*Name :* .....

*Roll No. :* .....

*Invigilator's Signature :* .....

**CS/B.Tech (CT)/SEM-5/CT-504/2010-11**

**2010-11**

# CEMENT & 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 for the following : $10 \times 1 = 10$

   i) HAC is extensively used as refractory cement and not for building construction purposes because

   a) lower cost b) higher cost

   c) low strength at r.t. d) quick setting.

   ii) Free lime in OPC in detrimental due to

   a) decrease corrosion

   b) decrease strength

   c) decrease setting time

   iii) The cause of unsoundness in cement is due to

   a) $Na_2O$ b) MgO

   c) $Fe_2O_3$ d) $SiO_2$.

iv) Granulated BFS is used for slag cement because of

a) crystalline in nature

b) amorphous in nature

c) lower setting time

v) Flash set occurs in OPC in due to

a) $C_2S$ - phase b) $C_3A$ - phase

c) $C_3S$ - phase d) $C_4AF$ - phase.

vi) Wash water from a concrete cannot be used as mixing water in cement due to

a) low lime & alkali content

b) high lime & alkali content

c) high $SiO_2$ content

d) none of these.

vii) False set occurs in OPC due to formation of

a) Ettringite phase b) Syngenite phase

c) $C_3A$ - phase d) none of these.

viii) Purity of HAC depends mainly on

a) $Al_2O_3$ content b) CaO-content

c) $Fe_2O_3$ content d) $SiO_2$ content.

ix) Main phase of HAC is

a) $CA_2$ b) $C_2AS$

c) CA d) $C_2S$.

x) Fineness of OPC is

a) 3500 $cm^2/gm$ b) 2250 $cm^2/gm$

c) 3000 $cm^2/gm$ d) none of these.

## GROUP – B

### ( Short Answer Type Questions )

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

2. Define Silica modulus, Iron modulus and chemical modulus. What can you guess from Silica modulus ? 3 + 2

3. What are the processes used for cement manufacturing ? What are the advantages and disadvantages of those processes ? 2 + 3

4. Write short notes on any *two* of the following : $2 \times 2\frac{1}{2}$

   a) Rapid hardening cement

   b) Sulphate resisting cement

   c) Portland blast furnace slag cement.

5. What do you mean by bleeding of concrete ? Is it always harmful or not ? Explain. 2 + 3

6. What are the tests necessary for cement and why ? What are the insoluble materials present in cement ? 4 + 1

## GROUP – C

### ( Long Answer Type Questions )

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

7. What are the importances of particle fineness of cement ? Mention different methods for determining particle fineness of cement and compare between these methods. What do you mean by soundness of cement ? How is it experimentally measured ? 2 + 4 + 3 + 2 + 4

8. Define concrete and its composition. What do you mean by workability and what factors are responsible for workability of concrete ? How bleeding of concrete is experimentally measured ? 4 + 3 + 5 + 3

9. Define HAC as per BS-specification. What are the raw materials used for manufacturing of HAC ? Describe with a flow chart the manufacturing of HAC. How HAC is classified as per their impurity content ? 2 + 3 + 5 + 5

10. What are the kilns used for cement manufacturing and which one is more economical and why ? What are the refractories used in different zones in rotary kiln and why ? 2 + 1 + 1 + 5 + 6

11. What do you mean by flash set and false set of cement ? What are the causes of these types of setting ? How false set of the cement can be avoided ? Discuss the alkali-aggregate reaction in OPC. 4 + 3 + 3 + 5

12. What do you mean by hydration of OPC ? What are the factors influencing the kinetics of hydration process ? Discuss with a neat sketch, the hydration of reaction of OPC. 3 + 6 + 6