

**II B. Tech II Semester Regular/ Supplementary Examinations, April/May - 2019**  
**CONCRETE TECHNOLOGY**  
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **FOUR** Questions from **Part-B**

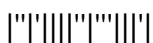
**PART -A**

- |       |  |    |
|-------|--|----|
| 1. a) | Name any four mineral admixtures.  | 2M |
| b)    | What is significance of workability?                                     | 3M |
| c)    | What is Abram's law?   | 2M |
| d)    | Define secant modulus of concrete.                                       | 2M |
| e)    | Differentiate between impermeable and durable of concrete.               | 3M |
| f)    | Difference between High Strength Concrete and High Performance Concrete. | 2M |

**PART -B**

- |       |  |     |
|-------|--|-----|
| 2. a) | What is consistency of cement and how it is tested?  | 7M  |
| b)    | Explain about alkali aggregate reaction and what precautions are necessary to minimize it.   | 7M  |
| 3. a) | Define workability and explain how it is going to be measured in terms of slump test.  | 7M  |
| b)    | Explain the effect of time and temperature on workability of concrete.   | 7M  |
| 4. a) | Explain how the splitting tensile strength relates to the modulus of rupture.  | 7M  |
| b)    | Explain how water cement ratio influences the strength of the cement paste matrix.   | 7M  |
| 5. a) | What is truly elastic material? Explain about non linearity of the stress strain relationship in concrete.   | 7M  |
| b)    | What are the typical ranges of drying shrinkage strain and creep strain in concrete, What is their significance?   | 7M  |
| 6.    | Design a M30 grade concrete mix by BIS method with the following data: Specific gravity of cement, Coarse aggregate and Fine aggregate are: 3.06, 2.50 and 2.60 respectively. Water absorption for coarse aggregate and fine aggregate are 0.70 and 0.60 percentage respectively. Free moisture Nil. Degree of quality control good and exposure moderate. Determine the quantities of ingredients in kg/m <sup>3</sup> of concrete. | 14M |
| 7. a) | What are the various methods of producing lightweight aggregate artificially?  | 7M  |
| b)    | What are the advantages of using ready mixed concrete instead of site mixed concrete.  | 7M  |

**Note : Only IS10262: 2009 mix design related graphs allowed**



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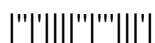
**PART -A**

- |       |   |    |
|-------|---|----|
| 1. a) | What do you mean by ettringite?                                   | 2M |
| b)    | Define slump loss.  | 2M |
| c)    | How strength and porosity related to each other?                  | 2M |
| d)    | Define poisson's ratio of concrete.                               | 3M |
| e)    | Explain the effect of water cement ratio in strength of concrete. | 3M |
| f)    | What is saponification?   | 2M |

**PART -B**

- |       |   |     |
|-------|---|-----|
| 2. a) | Explain about the reactions of hydration of the main compounds in Portland cement.  | 7M  |
| b)    | Explain about important reasons why it is desirable to use pozzolanic admixtures in concrete.   | 7M  |
| 3. a) | What are the various factors affecting workability.   | 7M  |
| b)    | What are the special features of transportation of ready mixed concrete from the plant to the site?   | 7M  |
| 4. a) | Split tensile test is a direct test or indirect test, Explain with a neat sketch.   | 7M  |
| b)    | Explain about ultra pulse velocity test to determine the quality of concrete.   | 7M  |
| 5. a) | Draw a typical stress strain curve of concrete and from that find the different types of static elastic moduli.   | 7M  |
| b)    | Explain about the factors affecting drying shrinkage.   | 7M  |
| 6.    | Design a M20 grade concrete mix by BIS method with the following data: specific gravity of cement, coarse aggregate and fine aggregate are: 3.05, 2.60 and 2.62 respectively. Water absorption for coarse aggregate and fine aggregate are 0.70 and 0.60 percentage respectively. Free moisture Nil. Degree of quality control good and exposure moderate. Determine the quantities of ingredients in kg/m <sup>3</sup> of concrete | 14M |
| 7.    | Explain about the following concretes and also write at what circumstances these are used.<br>a) Self Consolidating Concrete    b) Self Healing Concrete  | 14M |

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**PART -A**

- |       |  |    |
|-------|--|----|
| 1. a) | Define specific gravity.                       | 2M |
| b)    | Why internal vibrators are used in concrete?   | 2M |
| c)    | Define water cement ratio.                     | 2M |
| d)    | What is plastic shrinkage cracking?            | 2M |
| e)    | Difference between nominal mix and design mix. | 3M |
| f)    | What is artificial aggregate?                  | 3M |

**PART -B**

- |       |  |     |
|-------|--|-----|
| 2. a) | Explain the importance of Bogues compound in ordinary Portland concrete.   | 7M  |
| b)    | Explain about the fineness modulus of coarse aggregate.  | 7M  |
| 3. a) | Explain briefly about Rheology of concrete. Explain the factors affecting Rheology.  | 7M  |
| b)    | Explain in detail how workability is measured by compaction factor test.   | 7M  |
| 4. a) | Explain about the relationship between compressive and tensile strength of concrete.   | 7M  |
| b)    | Explain about rebound hammer test to determine the quality of concrete.  | 7M  |
| 5. a) | What is modulus of elasticity of concrete? Explain the difference between the dynamic and static moduli of elasticity of concrete.   | 7M  |
| b)    | What is creep of concrete? Explain about the factors affecting creep of concrete.  | 7M  |
| 6.    | Design a M25 grade concrete mix by BIS method with the following data: specific gravity of cement, Coarse aggregate and fine aggregate are: 3.10, 2.55 and 2.60 respectively. Water absorption for coarse aggregate and fine aggregate are 0.80 and 0.60 percentage respectively. Free moisture Nil. Degree of quality control good and exposure moderate. Determine the quantities of ingredients in kg/m <sup>3</sup> of concrete. | 14M |
| 7. a) | What is Fibre reinforced concrete and write about its applications.  | 7M  |
| b)    | Explain about the factors which control the performance of HPC.  | 7M  |

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**PART -A**

- |       |   |    |
|-------|---|----|
| 1. a) | Define Fineness Modulus.                      | 2M |
| b)    | Write about Shotcrete Concrete.               | 2M |
| c)    | What is air entrainment in concrete?          | 2M |
| d)    | Differentiate between swelling and shrinkage. | 3M |
| e)    | Explain characteristic strength.              | 3M |
| f)    | What is aspect ratio?                         | 2M |

**PART -B**

- |       |  |    |
|-------|--|----|
| 2. a) | Explain about important reasons why it is desirable to use pozzolanic admixtures in concrete.  | 7M |
| b)    | Define the terms grading and maximum aggregate size use in concrete technology. Discuss the reason why grading limits are specified. | 7M |
| 3. a) | Compare the various factors which affect the workability of concrete.  | 7M |
| b)    | Define the following phenomena, and give their significance and factors affecting them: segregation and bleeding.                    | 7M |
| 4. a) | Explain the principles behind the test procedures of Schmidt hammer test and Ultra pulse velocity test.                              | 7M |
| b)    | What do you understand by curing of concrete and what is the significance of curing.   | 7M |
| 5. a) | Discuss about the beneficial and harmful effects of creep of concrete.   | 7M |
| b)    | From typical stress strain curve for concrete how would you determine the dynamic modulus of elasticity.                             | 7M |
| 6. a) | Explain importance of mix design in concrete.  | 7M |
| b)    | Discuss the step by step procedure of mix design by BIS method.  | 7M |
| 7. a) | What is polymer reinforced concrete and what are different types of polymers used in concrete.                                       | 7M |
| b)    | What are the various quality control tests to be done to ensure good performance of polymer concrete?                                | 7M |

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