Total No. of Questions: 21

Enrollment No : _____

MEDICAPS UNIVERSITY

Faculty of Engineering

End Semester Examination May 2025

CE3ET10 Theory of Concrete

Programme	:	B.Tech.	**Branch/Specialisation**	:	CE
Duration	:	3 hours	**Maximum Marks**	:	60

Note: *All questions are compulsory. Internal choices, if any, are indicated. Assume suitable data if necessary. Notations and symbols have their usual meaning.*

Section 1 (Answer all question(s))

Marks CO BL

Q1. Which compound in cement is responsible for early strength gain? **1 1 2**

- ○ C2S
- ◉ C3S
- ○ C4AF
- ○ Gypsum

Q2. Which zone in concrete microstructure is considered the weakest link? **1 3 2**

- ○ Hydrated cement paste
- ◉ Transition zone
- ○ Aggregate phase
- ○ Gel pores

Q3. Air-entraining admixtures improve concrete's resistance to: **1 2 2**

- ○ Sulphate attack
- ○ Chloride penetration
- ◉ Freeze-thaw cycles
- ○ Alkali-silica reaction

Q4. Which of the following is a mineral admixture used to improve long-term strength? **1 1 2**

- ○ CaCl2
- ◉ Fly ash
- ○ Sodium hydroxide
- ○ Zinc oxide

Q5. The modulus of elasticity of concrete mainly depends on: **1 1 2**

- ○ Aggregate size only
- ○ Water content only
- ◉ Strength of concrete
- ○ Curing time only

Q6. Plastic shrinkage occurs: **1 3 2**

- ○ After setting
- ○ Before hydration
- ◉ Within few hours of placing concrete
- ○ Due to carbonation

Q7. Which property is most closely related to durability of concrete? **1 4 3**

- ○ Compressive strength
- ◉ Permeability
- ○ Bleeding
- ○ Slump

Q8. Carbonation in concrete mainly affects: **1 2 2**

- ○ Aggregate structure
- ◉ Steel reinforcement
- ○ Water-cement ratio
- ○ Surface texture

Q9. Which type of concrete contains no fine aggregate? **1 5 4**

- ○ Vacuum concrete
- ○ High-density concrete
- ◉ No-fines concrete
- ○ Self-compacting concrete

Q10. Which of the following concretes is used for radiation shielding? **1 5 4**

- ○ Sulphur-infiltrated concrete
- ◉ High-density concrete
- ○ Roller compacted concrete
- ○ Aerated concrete

Section 2 (Answer all question(s))

Marks CO BL

Q11. Describe the hydration process of cement. **4 1 2**

Rubric	Marks
Defination-2 Marks Process-2 Marks	4

Q12. (a) Explain Manufacturing dry process of cement. **6 4 3**

Rubric	Marks
Explain process in detail 1. Raw Material Collection 2. Crushing and Grinding 3. Blending and Homogenization 4. Preheating and Precalcination 5. Clinker Formation (Kiln Phase) 6. Clinker Cooling 7. Grinding of Clinker Storage and Packing	6

(OR)

(b) What is the transition zone in concrete, and how does it affect the properties of concrete?

Rubric	Marks
Explanation of transition zone-3 marks How It Affects Concrete Properties – 3 marks	6

Section 3 (Answer all question(s))

Marks CO BL

Q13. Define plasticizers and super plasticizers. **3 2 2**

Rubric	Marks
Plasticizers (Water Reducers): 1.5 marks Super plasticizers (High-Range Water Reducers): 1.5 marks	3

Q14. (a) Discuss the classification of super plasticizers and their effect on fresh concrete. **7 2 2**

Rubric	Marks
Classification: - 3 Marks Effects : - 4 marks	7

(OR)

(b) Explain how air entraining admixtures influence the properties of concrete.

Rubric	Marks
Define air entering admixtures: - 3 Process /types of influences : - 4	7

Section 4 (Answer all question(s))

Marks CO BL

Q15. Define dynamic modulus of elasticity and Poisson's ratio. **4 1 2**

Rubric	Marks
Dynamic Modules: - 2 Marks Poisson's ratio : - 2 Marks	4

Q16. (a) What are the factors affecting the modulus of elasticity of concrete? **6 2 2**

Rubric	Marks
Each Factor in details : - 1 Marks	6

(OR)

(b) Discuss different types of shrinkage observed in concrete.

Rubric	Marks
Types of shrinkage with details : - 1.5 Marks for each types	6

Section 5 (Answer all question(s))

Marks CO BL

Q17. Define permeability and its importance in concrete durability. **3 4 3**

Rubric	Marks
Definition: - 1 Importance: - 2	3

Q18. (a) What are the causes and prevention of cracking in concrete structures? **7 3 2**

Rubric	Marks
Causes of cracking with details: - 3 Marks Prevention of cracking with details :- 4 Marks	7

(OR)

(b) Explain sulphate and chloride attacks and their effects on concrete durability.

Rubric	Marks
Define sulphate attacks: - 1.5 Marks Effects sulphate attacks : - 2 Marks Define Chloride attacks :- 1.5 Marks Effects Chloride attacks : - 2 Marks	7

Section 6 (Answer any 2 question(s))

Marks CO BL

Q19. Explain the workability requirements and testing methods for self-compacting concrete. **5 4 3**

Rubric	Marks
Define workability of concrete: - 1 Marks Requirements of workability: - 2 Marks Testing methods for self-compacting concrete: - 2 Marks	5

Q20. Discuss the advantages and applications of roller compacted concrete. **5 5 4**

Rubric	Marks
Define roller compacted concrete:- 1 Marks Advantages of roller compacted concrete.: - 2 Marks Applications of roller compacted concrete.: - 2 Marks	5

Q21. Define vacuum concrete and its applications and advantage. **5 5 4**

Rubric	Marks
Define vacuum concrete:- 1 Marks Advantages of vacuum concrete.: - 2 Marks Applications of vacuum concrete.: - 2 Marks	5

******