Seat No._____                                        Enrolment No._____

# GUJARAT TECHNOLOGICAL  UNIVERSITY
### B.E. Sem-III   Remedial Examination March 2010

**Subject Code: 130605**
**Subject Name: Concrete Technology**

Date:  11 /03 /2010                                        Time:03.00 pm -05.30 pm

**Total Marks: 70**

Instruction: 1. Attempt all questions.
                2. Make suitable assumption wherever necessary.
                3. Figure to the right indicates full marks.

**Q-1** (a) Fill in the blanks with appropriate word.                                        **05**
             i)  The rapid hardening cement is used in case of _____ and _____.
             ii) Use of gravel in concrete increases _____ but decreases _____.
             iii) Maturity of concrete is defined by _____ and _____.
             iv)  In target mean strength standard deviation depends on _____and _____.
             v)   Polymer concrete is produced by _____ and _____ method.

       (b) Design the concrete mix by using IS 10262: 1982 recommendations for the                **09**
            following data.

            Grade of concrete              : $M_{30}$
            Degree of control             : Very good
            Maximum size of aggregate     : 20 mm
            Specific gravity of cement      : 3.1
            Specific gravity of Fine aggregate  : 2.6
            Specific gravity of Coarse aggregate : 2.85
            Condition of exposure         : Mild

            Note: i) Only 2.5% low results acceptable.
               ii) **Refer table 1 to 6.**
               iii) W/C from 28 days compressive strength of cement is 0.50
               iv) No correction to be applied to water content and sand content.

**Q-2** (a) Describe the wet process of manufacturing of cement stepwise.                        **05**
       (b) Explain different types of slump with sketch only.                                        **02**
       (c) Discuss the split tension test on concrete with sketch for cylinder and cube.                **07**
            Also enlist it's merits.

<p style="text-align:center"><strong>OR</strong></p>

       (c) i) Explain the action and application of water reducing admixtures.                        **04**
           ii) Discuss the phenomena of hydration of cement.                                        **03**

**Q-3** (a) Describe sieve analysis for aggregate and determination of fineness modulus.          **07**
            Also prepare required tabular form.
       (b) List the factors affecting the workability of concrete and explain any three                **07**
            out of them.

<p style="text-align:center"><strong>OR</strong></p>

**Q-3** (a) Describe the test for determining initial and final setting time of cement with          **07**
            dimensional sketch. Give IS requirements for setting time for OPC.
       (b) Describe Rebound hammer test with labeled sketch. Also mention under                    **07**
            which circumstances this method is useful.

**Q-4** (a) Write short note on Chloride Attack 05
     (b) Describe polymer concrete and it's applications. 05
     (c) Causes of cracks in concrete. 04

<div align="center"><strong>OR</strong></div>

**Q-4** (a) Explain ready mixed concrete with merits. 05
     (b) Write short note on High performance Concrete 05
     (c) Explain water ponding method of curing. 04

**Q-5** (a) What is meant by jacketing? Discuss different types of jacketing. 05
     (b) Concreting in hot weather. 05
     (c) Discuss bulking of sand. 04

<div align="center"><strong>OR</strong></div>

**Q-5** (a) Discuss gunniting technique and its applications. 05
     (b) Explain ultrasonic pulse velocity test. 05
     (c) List out the factors influencing the mix proportion of concrete. 04

Table: 1 to 6

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 |