

Please check that this question paper contains 09 questions and 04 printed pages within first ten minutes.

[Total No. of Questions: 09]

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Uni. Roll No.

Program: B.Tech. (Batch 2018 onward)

Semester: 4th

Name of Subject: Concrete Technology

Subject Code: PCCE – 105

Paper ID: 16176

Time Allowed: 03 Hours

Max. Marks: 60

NOTE:

- 1) Parts A and B are compulsory.
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice.
- 3) Any missing data may be assumed appropriately.

Part – A

[Marks: 02 each]

Q1.

- a) Briefly explain the ill effects of over-vibration while compaction of concrete.
- b) Describe about the fire resistance property of concrete.
- c) What do you mean by Spalling of concrete?
- d) How does Design mix differ from Nominal Mix for concrete?
- e) State the term “SCC” and its application.
- f) State the number of IS Code for Rebound Hammer and its principle of working.

Part – B

[Marks: 04 each]

Q2.

What do you mean by Alkali-Aggregate Reaction? How do you assess this property in the laboratory?

Q3.

Differentiate between bleeding and segregation. How will you control this phenomenon?

Q4.

Explain about the strength of concrete exposed to freeze and thaw cycle.

Q5.

A building is under construction in sugar mill with specification of materials like concrete grade of M35 and steel grade of Fe500D. While batching the concrete for roof slab at site by mixer, the sand used for concrete manufacturing is moist with residual of plant having concentration of sucrose. Discuss the effect on the setting and de-shuttering time of the slab concrete.

- Q6. Discuss the various problems associated with fiber reinforced concrete application over the construction site.
- Q7. How light weight concrete differs from conventional concrete? Discuss the various applications of this concrete over normal concrete.

Part – C

[Marks: 12 each]

- Q8. In hot summer days, how will you take care of shrinkage cracks while casting concrete of quantity 100m^3 for roof slab of 35m long and 18m wide?

OR

On a site, Concrete of M30 grade from RMC was being used for construction of RC components. M30 was being made with pozzolanic cementitious material (mixture of 260 kg of OPC 43 and 90 kg of Fly ash). But for quantity of 14m^3 , Fly ash was out of stock and concrete was produced with the use of 340 kg of OPC 43 only. Discuss the technical suitability and ill effects of this change for the concrete production, as client reports about the bad concrete supply against RMC owner.

- Q9. Discuss in detail about non-destructive techniques (NDT) to evaluate the strength and quality of concrete for an existing structure.

OR

Design a concrete mix for M35 grade as per BIS using following design stipulations and assuming suitable data if not given:

Type of Cement	PPC Grade	Degree of quality control	Good
Maximum size of aggregate	20 mm	Chemical admixture	Super Plasticizer
Minimum cement content	320 kg/m^3	Specific gravity of cement	2.95
Maximum water cement ratio	0.40	Specific gravity of coarse aggregates	2.85
Workability	medium	Specific gravity of fine aggregates	2.66
Exposure Condition	Severe (RCC)	Water absorption Coarse Aggregate Fine Aggregate	1.0% 1.2%
Method of Placing concrete	Pumping by Boom Placer	Free absorption Coarse Aggregate Fine Aggregate	0.5% 1.0%

1) Coarse aggregate

IS Sieve Sizes mm	Analysis of Coarse Aggregate Fraction		Percentage of Different Fractions			Remarks
	I	II	I	II	Conforming	
	(20-10 mm)	(10 - 4.75 mm)	60 percent	40 percent	100 percent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
20	100	100	60	40	100	
10	0	71.20	0	28.5	28.5	Conforming
4.75		9.40		3.7	3.7	to Table 7 of
2.36		0				IS 383

2) Fine aggregate

: Conforming to grading Zone II of Table 9 of IS 383

Figure 1 Sieve Analysis of Aggregates

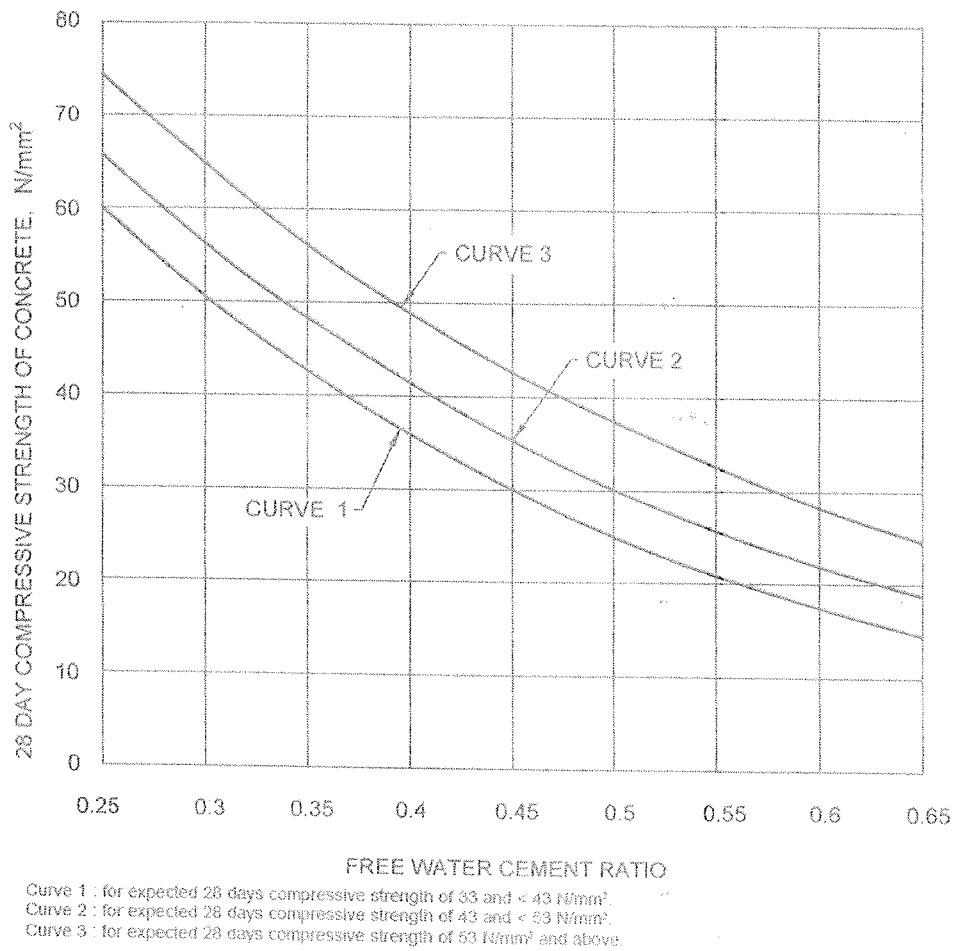


Figure 2 Graph b/w Free Water Cement Ratio and 28 Days Compressive Strengths of Concrete

Table 5 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate for Water-Cement/Water-Cementitious Materials Ratio of 0.50
(Clause 5.5)

Sl No.	Nominal Maximum Size of Aggregate mm	Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
		Zone IV (3)	Zone III (4)	Zone II (5)	Zone I (6)
i)	10	0.54	0.52	0.50	0.48
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.73	0.72	0.71	0.69

NOTES

- 1 Volumes are based on aggregates in saturated surface dry condition.
- 2 These volumes are for crushed (angular) aggregate and suitable adjustments may be made for other shape of aggregate.
- 3 Suitable adjustments may also be made for fine aggregate from other than natural sources, normally, crushed sand or mixed sand may need lesser fine aggregate content. In that case, the coarse aggregate volume shall be suitably increased.
- 4 It is recommended that fine aggregate conforming to Grading Zone IV, as per IS 383 shall not be used in reinforced concrete unless tests have been made to ascertain the suitability of proposed mix proportions.
