

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Final Semester Examination (May 2013)

B.Tech. (Civil), 4th Semester

Course Code : 11B11CE411

Max. Marks: 45

Course Name : Concrete Technology

Max. Time: 3 hrs

Note: All Questions are compulsory

1. a) Discuss maturity of concrete? How it is measured. What are its practical uses in the Concrete industry? (3)
b) Describe the importance of curing. When it should be commenced. For how long should it be continued? (3)
2. a) What are the defects of the currently used method of mix proportioning in India? How can it be made more scientific? (2)
b) What measures can be taken to make mix proportioning economical and scientific. (2)
3. a) What is the peculiarity of Poisson's ratio for concrete. (2)
b) Define shrinkage and creep. Why are shrinkage and creep treated together? (3)
4. a) Draw the typical stress-strain curve for concrete explaining the stress-strain behaviour of concrete under uniaxial compression. (4)
b) How does microstructure of concrete affect the durability of structure? (2)
5. a) Why does alkali-silica reaction disrupt concrete? What precautions can be taken to avoid alkali-silica reaction? (4)
b) What do you understand by carbonation of concrete? How is it tested? (2)
6. a) Explain the flexural strength test of concrete in detail as per Indian Standard recommendations. (3)
b) What is the principle of Schmidt rebound hammer test? How can you determine the strength of concrete? (3)
7. a) Define Fineness modulus. Give practical range of fineness modulus for coarse and fine aggregates. (2)
b) What method will you adopt to cure concrete in areas of water shortage? Explain in detail. (3)
8. Design M 30 Grade concrete by taking the following design parameters into consideration: (7)
Characteristic compressive strength required at site = 30 N/mm^2
MSA: 20 mm
Shape of coarse aggregate: Angular
Degree of workability: 0.85
Degree of quality control: Fair
Degree of exposure: severe
Data on material:
Cement used: Grade 53 conforming to IS : 12269-1987

Specific Gravity of cement = 3.15

CA: 20 and 12.5 mm mixed in the ratio of 60:40

Sand conforming to Zone II

Specific Gravity of CA: 2.67

Specific Gravity of sand: 2.6

Free Surface moisture:

CA: Nil

Sand: 2%

Water Absorption:

CA: 0.50%

Entrapped Air : 2%

Assume Standard Deviation = 5 and w/c ratio as 0.45

Grade	Nominal size of aggregate (mm)	Water content in m ³ of concrete (kg)	Sand as percentage of aggregate by absolute volume	Remarks
Up to M35	10	208	40	Sand zone II, water-cement ratio = 0.6, compaction factor 0.8
	20	186	35	
	40	163	30	
Beyond M35	10	200	28	
	20	180	25	

Change in conditions other than those given in Table 7.30	Correction for water content	Correction for sand content in total aggregate (%)
Sand conforming to zone I, zone III, or zone IV	0	+1.5 for zone I -1.5 for zone III -3.0 for zone IV
Increase or decrease in compacting factor value by 0.1 (for workability)	± 3%	0
Each 0.05 increase or decrease in water-cement ratio	0	± 1%
For rounded aggregates (gravel)	-15 kg/m ³	-7%