

Total No. of Questions : 8]

SEAT No. :

P595

[Total No. of Pages : 4

[5869]-208

S.E. (Civil)

CONCRETE TECHNOLOGY

(2019 Pattern) (Semester - IV)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.
- 2) Bold figures to the right indicate full marks.
- 3) Neat diagrams must be drawn whenever necessary.
- 4) Use of non programmable calculator is allowed in the examination.
- 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 effect of water cement ratio and effect of maximum size of aggregate on the strength of concrete. [9]

b) Explain the relation between compressive and tensile strength of concrete [8]

OR

Q2) a) Enlist non destructive tests for concrete. Explain rebound hammer test along with its limitations. [9]

b) Explain flexural strength test on concrete with neat sketch [8]

Q3) a) Define concrete mix design. Enlist objectives in mix design as well as factors affecting the mix design. [9]

b) Enlist the various methods of concrete mix design. Write step by step procedure for concrete mix design by using DOE method. [9]

OR

P.T.O.

Q4) a) Design a concrete for grade M25 using IS code method for following data: **[14]**

Parameter	:	Details
Grade designation	:	M25
Standard deviation,s	:	4.00
Factor based on the grade of concrete, X	:	5.50
Type of cement	:	OPC 53 grade conforming to IS 8112
Workability	:	75 mm (slump)
Exposure conditions	:	Moderate (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 fractions			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 50 mm 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 volume 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]

- i) Mean strength
- ii) Variance
- iii) Standard deviation
- iv) Coefficient of variation

- Q5) a)** Write short note on : [8]
i) Roller compacted concrete
ii) Under water concreting
b) Explain the cold and hot weather concreting. [9]

OR

- Q6) a)** Write short note on : [8]
i) Fiber reinforced concrete
ii) Geo-polymer concrete
b) What do you mean by light weight concrete and discuss its types. [9]

- Q7) a)** Define durability of concrete. Explain its significance and discuss the factors affecting the durability of concrete [9]
b) Write short note on : [9]
i) Sulphate attack on concrete
ii) Chloride attack on concrete
iii) Carbonation of concrete

OR

- Q8) a)** Write short note on : [12]
i) Evaluation of cracks in concrete and its necessity
ii) Symptoms and diagnosis of distress
iii) Corrosion monitoring and preventive measures
b) Discuss the application of fiber reinforced polymer (FRP) and polymer impregnated concrete for the retrofitting of concrete structures. [6]

