Reg. No.																

Question Paper Code	13147

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Fifth Semester

Civil Engineering

20CEEL506 - CONCRETE TECHNOLOGY

Regulations - 2020

(Use of IS:10262 - 2019 is Permitted)

Duration: 3 Hours | Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	Who is the father of Concrete technology? (a) Joseph Aspdin (b) William Aspdin (c) Royston Saint John (d) None of the above	1	K1	CO1
2.	If one bag of cement has a volume of 0.035m3, then the number of bags requires for one tonne of cement is _____ (a) 10 (b) 12 (c) 15 (d) 20	1	K2	CO1
3.	As per IS 456:2000, the organic content of water used for making concrete should not be more than _____ mg/l (a) 100 (b) 150 (c) 200 (d) 250	1	K1	CO1
4.	Which admixture is used to improve the workability of concrete? (a)Accelerators (b) Plasticizers (c) Water reducers (d) Metakaolin	1	K2	CO2
5.	Retarders are used for _____ (a) Cold weather concreting (b) Grouting deep oil wells (c) Construction of high rise building (d) Repair works	1	K2	CO2
6.	Which among the following mineral admixtures contain the maximum reactive silica? (a) Class C fly ash (b) Class F fly ash (c) Ground granulated blast furnace slag (d) Silica fume	1	K1	CO2
7.	As per IS: 456 -2000, the concrete mixes are designed into _____ grades (a) 4 (b) 5 (c) 6 (d) 7	1	K1	CO3
8.	In concrete mix, the maximum size of coarse aggregate is increased, the proportion of fine to coarse aggregate should _____ (a) increases (b) decreases (c) remains constant (d) not depend on size	1	K2	CO3
9.	According to IS 10262:2019, what is the water cement ratio for high strength concrete? (a) 0.45 (b) 0.50 (c) 0.55 (d) 0.60	1	K1	CO3
10.	Match List 1 (Workability test) with List 2 (Measurements) and select the correct answer using the codes are given the lists: List 1 (Workability test): A. Slump test; B. Compacting factor; C. Vee-bee test; D. Flow test List 2 (Measurement): 1. 300 mm to 500 mm; 2. 75 mm to 125 mm; 3. 0.80 to 0.98; 4. 0 to 10 s (a) A-2; B-4; C-3; D-1 (b) A-1; B-3; C-4; D-2 (c) A-1; B-4; C-3; D-2 (d) A-2; B-3; C-4; D-1	1	K2	CO4
11.	Slump test is a measure of _____ (a) Consistency (b) Compressive strength (c) Tensile strength (d) Impact value	1	K2	CO4
12.	Which test is the best test for finding the workability of fibre reinforced concrete? (a) Compaction factor test (b) flow table test (c) Slump test (d) Vee bee test	1	K1	CO4

13.	Durability of concrete is proportional to _____ (a) aggregate–water ratio (b) cement–aggregate ratio (c) water–cement ratio (d) sand content	1	K2	CO5
14.	The compressive strength of hardened concrete is inversely proportional to the water – cement ratio, provided the mix is of workable consistency; this is called as _____ (a) Abram's law (b) Euler's law (c) Mohr's law (d) Newton's law	1	K1	CO5
15.	The individual variation in compressive strength should not exceed _____ of the average (a) 5% (b) 10% (c) 15% (d) 20%	1	K1	CO5
16.	Consider the following strength of concrete: i) Cube strength ii) Cylinder strength iii) Split tensile strength iv) Modulus of rupture The correct sequence in increasing order of these strength is _____ (a) iii – iv – i – ii (b) iv – iii – i – ii (c) iii – iv – ii – i (d) iv – iii – ii – i	1	K2	CO5
17.	Three statements (S1, S2 and S3) associated with light weight concrete are given S1: Resistance to freezing and thawing is greater due to the greater porosity of lightweight aggregate S2: For the same strength, the deflections are lesser in lightweight concrete, compared to normal concrete S3: Fire resistance is greater because lightweight aggregate have a lesser tendency to spill Choose the correct statement(s) (a) S1 and S2 only (b) S1 and S3 only (c) S2 and S3 only (d) S2 only	1	K2	CO6
18.	The cement concrete from which entrained air and excess water are removed after placing it in position is called _____ (a) Air entrained concrete (b) Light weight concrete (c) Pre-stressed concrete (d) Vacuum concrete	1	K1	CO6
19.	To produce a high strength concrete, the best suitable aggregate is _____ (a) Angular aggregate (b) Flaky aggregate (c) Irregular aggregate (d) Rounded aggregate	1	K2	CO6
20.	Which of the following concrete has the ability to heal its crack? (a) High performance concrete (b) Bacterial concrete (c) Self compacting concrete (d) shotcrete	1	K1	CO6

PART - B (10 × 2 = 20 Marks)

Answer ALL Questions

21.	Describe the role played by gypsum in the hydration of cement.	2	K2	CO1
22.	Classify aggregate based on size, shape and unit weight.	2	K2	CO1
23.	Write the function of accelerators.	2	K1	CO2
24.	What are the desirable properties of silica fume?	2	K1	CO2
25.	What is the principle of mix proportioning?	2	K1	CO3
26.	What is the importance of trial mixes?	2	K1	CO3
27.	What are the properties of fresh concrete?	2	K1	CO4
28.	Why a compacting factor test is considered more suitable for the workability of concrete?	2	K2	CO4
29.	Why is there a difference in the modulus of elasticity between concrete and steel?	2	K2	CO5
30.	What is the principle behind vacuum dewatering?	2	K1	CO6

PART - C (6 × 10 = 60 Marks)

Answer ALL Questions

31.	a)	Compare the physical properties of 33, 43 and 53 grades of cement.	*10*	*K2*	*CO1*
		OR			
	b)	Briefly describe the following tests on aggregate: Specific gravity test, Crushing test and Impact test.	*10*	*K2*	*CO1*
32.	a)	What are super plasticizers? How are these helpful in modifying the properties of concrete?	*10*	*K2*	*CO2*
		OR			
	b)	Explain in detail the composition, physical properties of the silica fume and discuss how it improves the properties of concrete.	*10*	*K2*	*CO2*
33.	a)	Explain the step by step procedure of concrete mix design recommended by IS method.	*10*	*K2*	*CO3*
		OR			
	b)	Design a concrete mix for M30 grade of concrete using F type fly ash. Adopt BIS method with the following data: Type of cement – OPC 43 grades Maximum size of aggregate – 20mm Exposure condition – Severe (RCC) Workability – 100mm slump Minimum cement content – 320kg/m3 Maximum w/c ratio – 0.46 Method of placing concrete – Pumping Degree of supervision – Good Type of aggregate – Crushed angular aggregate Super plasticizers will be used Specific gravity of coarse aggregate – 2.80 Specific gravity of fine aggregate – 2.70 Specific gravity of fly ash – 2.20 Water absorption: Coarse aggregate – 0.5%, Fine aggregate – Nil Grading of coarse aggregate is conforming to Table 2 of IS: 383 and grading of fine aggregate is falling in zone I.	*10*	*K3*	*CO3*
34.	a)	What is meant by workability? How it is tested in the field and in laboratory?	*10*	*K2*	*CO4*
		OR			
	b)	What is meant by bleeding and segregation of concrete? What are the effects of bleeding and segregation in concrete? State the control measures to be taken to control it.	*10*	*K2*	*CO4*
35.	a)	Discuss the factors that affect the strength and durability of hardened concrete.	*10*	*K2*	*CO5*
		OR			
	b)	Explain the method of finding the flexural and split tensile strength of concrete.	*10*	*K2*	*CO5*
36.	a)	Narrate the different types of special concretes and their uses in construction.	*10*	*K2*	*CO6*
		OR			
	b)	Illustrate the various testing methods used to assess the workability and performance of self-compacting concrete.	*10*	*K2*	*CO6*