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# B.M.S. College of Engineering, Bengaluru-560019

**Autonomous Institute Affiliated to VTU**

## February 2025 Semester End Main Examinations

**Programme: B.E.** **Semester: IV**
**Branch: Civil Engineering** **Duration: 3 hrs.**
**Course Code: 22CV4PCCON / 23CV4PCCON** **Max Marks: 100**
**Course: Concrete Technology**

**Instructions**: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Use of IS-10262:2019 and IS-456:2000 is permitted.
3. Missing data, if any, may be suitably assumed.

**Important Note:** Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

| | | | | CO | PO | Marks |
|---|---|---|---|---|---|---|
| | | | **UNIT – I** | | | |
| 1 | a) | | List the various types of cement and mention at least one application. | *CO* 1 | *PO1* | **10** |
| | b) | | Discuss the various deleterious materials and their effects on concrete. | *CO* 1 | *PO1* | **10** |
| | | | **OR** | | | |
| 2 | a) | | Illustrate the various types of mineral and chemical admixtures available in the construction industry. | *CO* 1 | *PO1* | **10** |
| | b) | | Discuss the various laboratory tests to be carried out on coarse aggregates. | *CO* 1 | *PO1* | **10** |
| | | | **UNIT – II** | | | |
| 3 | a) | | Define workability and the explain the various factors affecting the workability of concrete. | *CO* 1 | *PO1* | **10** |
| | b) | | Explain the various steps involved in the process of production of concrete. | *CO* 1 | *PO1* | **10** |
| | | | **OR** | | | |
| 4 | a) | | Differentiate between segregation and bleeding of concrete | *CO2* | *PO1* | **10** |
| | b) | | Arrive at the causes, effects on the properties and remediation methods for plastic shrinkage in concrete. | *CO2* | *PO1* | **10** |
| | | | **UNIT - III** | | | |
| 5 | a) | | Distinguish between nominal and design mix. | *CO* 1 | *PO1* | **05** |

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| | | b) | Design a concrete mix for M-40 grade of concrete using IS 10262 - 2019 for the following data<br>i. Grade of concrete –M40<br>ii. Type of cement- OPC, 43 grade<br>iii. Maximum size of the aggregates – 20mm<br>iv. Minimum cement content – 320 kg/m3<br>v. Maximum W/C ratio – 0.42<br>vi. Workability – 125 mm slump<br>vii. Exposure condition – Severe (RCC)<br>viii. Type of aggregates – Angular aggregates<br>ix. Maximum cement content – 450 kg/m3<br>x. Specific gravity - Cement -3.10, Coarse aggregate – 2.7, Fine aggregate – 2.6<br>xi. Chemical admixture – super plasticizer<br>xii. Water absorption – Coarse aggregate -0.4%, Fine aggregate -1%<br>xiii. Fine aggregates –Zone II | ***CO*** 2 | ***PO3*** | **15** |
| | | | **OR** | | | |
| | 6 | a) | Discuss the factors affecting the mix design of concrete. | ***CO*** 1 | ***PO1*** | **05** |
| | | b) | Design a concrete mix containing OPC cement and Fly ash for M-40 grade of blended concrete using IS 10262 -2019 for the following data:<br>i. Grade of concrete –M40<br>ii. Type of cement- OPC, 53 grade<br>iii. Maximum size of the aggregates – 20mm<br>iv. Minimum cement content – 320 kg/m3<br>v. Maximum W/C ratio – 0.42<br>vi. Workability – 100 mm slump<br>vii. Exposure condition – Medium (RCC)<br>viii. Type of aggregates – Sub angular aggregates<br>ix. Maximum cement content – 450 kg/m3<br>x. Specific gravity - Cement -3.15, Fly ash- 2.10, Coarse aggregate – 2.65, Fine aggregate – 2.6<br>xi. Chemical admixture – super plasticizer<br>xii. Fine aggregates –Zone II | ***CO*** 2 | ***PO3*** | **15** |
| | | | **UNIT – IV** | | | |
| | 7 | a) | Explain the situations where different shrinkages occur in concrete | ***CO*** 2 | ***PO1*** | **10** |
| | | b) | Illustrate the test procedure for carrying out rebound hammer and Ultra sonic pulse velocity test. | ***CO*** 2 | ***PO1*** | **10** |
| | | | **OR** | | | |
| | 8 | a) | Discuss the various tests conducted to assess the hardened properties of concrete specimen. | ***CO*** 2 | ***PO1*** | **10** |

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| | | b) | Define creep and list the various factors affecting the creep. | ***CO*** 2 | ***PO1*** | **10** |
| | | | **UNIT – V** | | | |
| | 9 | a) | Enumerate the effect of chloride and sulphate ions on the performance of concrete and discuss the remedial measures. | ***CO*** 2 | ***PO1*** | **10** |
| | | b) | Explain the process of Alkali silicate reaction (ASR) in concrete and the factors affecting ASR. | ***CO*** 2 | ***PO1*** | **10** |
| | | | **OR** | | | |
| | 10 | a) | Define durability of concrete and explain the factors effecting the durability of concrete. | ***CO*** 2 | ***PO1*** | **10** |
| | | b) | Explain the mechanism of corrosion of concrete and remediation methods to control the same. | ***CO*** 2 | ***PO1*** | **10** |

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