SE/CIVIL/SEM-III /NEP 2020 / DEC-25

08/12/25

Q.P code:- 95023

Time: 2 Hours **Maximum Marks: 60**

Notes:

i. Question No. 1 is compulsory.
ii. Attempt any three out of remaining 5 Questions.
iii. Figures to the right indicate full marks.
iv. Assume suitable data if required.

Q.1 Attempt any ***FIVE*** of the following

a. Enlist the Properties of Glass 3
b. What is termite proofing? Mention any two methods used. 3
c. Enlist the Physical Properties of OPC as per IS Code 3
d. Classify The concrete according to Their Grade 3
e. Explain why curing for concrete is important. Explain with example. 3
f. What are the Objective in Concrete Mix Design 3
g. Enlist the limitation of NDT 3

Q.2 Attempt the following

a. Define Admixture and state different function of it 5
b. Draw neat labelled sketch of c/s of timber 5
c. Enlist different method of workability. Explain any one in details 5

Q.3 Attempt the following

a. State & explain Duff Abram's W/C ratio 5
b. Explain Seasoning of Stone 5
c. Explain Manufacturing process of Burnt Clay Brick 5

Q.4 Attempt the following

a. Prepare Mix deign for M25 grade as Per IS 10262 for reinforced concrete with following parameters: 12

Type of Cement: OPC 53
Max nominal size of aggregate: 20 mm
Exposure condition: Moderate
Workability of concrete: 75 mm
Admixture: Superplasticizers (1 % of Cement)
Sp. Gravity of Cement: 3.15
Sp. Gravity of Superplasticizers: 1.1
Sp. Gravity of Coarse Aggregate: 2.6
Sp. Gravity of Zone II Fine Aggregate: 2.65
Adopt W/C ratio: 0.4

b. State different methods used in curing of concrete 3

Q.5 Attempt the following

a. Draw Layout of Ready Mixed Concrete 5
b. Write short note on Hot water Concreting. 5
c. Explain Alkali aggregate reaction 5

Q.6 Attempt the following

a. State Properties of Concrete in Fresh and Hardened state. 5
b. Differentiate between Volume batching and Weight batching 5
c. Explain Rebound Hammer test in Case of NDT on concrete 5

Data for Q.4 (a)

Table 1 Value of X
(*Clause* 4.2)

Sl No.	Grade of Concrete	Value of X
(1)	(2)	(3)
i)	M10, M15	5.0
ii)	M20, M25	5.5
iii)	M30, M35, M40, M45, M50, M55, M60	6.5
iv)	M65 and above	8.0

Table 2 Assumed Standard Deviation
(*Clause* 4.2.1.3)

Sl No.	Grade of Concrete	Assumed Standard Deviation N/mm²
(1)	(2)	(3)
i)	M10, M15	3.5
ii)	M20, M25	4.0
iii)	M30, M35, M40, M45, M50, M55, M60	5.0
iv)	M65, M70, M75, M80	6.0

Table 3 Approximate Air Content
(*Clause* 5.2)

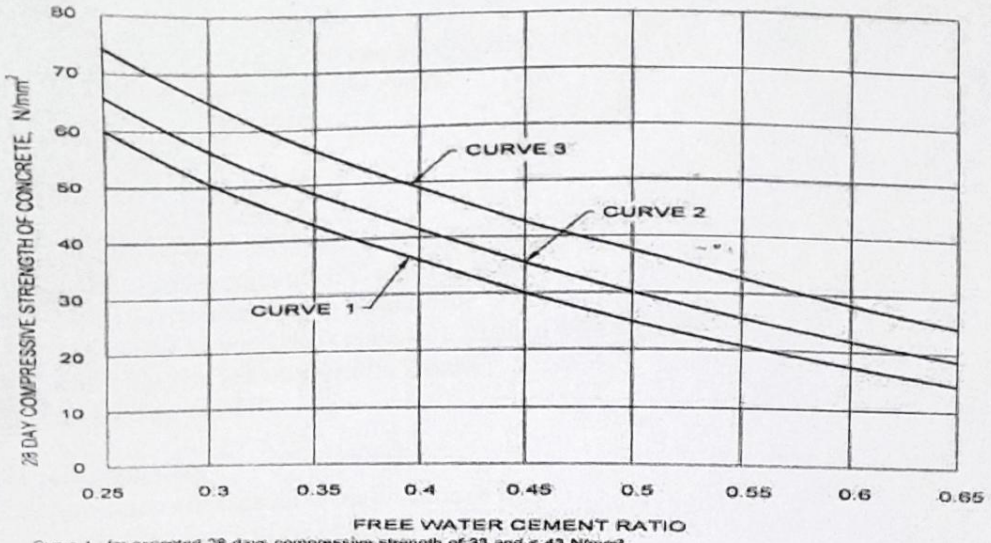
Sl No.	Nominal Maximum Size of Aggregate mm	Entrapped Air, as Percentage of Volume of Concrete
(1)	(2)	(3)
i)	10	1.5
ii)	20	1.0
iii)	40	0.8

Table 4 Water Content per Cubic Metre of Concrete For Nominal Maximum Size of Aggregate
(*Clause* 5.3)

Sl No.	Nominal Maximum Size of Aggregate mm	Water Content[1] kg
(1)	(2)	(3)
i)	10	208
ii)	20	186
iii)	40	165

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	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(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



Curve 1 : for expected 28 days compressive strength of 33 and < 43 N/mm².
Curve 2 : for expected 28 days compressive strength of 43 and < 53 N/mm².
Curve 3 : for expected 28 days compressive strength of 53 N/mm² and above.

Table 5 Minimum Cement Content, Maximum Water-Cement Ratio and Minimum Grade of Concrete for Different Exposures with Normal Weight Aggregates of 20 mm Nominal Maximum Size

(Clauses 6.1.2, 8.2.4.1 *and* 9.1.2*)*

Sl No.	Exposure	Plain Concrete			Reinforced Concrete		
		Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete	Minimum Cement Content kg/m³	Maximum Free Water-Cement Ratio	Minimum Grade of Concrete
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	Mild	220	0.60	-	300	0.55	M 20
ii)	Moderate	240	0.60	M 15	300	0.50	M 25
iii)	Severe	250	0.50	M 20	320	0.45	M 30
iv)	Very severe	260	0.45	M 20	340	0.45	M 35
v)	Extreme	280	0.40	M 25	360	0.40	M 40