**Set-: I**

**Q. Paper Code:**

**23SYCE203303**

** D.Y. PATIL COLLEGE OF ENGINEERING & TECHNOLOGY**

**KASABA BAWADA KOLHAPUR-416006**

**(An Autonomous Institute)**

**S. Y. B. Tech Civil (Semester-III)**

**END SEMESTER EXAMINATION, Dec. – 2022**

Course Name: **Concrete Technology,** Course Code: **201CEL203**

Seat No:

**Day and Date: Friday, 20.01.2023**

**Time: 2.00 pm to 4.00 pm Max. Marks- 50**

***Instructions:***

1. *Question No. 1&2 is compulsory.*
2. *Figure to the right indicate full marks.*

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| **BT** | **CO’s** | **Q. No.** | **MARKING SCHEME** | | **Marks** |
|  |  | **Q.1** | **All Questions are compulsory** | | **20** |
| **2** | **203.1** | **a** | Explain dry process of cement manufacture. **(Explaination of Process 7M)** |  | **7M** |
| **2** | **203.2** | **b** | Write a detailed note on workability of concrete and the factors affecting workability of concrete. **(Note 3M, Factor (any 3) 3M)** | **6 M** |
| **2** | **203.2** | c | Give detailed Explaination on Shrinkage of Concrete and types of shrinkage that occur in concrete. List out factors affecting shrinkage. **(Explaination 5M, Factors (any 2 points) 2M )** | **7 M** |
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|  |  | **Q.2** | **All Questions are compulsory** | | **10** |
| **2** | **203.3** | **a** | **Step 1 :** Target Strength = fck + 1.65\*s  Target strength **=26.60 N/mm2  (1 M)**  **Step 2 :** W/C ratio for mild exposure and R.C.C is 0.55 **(0.5 M)**  **Step 3 : Selection of water content**  Estimated water content for 100mm slump = 186 + (3+3)/100\*186 = **197 litres**  **(1 M)**  **Step 4 : Calculation of cement content**  W/C ratio = 0.50  197/C = 0.50  C = 197/0.50  Cement Content , C= **394 kg/m3  (1 M)**  **Step 5 : Proportion of volume of C.A. and F.A. content**  Volume of C.A. = 0.60 **(0.5 M)**  Volume of F.A. = 0.40 **(0.5 M)**  **Step 6 : Mix Calculations**   1. **Volume of Concrete** = 1 m3 2. **Volume of Cement** = Mass of cement/Specific gravity of cement\*1/1000   = 394/3.15 x 1/1000 = **0.125 m3**   1. **Volume of water** = Mass of water/Specific gravity\*1/1000   =197/1 x 1/1000 = **0.197 m3**   1. **Volume of total Aggregate** = Volume of concrete – (Volume of Cement + Volume of water)   = 1 – (0.125+0.197)  Volume of total Aggregate = **0.678 m3**   1. **Mass of C.A.** = (Volume of total aggregate)\* (Volume of C.A.)\* (Specific gravity of C.A.)\*1000   = (0.678) x (0.60) x (2.8) x 1000  Mass of C.A. **= 1139kg**   1. **Mass of F.A.** = (Volume of total aggregate) x (Volume of F.A.) x (Specific gravity of F.A.) x 1000   = (0.678) x (0.40) x (0.27)  Mass of F.A = **732 kg**  **(Half mark each sub step=3 M)**  **Step 7 : Adjustments required for water absorption and free Moisture**  Water absorbed by C.A. = 1139 x 0.33/100 = **3.76 litres**  Water absorbed by F.A. = 732 x 1.20/100 = **8.78 litres**  Free moisture in C.A. = 1139 x 0.20/100 = **2.28 litres**  Free moisture in F.A. = 732 x 2.00/100 = **14.64 litres**  Actual water quantity required = 197 + 3.76 + 8.78 – 2.28 – 14.64 = **193 litres**  Actual quantity of C.A. = 1139 – 3.76 + 2.28 = **1138 litres**  Actual quantity of F.A. = 732 – 8.78 + 14.64 = **738 litres**  **(2.5 M)**  **OR**   1. **Step 1 :** Assuming 5% of results are allowed to fall below specified design strength,   The mean strength **fm = fmin + k \* s**  = 30 + (1.64 x 5) = **38 MPa (1 M)**   1. **Step 2 :** Since O.P.C. is used , From Table 2, the estimated **W/C ratio** is 0.46.( by interpolation)   Therefore, adopting W/C = **0.46 (1 M)**   1. **Step 3 :** **From Table 5, Cement content** = 200/0.46 = **435 kg/m3 (0.5 M)** 2. **Step 4 :** **From Table 1**, Weight of C.A. = 0.62 x 1600 = **992 kg/m3 (1 M)** 3. **Step 5 :** From table 6, the firdt estimate of density of fresh concrete for 20mm maximum size of aggregate and for non air-entrained concrete -= **2355 kg/m3  (0.5 M)** 4. **Step 6 :** **Weight of all known ingredients of concrete**   Weight of water = **200 kg/m3**  Weight of cement = **435 kg/m3**  Weight of C.A. = **992 kg/m3**  Weight of F.A. = 2355 – (200 + 435 + 992) = **728 kg/m3 (1.5 M)**   1. **Step 7 :** **Estimated quantities of ingredients per cubic meter of concrete are**   Cement = **435 kg**  F.A. = **728 kg**  C.A. = **992 kg**  Water = **200 kg**  Total = **2355 kg (2 M)**   1. **Step 8 :** **Adjustments required for water absorption and free moisture**   Water absorbed by C.A. = 992 x 1/100 = **9.92** **kg/m3**  Water absorbed by F.A. = 728 x 2/100 = **14.56** **kg/m3**  Actual water quantity required = 200 – 14.56 + 9.92 **= 195 kg/m3**  Actual quantity of C.A. = 992 – 9.92 = **982.08** **kg/m3**  Actual quantity of F.A. = 728 + 14.58 = **743** **kg/m3** **(2.5 M)** |  |  |
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|  |  | **Q.3** | **All Questions are compulsory.** | | **10** |
| **2** | **203.2** | **a** | Write a short note on Air-entraining admixture.  (**Note 3M)** |  | **3** |
| **2** | **203.2** | **b** | Define Admixture. Enlist different types of admixtures used in concrete ? Explain in detail Superplasticizers.**(Definition 1M, List (any 6) 3M, Explaination 3M)** | **7** |
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|  |  | **Q.4** | **Attempt any two out of three questions** | | **10** |
| **2** | **203.2** | **a** | Explain ‘ Durability Of Concrete ‘ and Enlist factors affecting the Durability**(Explaination 5M)** |  | **5** |
| **2** | **203.4** | **b** | Write detailed note on Light Weight Concrete. **(Note Points/Paragraph 5M)** | **5** |
| **2** | **203.4** | **C** | Write detailed note on High Performance Concrete.**(Detailed Note 5M)** | **5** |

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