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PRESIDENCY UNIVERSITY BENGALURU

 **SET-B**

SCHOOL OF ENGINEERING

**END TERM EXAMINATION – MAY/JUNE 2024**

**Semester :** Semester II-2023

**Course Code :** CIV1006

**Course Name :** Building Materials and Concrete Technology

**Program :** B. Tech.

**Date :** Jun 18, 2024

**Time :** 1:00 PM - 4:00 PM

# Max Marks : 100

**Weightage :** 50%

# Instructions:

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

**PART A**

 **Answer any 4 Questions 4\*5=20 Marks**

1. List the various applications of bricks in construction.
2. Outline the composition of brick earth.
3. Define initial and final setting time of cement.
4. List the various functions of admixtures used in concrete.
5. Discuss the effects of flyash on properties of concrete.
6. Discuss briefly the effects of silica on concrete properties.
7. What are the three different types of slump of concrete?
8. Write the advantages of concrete used as building material.

(CO1) [Knowledge] (CO1) [Knowledge] (CO1) [Knowledge] (CO1) [Knowledge] (CO2) [Knowledge] (CO2) [Knowledge] (CO3) [Knowledge] (CO3) [Knowledge]

**PART B**

**Answer any 4 Questions 4\*10=40 Marks**

1. The quality and quantity of building stones mainly depend upon the locally available material and the requirement of the structure. There are some basic characteristics required to consider stone as a building material. Explain the basic characteristics of good building stone

(CO1) [Comprehension]

1. To get a good quality brick, the brick earth should contain the various ingredients in proper proportions. Explain the functions of these ingredients of brick earth.

(CO1) [Comprehension]

1. Workable concrete is the one which exhibits very little internal friction between particles or which overcomes the frictional resistance offered by the formwork surface or reinforcement contained in the concrete. Explain the various factors that affecting the workability of concrete.

(CO1) [Comprehension]

1. The slump test result is a measure of the behavior of a compacted inverted cone of concrete under the action of gravity. It measures the consistency or the wetness of concrete, Illustrate the procedure of conducting the slump cone test.

(CO1) [Comprehension]

1. The term shrinkage is loosely used to describe the various aspects of volume changes in concrete due to loss of moisture at different stages due to different reasons. To understand this aspect more closely, explain the different types of shrinkage of concrete.

(CO3) [Comprehension]

1. The volumetric changes in concrete structures due to the loss of moisture by evaporation are known as shrinkage of concrete. It is a time-dependent deformation that reduces the volume of concrete without the impact of external forces. Explain in detail the factors affecting the shrinkage of concrete.

(CO3) [Comprehension]

**PART C**

**Answer any 2 Questions 2\*20=40 Marks**

1. Design a concrete mix for M30 grade of concrete as per IS10262: 2019 using the following data: Type of cement : OPC 43 Grade conforming IS 12269

Maximum nominal size of aggregate : 20mm Minimum cement content : 320kg/ Maximum free water-cement ratio : 0.45 Workability : 75mm

Exposure condition : severe (For Reinforced Concrete)

Method of concrete placing : Pumping

Degree of supervision : Good

Chemical admixture type : Super Plasticizer -normal

The specific gravity of cement : 3.15 The specific gravity of coarse aggregate : 2.78 20mm

The specific gravity of fine aggregate : 2.70 The specific gravity of Chemical admixture : 1.145

Grading of coarse aggregates is conforming to Table 2 of IS383 and grading of Fine aggregates falling in Zone II

Assume missing data suitably.

(CO3) [Application]

1. Design a concrete mix for M35 grade of concrete with the following data:

•Grade designation : M35

•Type of Cement : OPC 43-grade confirming to IS 8112 having specific gravity of 3.15

•Minimum cement content : 320 kg/ $m^{3}$

•Maximum water cement ratio : 0.45

•Workability : 125mm (slump)

•Exposure condition : Severe condition for RCC

•Crushed angular aggregates size of aggregates – 10mm (45%) and 20mm (55%)

•specific gravity of coarse aggregate : 2.67

•Fine aggregate : Zone II ( specific gravity of F.A is 2.62)

* *Chemical admixture type – super plasticizers*
1. i) Write the detailed procedure to conduct the compressive strength of concrete.

ii) Write the detailed procedure to conduct the split tensile strength of concrete.

(CO3) [Application]

(CO2) [Application]

1. Design the concrete mix for M40 grade concrete with GGBS as a partial replacement of cement:

•Method of placing : Pumping

•Slump : 75mm

•Cement : OPC 43 grade

•GGBS specific gravity : 2.2

•Dosage of GGBS : 20 %

•Fine aggregate zone : II and specific gravity : 2.7

•Coarse aggregate : 20mm, specific gravity : 2.8

•Grading required : 10mm size 40 % and 20mm size 60 %

•Chemical admixture : super plasticiser Assume any suitable data if required.

(CO2) [Application]