



M.E/M.TECH/MCA DEGREE EXAMINATIONS: APRIL/MAY 2024

(Regulation 2018)

Second Semester

STRUCTURAL ENGINEERING

P18SEE0004: Smart Materials for Construction

COURSE OUTCOMES

- CO1:** Choose a suitable concrete admixture.
CO2: Design steel-concrete composite elements.
CO3: Design fiber reinforced concrete mix as per ACI standards.
CO4: Suggest composition of geopolymer and ferrocement.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Assertion (A): Admixtures are commonly used in concrete to improve its performance and properties. CO1 [K₂]
Reason (R): Admixtures interact with the cementitious materials, aggregates, and water in concrete to alter its fresh and hardened properties, such as workability, setting time, strength, and durability.
- a) Both A and R are Individually true and R is the correct explanation of A
b) Both A and R are Individually true but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true
2. Superplasticizer increases slump of concrete due to which phenomenon? CO1 [K₂]
- a) Densification of cement particles
b) Dispersion and deflocculation of cement particles
c) Drying of cement particles
d) Deterioration of cement particles
3. Due to the effect of composite action sizes of precast prestressed units can be CO2 [K₁]
- _____
- a) Increased
b) Reduced
c) Deducted
d) Serviced
4. Matching type item with multiple choice code: CO2 [K₂]

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| 22. Write short notes on retarders and accelerators. | CO1 | [K ₂] |
| 23. Enlist the advantages of steel concrete composite connection. | CO2 | [K ₂] |
| 24. Explain the characteristic strength of shear connectors | CO2 | [K ₂] |
| 25. Show the factors affecting fibre reinforced concrete. | CO3 | [K ₂] |
| 26. Discuss about fibre reinforced concrete and what are the fibres used in concrete? | CO3 | [K ₂] |
| 27. Outline the production process of geopolymer concrete that differ from conventional concrete. | CO4 | [K ₂] |
| 28. Classify the different curing methods employed for geopolymer concrete, and how do they affect its strength development and durability? | CO4 | [K ₂] |
| 29. Elucidate the different types of materials used in ferrocement construction. | CO4 | [K ₂] |
| 30. Infer the corrosion resistance of ferrocement compare to that of conventional reinforced concrete in marine environment. | CO4 | [K ₃] |

Answer any TWO Questions
PART D (2 x 10 = 20 Marks)

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| 31. Describe any four mineral admixtures added in high performance concrete. | CO1 | [K ₂] |
| 32. Explain the typical cross section of composite column with neat figure. | CO2 | [K ₂] |
| 33. In what way the behavior of fibre reinforced concrete can be used for seismic resistant design? Explain. | CO3 | [K ₃] |
