

Total No. of Questions : 8]

SEAT No. :

PA-1186

[Total No. of Pages : 4

[5925]-208

S.E. (Civil)

CONCRETE TECHNOLOGY

(2019 Pattern) (Semester - IV) (201010)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Use of non programmable calculator is allowed.
- 5) Your answers will be valued as a whole.
- 6) If necessary assume suitable data and indicate clearly.
- 7) Use of IS codes 10262, 456 is not allowed

- Q1)** a) Explain the compressive strength of concrete. How it is determined in laboratory. [6]
- b) State the various types of non-destructive tests carried on hardened concrete. Explain ultrasonic pulse velocity test with its limitations. [6]
- c) Explain the relationship between compressive strength and tensile strength of concrete. [6]

OR

- Q2)** a) Explain rebound hammer test with its limitations. [6]
- b) Define creep of concrete. What are the factors affecting on creep of concrete? [6]
- c) Explain the stress-strain relationship of concrete with neat sketch. [6]

- Q3)** a) What do you mean by concrete mix design? What are the objectives in mix design? [6]
- b) Explain the factors affecting the concrete mix design. [5]
- c) Explain DOE method of concrete mix design. [6]

OR

P.T.O.

Q4) a) Using IS code method design a concrete for grade M35 for following data : [13]

Parameter	: Details
Grade designation	: M35
Standard deviations	: 5.00
Factor based on the grade of concrete. X	: 6.50
Type of cement	: OPC 53 grade conforming to Is 8112
Workability	: 75 mm(slump)
Exposure conditions	: Very severe(for RCC)
Degree of supervision	: Good
Maximum cement content	: 450 kg/m ³
Type of aggregate	: Angular coarse aggregate
Specific gravity of cement	: 3.15
Specific gravity of coarse aggregate and fine aggregate	: 2.70
Water absorption of coarse aggregate	: 0.50%
Water absorption of fine aggregate	: 1.00%
Free surface moisture for coarse aggregate	: Nil
Free surface moisture for fine aggregate	: Nil
Sieve Analysis	:
Coarse aggregate	

IS Sieve (mm)	Analysis of coarse aggregate fraction		Percentage of different fraction			Remarks
	I	II	I (50 %)	II (50%)	Combined (100%)	
20	100	100	50	50	100	Conforming to table 7 of IS 383
10	2.80	78.30	1.4	39.15	40.55	
4.75	0	8.70	0	4.35	4.35	

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

Water content per m³ of concrete for 50mm slump :

Sr. No.	Nominal maximum size of aggregate (mm)	Maximum water content (kg/m ³)
i)	10	208
ii)	20	186
iii)	40	165

Volume of coarse aggregate per unit volume of total aggregate for water cement/water-cementitious material ratio of 0.30 :

Sr. No.	Nominal maximum size of aggregate (mm)	Volume of coarse aggregate per unit volume of total aggregate for different zones of fine aggregate		
		Zone III	Zone II	Zone I
i)	10	0.56	0.54	0.52
ii)	12.5	0.58	0.56	0.54
iii)	20	0.68	0.66	0.64

Approximate air content

Sr. No.	Nominal maximum size of aggregate (mm)	Entrapped air, as % of volum of concrete
i)	10	1.0
ii)	12.5	0.8
iii)	20	0.5

Minimum cement content, maximum W/C and minimum grade of concrete for different exposures with normal weight aggregates of 20 mm nominal maximum size :

Sr. No.	Exposure	Minimum cement content (kg/m ³)	Maximum W/C	Minimum grade of concrete
i)	Mild	300	0.55	M20
ii)	Moderate	300	0.50	M25
iii)	Severe	320	0.45	M30
iv)	Very severe	340	0.45	M35
v)	Extreme	360	0.40	M40

- b) What do you mean by: [4]
- Mean strength
 - Variance
 - Standard deviation
 - Coefficient of variation

- Q5) a) Describe the types of vibrators used for compaction of concrete. [6]
 b) What is light weight concrete? How it can be achieved in practice? [6]
 c) Describe the cold and hot weather concreting. [6]

OR

- Q6)** a) Write a short note on : [8]
- i) Fiber reinforced concrete
 - ii) Geo-polymer concrete
- b) Enlist special concreting techniques? Explain under water concreting. [5]
- c) Explain the ferrocement technology with its applications. [5]

- Q7)** a) Explain the durability of concrete? What effect the water- cement ratio makes on durability? [5]
- b) Write short note on [12]
- i) Sulphate attack on concrete
 - ii) Chloride attack on concrete
 - iii) Carbonation of concrete

OR

- Q8)** a) What are the symptoms and diagnosis of distress of concrete? [5]
- b) Explain in detail corrosion monitoring techniques of reinforcement and preventive measures against corrosion. [6]
- c) What do you meant by retrofitting of concrete and explain use of fiber reinforced polymer concrete for retrofitting. [6]

