.
- b) Discuss the influence of mix proportions of concrete on shrinkage? (8M+8M)
6. Design a concrete mix of M20 grade for a roof slab. Take a Standard deviation of 4MPa. The specific gravities of Coarse Aggregate and Fine Aggregate are 2.73 and 2.60 respectively. The bulk density of coarse aggregate is 1615kg/m³ and fineness modulus of fine aggregate is 2.74. A slump of 55mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using IS code method. Assume any missing data suitably. (16M)
7. What is the need to study fiber reinforced concrete and explain briefly the factors effecting properties of fiber reinforced concrete? (16M)



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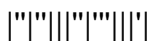
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PART-A

1. a) How is fineness of cement measured?
 b) What is meant by honeycombing?
 c) Define the gel/space ratio?
 d) What is a secant modulus of elasticity?
 e) Write short note on no fines concrete? (4M+4M+4M+5M+5M)

PART-B

2. a) What is the pozzolanic activity index?
 b) Why do we determine the elongation index?
 c) What is bulking of sand? (6M+6M+4M)
3. a) Explain what is meant by bleeding of concrete?
 b) What are the factors affecting the workability of concrete? (8M+8M)
4. a) What is the importance of Non-Destructive tests?
 b) Write a brief note on split tensile strength of Concrete. (8M+8M)
5. a) Discuss the main factors affecting the creep of concrete
 b) Describe the mechanism of drying shrinkage of concrete (8M+8M)
6. Design a concrete mix of M30 grade for a roof slab. Take a Standard deviation of 5MPa. The specific gravities of Coarse Aggregate and Fine Aggregate are 2.74 and 2.62 respectively. The bulk density of coarse aggregate is 1620kg/m³ and fineness modulus of fine aggregate is 2.76. A slump of 65mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using IS code method. Assume any missing data suitably. (16M)
7. Explain the following,
 a) Cellular concrete
 b) Polymer concrete
 c) High performance concrete (5M+5M+6M)



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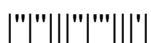
PART-A

1. a) What are the major compounds in Portland cement?
- b) What is meant by segregation of a concrete mix?
- c) What is the effective water/cement ratio?
- d) What is a tangent modulus of elasticity?
- e) Write short note on self compacting concrete

(4M+4M+4M+5M+5M)

PART-B

2. a) How are the strength tests of cement performed?
- b) Why do we determine the flakiness index?
- c) What are the advantages of a gap-graded mix? (6M+5M+5M)
3. a) Discuss the factors affecting bleeding of concrete.
- b) What is relation between cohesiveness and segregation? (8M+8M)
4. a) Discuss the relation between modulus of elasticity and strength
- b) Write a brief note on rebound hammer test. (8M+8M)
5. a) Write a brief note on factors affecting modulus of elasticity.
- b) Define Creep and explain how creep is measured.
- c) Explain in detail the classification of Shrinkage. (6M+5M+5M)
6. Design a concrete mix of M25 grade for a roof slab. Take a Standard deviation of 4MPa. The specific gravities of Coarse Aggregate and Fine Aggregate are 2.75 and 2.58 respectively. The bulk density of coarse aggregate is 1630kg/m³ and fineness modulus of fine aggregate is 2.78. A slump of 60mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using IS code method. Assume any missing data suitably. (16M)
7. Explain the following,
 - i) Light weight aggregate concrete
 - ii) SIFCON
 - iii) Types of polymer concrete (5M+5M+6M)



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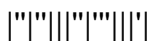
PART-A

1. a) What is meant by the total heat of hydration of cement?
- b) What is meant by bleeding of concrete?
- c) What is Abram's law?
- d) Explain what is meant by differential shrinkage?
- e) Write short note on self healing concrete

(4M+4M+4M+5M+5M)

PART-B

2. a) What is meant by soundness of aggregate
- b) What is a gap-graded mix?
- c) Define toughness of aggregate (6M+5M+5M)
3. a) Discuss the factors affecting cohesion of concrete?
- b) What is Workability and explain various factors influencing the Workability? (7M+9M)
4. a) What are the advantages of NDT over destructive tests?
- b) Write a brief note on compressive strength of Concrete. (8M+8M)
5. a) Explain the term efflorescence.
- b) Define Creep and explain how creep is measured.
- c) Write about the thermal properties of concrete. (5M+6M+5M)
6. Design a concrete mix of M35 grade for a roof slab. Take a Standard deviation of 5MPa. The specific gravities of Coarse Aggregate and Fine Aggregate are 2.76 and 2.59 respectively. The bulk density of coarse aggregate is 1625kg/m³ and fineness modulus of fine aggregate is 2.82. A slump of 70mm is necessary. The water absorption of coarse aggregate is 1% and free moisture in fine aggregate is 2%. Design the concrete mix using IS code method. Assume any missing data suitably. (16M)
7. a) What are the factors affecting properties of fiber reinforced concrete?
- b) Difference between High performance concrete and high density concrete. (8M+8M)



II B. Tech II Semester Supplementary Examinations, Dec – 2015
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PART -A

1. a) Explain the Setting time of cement?
- b) What is Workability
- c) Write about Tension tests?
- d) Explain about Creep of concrete?
- e) Write briefly about Quality Control of concrete
- f) What are the Factors affecting properties of F.R.C?

PART -B

2. Explain dry process of manufacturing the cement with neat diagram. Explain advantages over the wet process
3. a) List out various tests to measure workability of concrete.
b) Explain the significance of the tests on concrete at fresh state while we are interested only in concrete at hardened state?
4. a) Explain Maturity concept of concrete?
b) Discuss the Abrams water/cement ration law and its significance. How strength of concrete is estimated by w/c ratio law.
5. a) Explain phenomenon of creep in concrete.
b) Explain measurement of creep in creep with loading diagram.
6. Explain in detail the various steps involved in designing concrete mixes using I.S.I method.
7. a) Explain salient features of Sulphur infiltrated concretes.
b) Explain applications of various sulphur-infiltrated concrete

