Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.TECH(CE)(N)/SEM-5/CE-503/2012-13

2012

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 : $10 \times 1 = 10$

i) The maximum heat of hydration per gram of individual cement compound is due to

a) C_3S b) C_2S

c) C_3A d) C_4AF.

ii) The compacting factor test of cement concrete determines its

a) Strength b) Porosity

c) Workability d) Degree of compaction.

iii) Vicat's apparatus is used for

a) Fineness Test

b) Consistency Test

c) Soundness Test

d) Compressive strength Test.

iv) Volume of one bag of cement is

a) 0.0370 cum b) 0.0347 cum

c) 0.0875 cum d) none of these.

v) The entrained air in concrete

a) increases workability b) decreases workabiliry

c) increases strength d) none of these.

vi) For complete hydration of cement and for occupying the space in gel pores, total amount of water by weight of cement required is

a) 15% b) 23%

c) 38% d) 50%.

vii) The bulking of sand is caused due to

a) voids b) angularity

c) surface moisture d) viscosity.

viii) If P is the normal consistency of cement amount of water used in conducting initial setting time test on cement is

a) 0.65 P b) 0.85 P

c) 0.7 P d) 0.6 P.

ix) Toughness property of aggregates can be found by

a) LA abrasion test b) impact test

c) flakiness test d) none of these.

x) 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.

xi) Which pH value of water is suitable for good concrete ?
   a) 3 – 4 b) 5 – 6
   c) 8 – 9 d) 6 – 8.

xii) Addition of fibres in concrete results in
   a) modest increase in compressive strength
   b) increased ductility
   c) enhanced toughness
   d) all of these.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. The oxide composition of OPC is a follows :
   CaO (55%), SiO_2 (17%), Al_2O_3 (6%), Fe_2O_3 (3%), SO_3 (2%)
   Find the percentage of C_3S, C_2S, C_3A and C_4AF.

3. What do you mean by "Alkali aggregate reaction" ? What are the factors influencing this reaction ?

4. What is segregation and bleeding ? Explain.

5. What is bulking of sand ? Discuss its importance in concrete preparation.

6. What is the role of fibre in fibre-reinforced concrete ? Explain briefly.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. Design a concrete mix of grade M45 with the following data as per IS : 10262 – 1982 :

   Type of cement = Ordinary Portland cement, fine aggregate :

   Natural river and conforming to grading zone II of table-4 of IS : 383 – 1970, coarse aggregate crushed (angular) stone chips of 20 mm maximum size conforming to IS : 383 code requirements, specifi gravity of cement, sand and coarse aggregate are 3.14, 2.63 and 2.61 respectively. Type of exposure - mild, Degree of quality control at site - very good.

   Assume reasonable values of other data for your design. 15

8. Describle the following tests : 5 + 5 + 5

   a) Agggregate crushing value test

   b) Setting time of cement

   c) Compacting factor test for concrete.

9. a) What is the role of a "Water reducing admixture" in concrete. 4 + 4 + 4 + 3

   b) What is the role of 'Gypsum" in cement

   c) What is the role of 'C_3A' in cement

   d) What is a "Light weight concrete".

10. Introduce the following tests. 4 + 4 + 4 + 3

    i) Rebound hammer test on concrete

    ii) Ultrasonic Pulse Velocity test on concrete

    iii) Sieve analysis of coarse aggregates

    iv) Flakiness and Elongation test on aggregate.