



Name : .....  
Roll No. : .....  
Invigilator's Signature : .....

**CS / B. TECH (CE) / SEM-5 / CE-502 / 2010-11  
2010-11**

**CONCRETE TECHNOLOGY**

*Time Allotted : 3 Hours*

*Full Marks : 70*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

i) Initial setting time of cement is due to reaction of

a)  $C_3S$

b)  $C_2S$

c)  $C_3A$

d) both (a) and (b).

ii) The bulking of sand is caused due to

a) voids

b) angularity

c) surface moisture

d) viscosity.



- iii) Air permeability method is used to determine
  - a) specific surface of cement
  - b) soundness of cement
  - c) setting time
  - d) none of these.
- iv) Workability of concrete can be increased by the
  - a) increase in maximum size of aggregate
  - b) decrease in temperature
  - c) use of round aggregate which has smooth surface texture
  - d) all of these.
- v) The maximum % of chemical ingredient of cement is that of
  - a) magnesium oxide      b) iron oxide
  - c) aluminium              d) lime                      e) silica.
- vi) Compacting factor of 0.87 indicates a mix of
  - a) medium workability      b) very low workability
  - c) low workability              d) high workability.
- vii) The shrinkage in concrete is due to
  - a) hydration of cement
  - b) loss of water by evaporation from the surface
  - c) withdrawal of water stored in unsaturated air voids of concrete
  - d) all of these
  - e) none of these.

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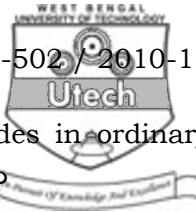
- xiii) Epoxy injection technique is used for
- a) repairing the water retaining structures
  - b) sealing of large cracks
  - c) sealing the narrow cracks
  - d) all of these.
- xiv) Portland cement is heavier than water by about
- a) 1.15 times
  - b) 2.30 times
  - c) 3.85 times
  - d) 3.15 times.
- xv) Reduction in aggregate-cement ratio while keeping w/c ratio constant causes
- a) decrease in workability
  - b) workability is not affected
  - c) increase in workability
  - d) none of these.

#### **GROUP – B**

##### **( Short Answer Type Questions )**

Answer any *three* of the following.  $3 \times 5 = 15$

2. What are segregation and bleeding ? Explain.
3. Write a short note on Alkali-Aggregate reactions.
4. What are the factors affecting workability of concrete ? Discuss.



5. What are the functions of the following oxides in ordinary Portland cement and what are their contents ?

CaO, SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub>

6. What are the advantages of Portland Pozzolana cement ?
7. What are admixtures ? Give their functions.

### GROUP – C

#### ( Long Answer Type Questions )

Answer any *three* of the following.  $3 \times 15 = 45$

8. a) Distinguish between retarders and accelerators ? Under what circumstances are they used ?
- b) Give one example each of accelerator, retarder, plasticizer and superplasticizer ?  $7 + 8$
9. a) In Laboratory Trial Mix for M25 Grade Concrete, it is tried with water cement ratio = 0.40 and water cement = 160 ltrs / cum. What is the cement content of the mix ?
- b) Calculate the Coarse (20 mm of 70% and 12.5 mm of 30%) and Fine Aggregates content for the above mix as per IS : 10262 – 1982 when given Specific Gravity of (i) Cement = 2.87, (ii) Coarse aggregate = 2.81 and (iii) Fine aggregate = 2.61. Fine aggregate (Sand) is taken as 35% of the total aggregate to get cohesiveness ?  $3 + 12$



10. a) What is meant by fineness modulus of aggregate ?

b) Determine the fineness modulus of a 5 kg sample of coarse aggregate having the following sieve analysis :

IS Sieve No.	63 mm	40 mm	20 mm	12.5 mm	4.75 mm	2.36 mm	600 mic	300 mic	150 mic	75 mic
Weight Retained in Kg.	0.0	0.3	1.7	2.1	0.8	0.1	--	--	--	--

c) Is this aggregate suitable for good Concrete ?  $3 + 8 + 4$

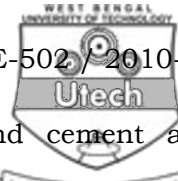
11. Write short notes on  $3 \times 5$

- a) Slump Test
- b) Compacting Factor Test
- c) Kelly Ball Test.

12. a) Distinguish between accelerators and retarders. What type of materials is used as accelerators and retarders ?

b) What is plasticizer ? What materials and at what dosage are used as plasticizer ?

c) When are super plasticizers used ? Discuss the materials that are used as super plasticizer ?  $5 + 5 + 5$



13. a) Distinguish between Ordinary Portland cement and Rapid Hardening cement. Discuss their physical and chemical characteristics.
- b) What are the advantages of Sulphate resisting cement over Ordinary Portland cement ? What is Sulphate attack due to ? How does Sulphate resisting cement control sulphate attack ?

7 + 8

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