Reg No.:_____ Name:_____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**

B.Tech Degree S6 (R,S) / S4 (PT) (R,S) Examination May 2024 (2019 Scheme)

**Course Code: CET352**

**Course Name: ADVANCED CONCRETE TECHNOLOGY**

Max. Marks: 100 Duration: 3 Hours

Use of attested copies of pages 3 to 6 of IS: 10262 (2019) is permitted

**PART A**

***Answer all questions, each carries 3 marks.*** Marks

| | | | |
|---|---|---|---|
| 1 | | What are superplasticizers and how do they improve the performance of concrete? | (3) |
| 2 | | What is an artificial aggregate? List two advantages of using artificial aggregates in construction. | (3) |
| 3 | | List out the variables involved in mix proportioning. | (3) |
| 4 | | Explain the need of statistical quality control in concrete. | (3) |
| 5 | | What are the factors affecting creep? | (3) |
| 6 | | Define autogenous shrinkage and carbonation shrinkage. | (3) |
| 7 | | List three advantages of non-destructive testing over conventional testing. | (3) |
| 8 | | What are the causes of corrosion of embedded steel reinforcement in concrete? | (3) |
| 9 | | Write short notes on green concrete. | (3) |
| 10 | | Enlist the benefits of employing pre-fabrication technology in construction. | (3) |

**PART B**

***Answer one full question from each module, each carries 14 marks.***

**Module I**

| | | | |
|---|---|---|---|
| 11 | a) | What are the different stages involved in the manufacture of cement? | (10) |
| | b) | Write a short note on aggregate crushing value. | (4) |

**OR**

| | | | |
|---|---|---|---|
| 12 | a) | What are accelerators and retarders? Explain their mechanism of action in concrete. | (7) |
| | b) | What is GGBS? What is its effect on the performance of fresh concrete and hardened concrete? | (7) |

## Module II

| | | | |
|---|---|---|---|
| 13 | a) | Write short notes on mean strength, standard deviation and co-efficient of variation. | (6) |
| | b) | Discuss the factors that engineers take into consideration while determining the mix proportions for concrete. | (8) |

**OR**

| | | | |
|---|---|---|---|
| 14 | | Design a concrete mix for the following data as per IS 10262:2019:<br>Grade of concrete – M25, Cement – OPC grade 43, Exposure condition – severe, Zone II sand, slump – 75 mm, maximum size of aggregate – 20 mm, crushed, angular; specific gravity of cement – 3.1, specific gravity of fine and coarse aggregates – 2.7 and 2.8, admixture – superplasticizer.<br>Assume all aggregates in SSD condition. Assume any other data suitably. | (14) |

## Module III

| | | | |
|---|---|---|---|
| 15 | a) | Discuss any three properties of hardened concrete and their significance in the performance of a structure. | (10) |
| | b) | Write a short note on modulus of elasticity of concrete. | (4) |

**OR**

| | | | |
|---|---|---|---|
| 16 | a) | Elaborate slump test including its procedure, significance, and interpretation of results in terms of workability. | (8) |
| | b) | Define creep and shrinkage. How do these impact concrete structures? | (6) |

## Module IV

| | | | |
|---|---|---|---|
| 17 | a) | Describe a test to measure the reinforcement cover in a beam. | (6) |
| | b) | Define durability. Explain any six factors that affect durability of concrete. | (8) |

**OR**

| | | | |
|---|---|---|---|
| 18 | a) | How exposure to sea water can affect concrete structures? | (6) |
| | b) | Elaborate a test that shall assess the penetration resistance of concrete. | (8) |

## Module V

| | | | |
|---|---|---|---|
| 19 | a) | Compare and contrast high strength concrete and high performance concrete. | (6) |
| | b) | List the advantages and disadvantages of ready-mix concrete. | (8) |

**OR**

| | | | |
|---|---|---|---|
| 20 | a) | Explain the properties of self-compacting concrete. | (6) |
| | b) | Write short notes on slipform construction and 3D printing of concrete. | (8) |

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