# KADI SARVA VISHWAVIDHAYALAYA
## LDRP INSTITUTE OF TECHNOLOGY & RESEARCH, GANDHINAGAR.
## B.E. 4th Semester
## MID SEM REMEDIAL EXAMINATION

**Subject Name : Concrete Technology** **Date/Day : 01/04/15, WEDNESDAY**

**Subject Code : CV 403**

**Time : 12:00 noon to 1:30 pm** **Max. Marks: 30**

**Instructions:** 1) All questions are **compulsory**
2) Figures to the **right** indicate full marks.
3) Indicate **clearly**, the options you attempt along with its respective question number.

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| | | | |
|---|---|---|---|
| Q.1 | (a) | What is soundness of cement and how is it tested, describe in details. | [5] |
| | (b) | What are the effects of shape and texture of aggregate and on the strength and workability of concrete? Write the role of gypsum in cement. | [5] |
| Q.2 | (a) | Distinguish between segregation and bleeding of concrete. | [5] |
| | (b) | Discuss various aspects of durability. What care should be taken to assure good durability in concrete? | [5] |

**OR**

| | | | |
|---|---|---|---|
| Q.2 | (a) | What are the factors affection on permeability? | [5] |
| | (b) | What is effect of freezing and thawing on concrete? | [5] |
| Q.3 | (a) | Explain Slump Test with neat sketch. | [5] |
| | (b) | Explain the Steps of the example of DOE method for Mix Design. | [5] |

**OR**

| | | | |
|---|---|---|---|
| Q.3 | | Design the concrete mix by using IS 10262: 1982 recommendations for the following data.<br>Grade of concrete : M 30<br>Degree of control : Very good<br>Maximum size of aggregate : 20 mm<br>Specific gravity of cement : 3.1<br>Specific gravity of Fine aggregate : 2.6<br>Specific gravity of Coarse aggregate : 2.85<br>Condition of exposure : Mild<br>Note: i) Only 2.5% low results acceptable.<br>ii) Refer table 1 to 6.<br>iii) W/C from 28 days compressive strength of cement is 0.50<br>iv) No correction to be applied to water content and sand content. | [10] |

**P.T.O.**

Table – 1: Suggested Values of Standard Deviation

| Grade Of Concrete | Standard Deviation for Different Degree of Control | | |
|---|---|---|---|
| | Very Good | Good | Fair |
| M 10 | 2.0 | 2.3 | 3.3 |
| M 15 | 2.5 | 3.5 | 4.5 |
| M 20 | 3.6 | 4.6 | 5.6 |
| M 25 | 4.3 | 5.3 | 6.5 |
| M 30 | 5.0 | 6.0 | 7.0 |

Table - 2: Values of 't'

| Accepted Proportion of Low Results | Value of 't' |
|---|---|
| 1 in 5 | 0.84 |
| 1 in 10 | 1.28 |
| 1 in 15 | 1.50 |
| 1 in 20 | 1.65 |
| 1 in 40 | 1.86 |
| 1 in 100 | 2.33 |

Table - 3: Values of W/C and Compressive Strength

| Compressive Strength in $N/mm^2$ at 28 days | W/C |
|---|---|
| 20 | 0.6 |
| 25 | 0.525 |
| 30 | 0.48 |
| 35 | 0.42 |
| 40 | 0. 375 |
| 45 | 0.335 |

Table - 4: W/C as per Durability Requirements

| Exposure Condition | Maximum Water Cement Ratio |
|---|---|
| Mild | 0.65 |
| Moderate | 0.55 |
| severe | 0.45 |

Table – 5: Approximate sand and water concrete per meter of concrete for grade up to M 35

| Nominal maximum size of aggregate - mm | Water content per cubic meter of concrete in kg | Sand as percentage of total aggregate by absolute volume |
|---|---|---|
| 10 | 208 | 40 |
| 20 | 186 | 35 |
| 40 | 165 | 30 |

Table – 6: Approximate Air Content

| Nominal maximum size of aggregate - mm | Entrapped air as percentage of volume of concrete |
|---|---|
| 10 | 3.0 |
| 20 | 2.0 |
| 40 | 1.0 |

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## LDRP INSTITUTE OF TECHNOLOGY & RESEARCH, GANDHINAGAR.
## B.E. 4th Semester
## MID SEMESTER EXAMINATION

**Subject Name : Concrete Technology** **Date/Day : 03/03/15,TUESDAY**
**Subject Code : CV 403**
**Time : 12:00 noon to 1:30 pm** **Max. Marks: 30**

**Instructions:** 1) All questions are **compulsory**
2) Figures to the **right** indicate full marks.
3) Indicate **clearly**, the options you attempt along with its respective question number.

**Q.1** **(a)** Short questions **(i)** Define Workability **(ii)** Define Segregation **(iii)** Define Bleeding **(iv)** What is the initial and final setting time of cement? **(v)** What is the role of calcium chloride and gypsum in the reaction of cement? **[5]**

**(b)** Enlist various types of Cements and differentiate between Rapid Hardening Cement and Quick Setting Cement. **[5]**

**Q.2** **(a)** State the tests on workability & describe any one in detail. **[5]**

**(b)** State different types of chemical & mineral admixtures & differentiate between them. **[5]**

**OR**

**Q.2** **Short Note With Sketch. (Write any One)** : **(i)** Wet Process **(ii)** Dry Process. **[10]**

**Q.3** **(a)** Define: (i) Mean strength (ii) Variance (iii) Standard deviation (iv) Durability (v) Target Strength **[5]**

**(b)** Using IS method of mix design, find out proportions of concrete for following data: **[5]**
Grade of Concrete: M 20
Degree of Control: Good
Maximum size of Aggregate: 20 mm
Specific gravity of Cement: 3.15
Specific gravity of FA: 2.62
Specific gravity of CA: 2.65
Condition of Exposure: Moderate
Workability: 0.90 CF
Note: 5% of the low results are acceptable and W/C ratio for 28 days strength of concrete is 0.49. Refer table 1 to 6.

**OR**

**Q.3** Define "CHARACTERISTIC STRENGTH" and "Mix design". **[10]**
Design concrete mix M30 using following data and IS : 10262 procedure.
1. Max. size of aggregate = 20 mm
2. Degree of workability = 0.80 CF
3. Degree of quality control = good
4. Type of exposure = mild
5. w/c/ = 0.49
6. Cement used = OPC 53 grade
7. Sp. Gravity of cement =3.15, Coarse aggregate = 2.70, Fine aggregate =2.60
8. Water absorption of Coarse aggregate = 0.5 %, Fine aggregate = 1.0 %
9. Free moisture in C. A. = 0.0 % , F. A. = 0.0 %
10. Bulk density of Cement = 1440, C. A. = 1650, F.A. = 1800 kg/$m^3$

**P.T.O.**

Table – 1: Suggested value of standard deviation

| Grade of Concrete | Standard Deviation for Different Degree of Control | | |
|---|---|---|---|
| | Very good | Good | Fair |
| M 10 | 2.0 | 2.3 | 3.3 |
| M 15 | 2.5 | 3.5 | 4.5 |
| M 20 | 3.6 | 4.6 | 5.6 |
| M 25 | 4.3 | 5.3 | 6.5 |
| M 30 | 5.0 | 6.0 | 7.0 |

Table – 2 Value of 't'

| Accepted Proportion of Low Results | Value of 't' |
|---|---|
| 1 in 5 | 0.84 |
| 1 in 10 | 1.28 |
| 1 in 15 | 1.5 |
| 1 in 20 | 1.65 |
| 1 in 40 | 1.86 |
| 1 in 100 | 2.33 |

Table – 3 Values of W/C ratio and compressive strength

| Compressive Strength in $N/mm^2$ at 28 days | W/C ratio |
|---|---|
| 20 | 0.600 |
| 25 | 0.525 |
| 30 | 0.480 |
| 35 | 0.420 |
| 40 | 0.375 |
| 45 | 0.335 |

Table – 4 W/C ratios as per Durability Requirements

| Exposure Condition | Maximum W/C ratio |
|---|---|
| Mild | 0.65 |
| Moderate | 0.55 |
| Severe | 0.45 |

Table – 5 Approximately sand and water content per m3 of concrete for grade up to M 35

| Nominal maximum size of aggregate mm | Water content per meter cube of concrete in kg | Sand as % of total aggregate by absolute volume |
|---|---|---|
| 10 | 208 | 40 |
| 20 | 186 | 35 |
| 40 | 165 | 30 |

Table – 6 Approximate Air Content

| Nominal Maximum size of Aggregate mm | Entrapped air as % of volume of concrete |
|---|---|
| 10 | 3.0 |
| 20 | 2.0 |
| 40 | 1.0 |

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