

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014**

**Subject code: 1722009**

**Date: 25-06-2014**

**Subject Name: Concrete Technology**

**Time: 02:30 pm - 05:00 pm**

**Total Marks: 70**

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) What are the physical requirements of OPC 53 Grade Cement? **07**  
How is cement manufactured by dry process?  
Who has taken the patent for the manufacture of cement?
- (b) Enlist five different types of cement and explain any two with property, application and cost. **07**
- Q.2** (a) What is the effect of impurities in water on concrete? **07**  
What should be the pH of water to be used in making concrete?
- (b) What is the different test to be performed on aggregates? **07**  
What are the limiting values of different test so that they can be use for construction work?
- OR**
- (b) Write short note on Products of hydration of Cement. **07**
- Q.3** (a) Explain the action of super plasticizers and air entraining admixture used in concrete. **07**
- (b) What the requirement of size of aggregate is as emphasized in IS 456-2000. **07**
- OR**
- Q.3** (a) Enlist the destructive test performed on hardened concrete and explain any one in detail. **07**  
Calculate the approximate spilt strength of a standard cube of concrete having split load of 90KN at failure.
- (b) Calculate the gel space ratio and theoretical strength of a sample of concrete with 3000gm of cement with 0.5 w/c ratio at 60% hydration. **07**
- Q.4** (a) Define Maturity concept of concrete. **07**  
Lab experiments conducted at Poona on a particular mix showed strength of 34 MPa for fully matured concrete.  
Find whether form work can be removed for an identical concrete placed at Srinagar at the age of 17 days when the day time temp is 10 degree C and night time temp is 4 degree C.  
If the concrete is likely to be subjected to a stripping stress of 26 MPa.  
(let A=21, B=61)
- (b) Discuss the effects of the following factors on strength of concrete -: **07**
1. Gel/Space ratio
  2. Aggregate/cement ratio
  3. water/cement ratio

**OR**

- Q.4 (a)** Determine the quantity of fine and coarse aggregate for the following data, **07**
- |   |         |
|---|---------|
| Mass of water/m <sup>3</sup> of concrete  | 191.6kg |
| Mass of cement/m <sup>3</sup> of concrete | 383kg   |
| Specific gravity of cement                | 3.15    |
| Specific gravity of fine aggregate        | 2.66    |
| Specific gravity of coarse aggregate      | 2.75    |
| % Entrapped air                           | 2%      |
| % fine Aggregate/Total Aggregate          | 31.5%   |
- Design the concrete mix by volume also if the bulk density of cement, Fine Aggregate and coarse aggregate is 1450kg/m<sup>3</sup>, 1700kg/m<sup>3</sup> and 1800kg/m<sup>3</sup> respectively.
- (b)** What is shrinkage? Describe briefly. **07**
- Q.5 (a)** Explain advantages and disadvantages of different workability tests on Concrete **07**
- (b)** Explain Bulking of sand and Alkali Aggregate reaction **07**
- OR**
- Q.5 (a)** What are the different mineral admixtures? **07**
- Explain any one mineral admixture discussing its engineering properties.
- (b)** Answer the following briefly. **07**
- Define M30 grade of concrete?
  - What is loss on ignition?
  - What is the advantage of Ca(OH)<sub>2</sub> in cement?
  - Define compaction factor?
  - What are Capillary pores and Gel pores?
  - List the measures to improve durability of concrete in sea water?
  - What is Alite, Belite, Celite and Felite?

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