

CIVIL

SEM:V

SUB:-( ACT)

R-2019-20 'C' SCHEME

DATE:- 13.06.25



Time: 3 Hours

Maximum Marks: 80

Instructions:

1. Question No.1 is compulsory
2. All questions carry equal marks
3. Attempt three questions out of the remaining five questions
4. Figures to the right indicate full marks.
5. Assume suitable data if required and state it clearly

1. Attempt any **four out of five** of the following (each question carries **5** marks) 20
  - (a) Define the bulking of sand. State its effects on the concrete mix.
  - (b) List four properties of high-performance concrete.
  - (c) Define workability and name two tests used to measure it.
  - (d) What are bleeding and segregation?
  - (e) What is zero slump concrete?
2.
  - (a) Describe the role of pozzolanic materials with any two examples. 7
  - (b) Explain the effect of water-cement ratio on strength and durability of concrete. 7
  - (c) Explain the slump cone test, including a neat sketch and a step-by-step procedure. 6
3.
  - (a) State and explain **six** factors that affect the durability of concrete. 7
  - (b) Explain plastic shrinkage cracks and remedial measures. 7
  - (c) What is the grading of aggregate? Explain with a neat example. 6
4.
  - (a) Define Hot weather concrete. what are the effects of hot weather on concrete? What precautions should be taken during hot weather concreting? 10
  - (b) Explain the stepwise procedure of mix design as per IS 10262. 10



5. (a) Design a concrete mix by IS 10262: 2009 for the following data: 13
- Characteristic compressive strength required in the field at 28 days grade designation = M 25
  - Standard Deviation = 4.0
  - Nominal maximum size of aggregate = 20 mm
  - Shape of C.A aggregate = Angular
  - Degree of workability required at site = 50-75 mm slump
  - Type of exposure = mild
  - Method of concrete placing = Pumpable concrete
  - Specific gravity of cement = 3.15
  - Specific gravity of C.A = 2.84
  - Specific gravity of F.A = 2.64
  - Aggregates are assumed to be in a saturated surface-dry condition.
  - F.A belongs to Zone II

**Table 2 Maximum Water Content per Cubic Metre of Concrete for Nominal Maximum Size of Aggregate**  
(Clauses 4.2, A-5 and B-5)

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

NOTE — These quantities of mixing water are for use in computing cementitious material contents for trial batches.

<sup>1)</sup> Water content corresponding to saturated surface dry aggregate.

**Table 3 Volume of Coarse Aggregate per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate**  
(Clauses 4.4, A-7 and B-7)

Sl No.	Nominal Maximum Size of Aggregate mm	Volume of Coarse Aggregate <sup>1)</sup> per Unit Volume of Total Aggregate for Different Zones of Fine Aggregate			
(1)	(2)	Zone IV	Zone III	Zone II	Zone I
(1)	(2)	(3)	(4)	(5)	(6)
i)	10	0.50	0.48	0.46	0.44
ii)	20	0.66	0.64	0.62	0.60
iii)	40	0.75	0.73	0.71	0.69

<sup>1)</sup> Volumes are based on aggregates in saturated surface dry condition.

- (b) Write a note on applications of steel and polypropylene fiber-reinforced concrete. 7
6. (a) Describe the significance of curing. List various curing methods. 6
- (b) Write a short note on concreting under extreme weather: Cold 8
- (c) Write a short note on pumpable concrete and its mix considerations. 6

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