Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/B.Tech(CE)/SEM-5/CE-502/2009-10

2009

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) Workability of concrete is influenced most by its

      a) cement concrete

      b) aggregate-cement ratio

      c) water-cement ratio

      d) water content.

   ii) Compacting factor of 0·855 indicates a mix of

      a) low workability

      b) high workability

      c) very low workability

      d) medium workability.

iii) The reasonable slump for mass concrete should be

a) 90-180 m

b) 10-30 m

c) 50-75 m

d) 25-50 m.

iv) As per IS : 456-2000, the relationship between modulus of rupture (f_{cr}) and characteristic strength of concrete (f_{ck}) is

a) 0·80 $|f_{ck}$

b) 0·12 $|f_{ck}$

c) 0·70 $|f_{ck}$

d) 1·0 $|f_{ck}$.

v) The tensile strength of concrete is approximately of compressive strength of concrete, is

a) 50% b) 20%

c) 10% d) 5%.

vi) The value of pulse velocity of good quality concrete should be

a) more than 3·5 km/sec

b) less than 3·5 km/sec

c) less than 2·0 km/sec

d) none of these.

vii) Gypsum is interground with cement clinker to

a) increase strength of cement mortar

b) decrease consistency of cement paste

c) prevent flash setting of cement concrete

d) decrease initial setting time of cement paste.

viii) 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.

ix) 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%.

x) An admixture that slows down the process of hydration of concrete to keep it plastic for a long period is called

a) retarder

b) accelerator

c) both (a) and (b)

d) none of these.

xi) In mass concreting, the type of cement which is used is

a) ordinary Portland cement

b) Portland slag cement

c) low heat cement

d) Portland Pozzolana cement.

xii) The best view about concrete is that

a) it is a two phase material, *i.e.* paste phase and aggregate phase

b) it is aggregate filling the cementing medium

c) it is aggregate as mini-masonry joined by mortar

d) it is a mixture of cement fine aggregates and coarse aggregates having the consistency of soup.

xiii) A mixture of cement and water, in place of cement, aggregates and water cannot be considered as a building materials, because

a) the so-called volume change will be excessively high

b) shrinkage will be too large

c) the heat of large amount of hydration may lead to cracking of the structural element

d) all of these causes.

GROUP – B

(Short Answer Type Questions)

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

2. What are all the factors affecting workability of concrete ? Discuss.

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

4. Write the concept of 'maturity of concrete'.

5. What are Initial and Final setting time of cement ? What is the characteristic compressive strength of concrete ?

6. Write the relation between the characteristic compressive strength to flexural strength, modules of elasticity.

7. What do you mean by alkali aggregate reaction ? What are the factors promoting alkali aggregate reaction ? Explain.

GROUP – C

(Long Answer Type Questions)

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

8. What are the various mechanical properties of aggregates ? Discuss the tests that are conducted on aggregate to determine its properties.

9. a) What are the different tests conducted on hardened concrete ? Explain.8

   b) What is shrinkage ? What factors promote shrinkage ? What precautions will you take to reduce it ? 7

10. What do you understand by workability of concrete ? What are the factors affecting the workability ? Explain. Describe briefly a test for its *in-situ* determination. What should be the values of observation from this test for concrete used for different purposes ?

11. Write short notes on the following : 3 ∞ 5

    a) Surface hardness test

    b) Mix design of concrete

    c) Setting time of cement.

12. a) What is Fiber reinforced concrete ? State different types of fibre reinforced concrete and its application in detail. 7

    b) Define admixtures and state its application. What are the different types of admixtures ? Explain any one. 8

13. a) Explain how Portland Pozzolana cement and super sulphated cement differ from ordinary Portland cement and the specific circumstances in which these cements would be used. 8

    b) Explain in detail about light weight concrete. 7

14. a) Briefly state the alkali aggregate reaction. 6

b) Elaborate the ultrasonic pulse testing method of determining the strength of the concrete. 6

c) What is non-destructive test of concrete ? 3

15. a) Distinguish between retarders and accelerators. Under what circumstances are they used ?

b) Give one example each of accelerator, retarder, plasticiser and superplasticiser.

c) What do you mean by flaky and elongated aggregate ?

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