| C | Reg. No. : |  |  |  |  |  |  |  |  |  |
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# **Question Paper Code: 99112**

### B.E./B.Tech. DEGREE EXAMINATION, APRIL 2024

#### **Professional Elective**

## Civil Engineering

#### 19UCE912- REPAIR AND REHABILITATION OF STRUCTURES

(Regulations 2019)

|                       |  | (Regulati   | ons 2019)   |                 |  |  |  |
|-----------------------|--|---|---|-----------------|--|--|--|
| Duration: Three hours |  |   | Maximum: 100 Marks                                  |                 |  |  |  |
|                       |  | Answer AL   | L Questions   |                 |  |  |  |
|                       |  | PART A - (10 x                                      | x 1 = 10  Marks                                     |                 |  |  |  |
| 1.                    | Under what condi-                          | tions maintenance will ca                           | s maintenance will carried out                      |                 |  |  |  |
|                       | a) Maintenance                             | b) Repair   | c) Rehabilitation                                   | d) Inspection   |  |  |  |
| 2.                    | Which of the follo                         | wing is not a classification                        | on of maintenance                                   | CO1- U          |  |  |  |
|                       | (a) Corrective mai                         | ntenance  | (b) Timely maintenance                              |                 |  |  |  |
|                       | (c) Scheduled mai                          | ntenance  | (d) Preventive maintenan                            | ce              |  |  |  |
| 3.                    | •  | from the point the machinal it is repaired and brou | ne fails to perform its ght into operating conditio | n CO1- U        |  |  |  |
|                       | a) Down time                               | b) Break Down time                                  | c) Both (A) and (B)                                 | d) Idle time    |  |  |  |
| 4.                    | Strength of concre                         | ete increase with                                   |   | CO1- U          |  |  |  |
|                       | a) Increase with w                         | /c ratio  | b) Increase in fineness                             | s of cement     |  |  |  |
|                       | c) Decrease in size of aggregates          |   | d) Decrease in curing                               | time            |  |  |  |
| 5.                    | The curing period of geoplymer concrete is |   |   | CO1- U          |  |  |  |
|                       | a.24-48 hours                              | b.30-40 hours                                       | c.10-20 hours                                       | d.none of these |  |  |  |
| 6.                    | Entrainment of air                         | CO1- U  |   |                 |  |  |  |
|                       | a) True                                    | b) False  | (c) Both (A) and (B)                                | (d) Idle time   |  |  |  |
| 7.                    | The pachometer is                          | s used to locate the                                |   | CO1- U          |  |  |  |

|     | a) Steel reinforcement  |  | nt   | b) Aluminium reir                  |                   |        |  |
|-----|---|--|--|------------------------------------|-------------------|--------|--|
|     | c) Tensile reinforcement  |  |  | d) Surface reinford                | cement            |        |  |
| 8.  | In a dry environment, concrete strength will be loosed as much as % in moist environment. |  |  |                                    |                   | CO1- U |  |
|     | (a)   | 30   | (b) 40   | (c) 50                             | (d) 60            |        |  |
| 9.  |   | e point of applica<br>Ill not be less thar | oushing  | CO1- U                             |                   |        |  |
|     | <b>a</b> ) 1  | 1/3 of building he                         | ight   | b) 1/2 of building                 | height            |        |  |
|     | c) 3  | 3/4 of building he                         | ight   | d) 2/3 of building                 | height            |        |  |
| 10. | The   | e process of re- es                        | stablishment of dama                             | aged structures is called          | d                 | CO1- U |  |
|     | (a)   | Repair                                     | (b) Rehabilitation                               | (c) Restoration                    | (d) None of the a | bove   |  |
|     |   |  | PART - B (                                       | 5 x 2= 10Marks)                    |                   |        |  |
| 11. | Stat  | e the causes of de                         | eterioration in RC St                            | ructures.                          |                   | CO1- U |  |
| 12. | In what way carbonation of concrete affects the structures?  CO1- U                       |  |  |                                    |                   |        |  |
| 13. | What are the applications of Special Concrete? CO1- U                                     |  |  |                                    |                   |        |  |
| 14. | . List down the characteristics of coatings to concrete.                                  |  |  |                                    |                   |        |  |
| 15. | Def   | ine external stress                        | sing.  |                                    |                   | CO1- U |  |
|     |   |  | PART – C   | C (5 x 16= 80Marks)                |                   |        |  |
| 16. | (a)   |  | agram, Describe th<br>valuate damages in a<br>Or | ne steps in the asse<br>structure. | essment CO1 U     | (16)   |  |
|     | (b)   | •  | etermine concrete da<br>concrete repair metho    | nmage repair in RC Stro<br>od      | uctures. CO1- U   | (16)   |  |
| 17. | (a)   | Explain the vari                           | ous corrosion protec                             | etion methods.                     | CO1- U            | (16)   |  |
|     | (b)   | Discuss in detail                          | ls about thermal pro                             | perties of concrete.               | CO1- U            | (16)   |  |
| 18. | (a)   | Describe the structures.                   | effect of Elevated                               | d Temperature in c                 | oncrete CO1- U    | (16)   |  |

Or

- (b) What is the principal advantage of using fibre reinforced CO1- U (16) concrete? Explain the factors that affect the properties of fibre reinforced concrete.
- 19. (a) If doing a partial demolition yourself or a deconstruction, you CO4-Ana may have to manually remove some drywall. If one side of your drywall has already been removed and the other side is exposed, what tool can you easily use to knock off the drywall from behind?

Or

- (b) Recommend the techniques for strengthening of structural CO4-Ana (16) elements.
- 20. (a) As a engineer, illustrate the various pre-planning activities to be CO5-Ana (16) done during demolition and suggest suitable remedy / protection against it with minimum economical support.

Or

(b) Consider a RC structure in a marine environment, discuss the CO5-Ana possible types of distress likely to affect the structure and suggest suitable remedy/protection for the structure.