Q.5	i.	Define durability. What is the significance of durability with respect to concrete?	**4**	03	01 06 07	03	01
	ii.	Explain various factors contributing to cracks in concrete.	**6**	03	01 06 07	04	02
OR	iii.	Write a short note on the following: (a) Sulphate attack (b) Carbonation (c) Chloride attack (d) Freezing and thawing	**6**	03	01 06 07	4	01
Q.6		Attempt any two:					
	i.	What is high-density concrete? Discuss the properties and applications of high-density concrete.	**5**	04	06 07 12	5	01 02
	ii.	What is roller compacted concrete (RCC)? Discuss how RCC differs from conventional concrete and any associated challenges.	**5**	04	06 07 12	5	01 02
	iii.	What is self-compacting concrete (SCC)? Describe its composition, properties, advantages, and applications.	**5**	04	06 07 12	5	01 02

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering
End Sem Examination Dec 2024
CE3ET10 Theory of Concrete

Programme: B.Tech. Branch/Specialisation: CE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

			Marks	**BL**	**PO**	**CO**	**PSO**
Q.1	i.	The main characteristic of the transition zone in concrete is- (a) High strength due to dense packing of particles (b) Low porosity and high durability (c) Higher porosity and lower strength compared to the bulk paste (d) Uniform distribution of aggregate particles	**1**	02	01 06 07	01	01 02
	ii.	Which compound in cement reacts first with water during hydration? (a) Tricalcium silicate (C3S) (b) Dicalcium silicate (C2S) (c) Tricalcium aluminate (C3A) (d) Tetracalcium aluminoferrite (C4AF)	**1**	02	01 06 07	01	01 02
	iii.	Plasticizers in concrete are used to: (a) Increase the water-cement ratio (b) Improve workability without increasing water content (c) Reduce the setting time of cement (d) Increase the weight of concrete	**1**	02	01 06 07	01	01

iv.	Mineral admixtures in concrete are primarily used to: (a) Reduce the cement content and enhance concrete properties (b) Accelerate the setting time of concrete (c) Increase water requirement in concrete (d) Reduce the temperature of concrete	**1**	02	01 06 07	01	02
v.	The modulus of elasticity of concrete is a measure of: (a) Compressive strength of concrete (b) Flexural strength of concrete (c) Stiffness or rigidity of concrete (d) Workability of concrete	**1**	02	01 06 07	01	01
vi.	Creep is typically more pronounced in: (a) Concrete with high cement content (b) Fully matured concrete (c) Concrete under cycling loads (d) Concrete with a high water-cement ratio	**1**	02	01 06 07	01	02
vii.	The water-cement ratio primarily affects the permeability of concrete by: (a) Reducing the cement hydration (b) Controlling the amount of capillary pores formed (c) Increasing the aggregate content (d) Decreasing the workability	**1**	02	01 06 07	01	01
viii.	The main compound in concrete that reacts with sulphate ions during sulphate attack is: (a) Tricalcium silicate (b) Calcium hydroxide (c) Calcium aluminate (d) Dicalcium silicate	**1**	02	01 06 07	01	02
ix.	Aerated concrete is typically known for its: (a) High thermal conductivity (b) Low density and good insulation properties (c) High strength-to-weight ratio (d) High permeability	**1**	02	01 06 07	01	01

	x.	Passing ability in SCC refers to its ability to: (a) Withstand compressive forces (b) Pass through and fill areas around reinforcement without blockages (c) Resist segregation and bleeding (d) Achieve rapid hardening	**1**	02	01 06 07	01	02
Q.2	i.	Discuss any two types of cement primarily used for making concrete.	**2**	02	01 06 07 12	01	01
	ii.	Discuss the characteristics, formation, and significance of the interfacial transition zone (ITZ) in concrete.	**3**	02	01 06 07 12	01	02
	iii.	Discuss in detail about the process of hydration of cement.	**5**	02	01 06 07 12	01	01
OR	iv.	Describe the process of cement manufacturing with a flow chart, including the main raw materials, production steps, and the significance of each stage.	**5**	02	01 06 07 12	01	02
Q.3	i.	Discuss any one specific type of admixture and its applications in concrete.	**2**	02	01 12	02	01
	ii.	Discuss the role of admixtures in concrete. Categorize the different types of admixtures, describe their functions, and explain how they influence the properties of concrete in both fresh and hardened states	**8**	02	01 06 07 12	02	02
OR	iii.	Define plasticizers. Discuss in detail about the action or working mechanism of plasticizers.	**8**	02	01 06 07 12	02	01
Q.4	i.	Define the elasticity of concrete. List various factors affecting the elasticity of concrete.	**3**	03	06 07 12	02	01
	ii.	Explain with a diagram the various ways used to designate the modulus of elasticity of concrete.	**7**	03	06 07 12	03	02
OR	iii.	Explain the rheological representation of creep with a diagram.	**7**	03	06 07 12	03	01

Marking Scheme
CE3ET10 Theory of Concrete

Q.1	i)	c		**1**
	ii)	c		**1**
	iii)	b		**1**
	iv)	a		**1**
	v)	c		**1**
	vi)	d		**1**
	vii)	b		**1**
	viii)	c		**1**
	ix)	b		**1**
	x)	b		**1**

Q.2	i.	1 mark for each type of cement	**2**
	ii.	Characteristic – 1 mark Formation – 1 mark Significance – 1mark	**3**
	iii.	Initial stage of hydration (day 1) – 2 marks Intermediate stage of hydration (Day 2 - day 7) – 2marks	**5**
OR	iv.	Diagram/flow chart – 2marks Production steps – 2 marks Significance of each step – 1 marks	**5**

Q.3	i.	Admixture – 1 marks Application – 1marks	**2**
	ii.	Role of admixture – 2 marks Type of admixtures – 2 marks Function of admixture – 2 marks Its influence on the properties of concrete – 2 marks	**8**
OR	iii.	Definition – 2 marks Mechanism of plasticizers – 6 marks	

Q.4	i.	Definition – 1 marks Factors affecting elasticity – 2 marks	**3**
	ii.	Diagram – 3 marks Ways to designate modulus of elasticity – 4 marks	**7**
OR	iii.	Diagram – 2 marks Macroscopic representation – 2 marks Microscopic representation – 3 marks	**7**

Q.5	i.	Definition – 1 marks Significance – 2 marks	**3**
	ii.	1 mark for each reason	**7**
OR	iii.	1.75 marks for each short note	**7**

Q.6

i.	Definition – 1 marks Properties – 2 marks Application – 2 marks	**5**
ii.	Definition – 1 marks Difference between RCC and conventional concrete – 4 marks	**5**
iii.	Definition – 1 marks Composition – 1 marks properties - 1 marks advantages - 1 marks applications - 1 marks	**5**

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P.T.O.