

Roll No																			
---------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--



**PRESIDENCY UNIVERSITY
BENGALURU**

SET A

**SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024**

Semester : Semester VII -2020

Course Code : CIV3010

Course Name : Repair and Rehabilitation of Structures

Program : B.Tech.

Date : 05-JAN-2024

Time : 9:30AM - 12:30 PM

Max Marks : 100

Weightage : 50%

Instructions:

- (i) Read all questions carefully and answer accordingly.
 - (ii) Question paper consists of 3 parts.
 - (iii) Scientific and non-programmable calculator are permitted.
 - (iv) Do not write any information on the question paper other than Roll Number.
-

PART A

ANSWER ALL THE QUESTIONS

4 X 5M = 20M

1. Concrete shrinkage is the decrease in either length or volume of concrete due to changes in moisture content or chemical changes. It is a time-dependent deformation that can cause cracking and structural movement in concrete structures. Briefly describe the various types of shrinkages observed in concrete.
(CO1) [Knowledge]
2. Permeability of concrete is a measure of the amount of water, air, or any other substances that percolates through concrete. Higher permeability will lead to lower durability. Mention any five factors that influences the permeability of concrete.
(CO1) [Knowledge]
3. Durability of concrete is the ability of concrete to resist weathering, chemical attack, abrasion and other processes of deterioration while maintaining its engineering properties. List any five factors that affect the durability of concrete.
(CO1) [Knowledge]
4. A number of tests can be conducted on concrete to examine and assess its existing condition. Some of them could be non-destructive (NDT) and semi-destructive (SDT) in nature. The investigation helps to understand the degree of deterioration. List any five types of NDT and SDT methods.
(CO2) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS

5 X 10M = 50M

5. A detailed Concrete Condition Survey of the reinforced concrete structure by trained and experienced personnel on-site, is always necessary in order to correctly determine the extent and nature of any concrete damage. Assume a scenario where you are a consultant to restore an old building, how would you examine the structure? Describe the process you would adopt.
(CO2) [Comprehension]
6. Premixed cement concrete is one of the conventional repair material used for repairing the distresses. Properties of premix can be modified with the addition of admixtures or replacement of concrete ingredients. Discuss the use of Premixed cement concrete as a repair material.
(CO3) [Comprehension]
7. To the Portland cement a pre-polymer (monomer) of a dispersed polymer is incorporated to make Polymer Cement Concrete (PCC). This combination creates a polymer network in-situ during the curing process of the concrete. Describe the properties of PCC.
(CO3) [Comprehension]
8. The decision to repair or replace a structure or its component can be taken only after consideration of likely service life of the structure is established based on the technical & economic evaluations. Explain any five factors that influences the choice of repair method.
(CO4) [Comprehension]
9. Shotcrete or gunite or sprayed concrete is a concrete or mortar conveyed through a hose and pneumatically projected at high velocity onto a surface. This is one of the repair methods adopted for a variety of applications. Explain the process of guniting and mention any four applications of the same.
(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS

2 X 15M = 30M

10. Polymer cement concrete is a composite concrete that consists of synthetic polymer within the binding material. Polymer concrete has advantages of enhanced properties compared to conventional concrete, low energy requirements and low labor costs. Briefly explain the process of preparation of polymer impregnated concrete (PIC) and polymer portland cement concrete (PPCC).
(CO3) [Application]
11. Structural rehabilitation has globally become an urgent need due to both widespread construction obsolescence and more demanding requirements from modern construction codes. A number of structural rehabilitation methods are available in order to enhance the strength and serviceability of structures. Explain briefly a) RCC jacketing and b) Near surface mount methods of rehabilitation of structures.
(CO4) [Application]