

Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech(CT)/SEM-5/CT-504/2009-10

2009

CEMENT AND CONCRETE

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 of the following : $10 \times 1 = 10$

i) Flash set occurs in OPC due to

- | | |
|--------------------|----------------------|
| a) C_2 S - phase | b) C_3 A - phase |
| c) C_3 S - phase | d) C_4 AF - phase. |

ii) False set occurs in OPC due to the formation of

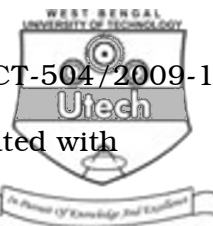
- | | |
|---------------------|---------------------|
| a) Ettringite phase | b) Syngenite phase |
| c) C_3 S - phase | d) C_3 A - phase. |

iii) Granulated BFS is used for slag cement because of

- | | |
|--------------------------|------------------------|
| a) crystalline in nature | b) amorphous in nature |
| c) lower setting time | d) none of these. |



- iv) Wash water from a concrete cannot be used as mixing water in cement due to
- a) low lime and alkali content
 - b) high lime and alkali content
 - c) high in SiO_2 content
 - d) none of these.
- v) What cement would you use to reduce alkali aggregate reaction ?
- a) OPC
 - b) HAC
 - c) Slag-cement
 - d) None of these.
- vi) Which is the most uncommon phase in HAC ?
- a) CA
 - b) C_3A
 - c) C_{12}A_7
 - d) None of these.
- vii) The cost of HAC depends on
- a) colour
 - b) $\text{CaO} : \text{Al}_2\text{O}_3$ wt ratio
 - c) $\text{Fe}_2\text{O}_3 : \text{Al}_2\text{O}_3$ wt ratio
 - d) none of these.
- viii) The cause of unsoundness of cement is due to presence of
- a) free CaO
 - b) free CaO and MgO
 - c) Fe_2O_3
 - d) none of these.



ix) The fineness of cement is very much related with

- a) hydration
- b) colour
- c) strength
- d) none of these.

x) Bleeding of concrete causes always

- a) harmful effect
- b) not harmful effect
- c) reduce porosity of concrete
- d) none of these.

GROUP – B

(Short Answer Type Questions)

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

2. Define HAC as per B.S. specification. What are the raw materials used for manufacture of HAC ? $2 + 3$
3. What are the insoluble residues in OPC ? What is its importance ? $3 + 2$
4. What is the importance of fineness of cement ? Mention the different methods for the measurement of particle fineness. $3 + 2$
5. Write short notes on any *two* of the following : $2 \times 2\frac{1}{2}$
 - a) Oil well cement
 - b) White Portland cement
 - c) Sorel cement.
6. What do you mean by silica modulus and iron modulus ? What can you guess from the above moduli ? $3 + 2$



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following.

3 × 15 = 45

7. What do you mean by hydration of Portland cement ? What are the factors influencing the kinetics of hydration process ? Discuss with a neat sketch the hydration of Portland cement. 3 + 6 + 6
8. What is pozzolana ? What are the factors influencing the pozzolanic activity of pozzolana ? Discuss lime-pozzolana reaction and also mention the product formed in lime-pozzolana reactions. 2 + 3 + 7 + 3
9. What are the kilns used for cement manufacturing ? What are the refractories used in different zones in R.K. for OPC clinker manufacturing and why are they used ? Discuss with a flow diagram, the manufacture of OPC in dry process. 1 + 7 + 7
10. Give a descriptive flowchart for the manufacture of HAC in industry. Discuss the different mineralogical phases present in different types of HAC and also mention their relative hydration rate. How is HAC classified as per their purity content ? 5 + 3 + 2 + 5
11. What is concrete ? What do you mean by workability of concrete ? Mention the factors which affect the workability of a concrete ? Discuss the different factors on which the development of strength of concrete depends. What is bleeding of concrete ? 2 + 3 + 4 + 4 + 2

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