TECHNOLOGY, WEST BENGAL

Paper Code : CE-503

CONCRETE TECHNOLOGY

Full Ma

Allotted: 3 Hours

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)

Choose the correct alternative for *any ten* of the following:

(i) Type of cement used in patch repair works is

(a) OPC
(b) PPC
(c) rapid hardening portland and cement
(d) None of these

(ii) Critical w/c ratio for complete hydration of cement is

(a) 0·23
(b) 0·38
(c) 0·4
(d) 0·5

(iii) For fine aggregate, fineness modulus is between

(a) 2-3·5
(b) 4-5
(c) 6-8
(d) None of these

(iv) Gel porosity is about

(a) 25%
(b) 38%
(c) 28%
(d) 30%

(vi) Loss Angles machine is used to test the aggregate for

(a) Crushing strength
(b) Impact value
(c) Toughness property
(d) Water absorption

(vii) Permissible value of alkali controlling alkali silicate reaction is

(a) 0·5%
(b) 0·6%
(c) 0·85%
(d) 0·9%

(viii) The ratio between cube strength and cylinder strength of concrete is about

(a) 0·8
(b) 0·75
(c) 1·20
(d) 1·25

(ix) The most suitable test for concrete of very low workability is

(a) Slump test
(b) C.F. test
(c) Vee bee test
(d) All of these

(x) The increase in the strength of concrete with time is

(a) Linear
(b) Non-linear
(c) Asymptotic
(d) All of these

(xi) Maximum value of Autoclave expansion of cement is

(a) 0·6%
(b) 1·0%
(c) 3·0%
(d) 2·5%

(xii) Zone I Sand is

(a) Coarsest
(b) Finest
(c) Moderate
(d) None of these

(xiii) Maximum water-cement ratio required for making high strength concrete is

(a) 0·38
(b) 0·4
(c) 0·5
(d) 0·6

Group – B

(Short Answer Type Questions) 5×3=15

Answer *any three* of the following.

2. What do you mean by Alkali aggregate reaction? How ill effects of such reaction can be controlled? 2+3=5
3. Write a short note on "method of membrane curing". 5
4. Define 'Bulking of sand'. How is it related to production of concrete? 3+2=5
5. Explain the factors affecting the workability of concrete. 5
6. Define creep. What are its advantages and disadvantages? 5
7. When are super plasticizers used? Discuss the materials that are used as super plasticizers. 5

Group – C

(Long Answer Type Questions)

Answer *any three* of the following. 15×3=4

8. (a) What do you mean by bleeding and segregation in concrete? How bleeding and segregation concrete can be prevented?

   (b) Describe significance of 'rebound hammer test' in assessing quality of concrete construction.

   (c) Explain 'maturity of concrete' with an example. 5+5+5

9. (a) Calculate the weights of fine and coarse aggregates for concrete (1 cum) data as follows:

   w/c = 0·55, cement = 400 kg/cum. Coarse aggregate: Fine aggregate = 60 : 40 (by weight) Sp gravity of cement, find and coarse aggregates are 2·8, 2·54 and 2·80 respectively.

   (b) Explain the role of C_2S and C_3S in hydration and strength development of cement.

   (c) State water-cement ratio law. Explain the role of aggregates in workability of concrete. 5+5

10. (a) What are the design stipulations for a concrete mix? Illustrate the steps in selecting water and cement content as per IS 10262 : 2009 for a given coarse and fine aggregate.

    (b) Write short notes on *any two* of the following:

    (i) Setting time of concrete

    (ii) Gel-space ratio

    (iii) Polymer concrete

11. (a) Distinguish between Portland Slag Cement and Ordinary Portland Cement. Under circumstances are they used?

(b) With neat sketches explain types of slump observed during testing of a fresh concrete. 6+5

(c) What is shrinkage? What factors promote shrinkage?

12. (a) What do you mean by the term 'M40 grade concrete'? Differentiate between design mix and concrete mix.

(b) Explain the stress-strain curve for concrete. 5

(c) Specify the types of fibre used in fibre-reinforced concrete.