

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. Sem. – IInd - Examination – June/July- 2011

Subject code: 1722009

Subject Name: Concrete Technology

Date: 01/07/2011

Time: 10:30 am – 01:00 pm

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. IS 10262-1982 concrete mix code is allowed

Q.1 (a) What are the different compounds of cement? What is the role of different compounds of cement? In OPC, what is the different percent of different compounds present? **07**

(b) Enumerate the different tests performed on cement to see its compliance with BIS. Describe any one of it in detail. **07**

Q.2 (a) Write the steps involved for the manufacture of concrete. Explain the process in detail. **07**

(b) List at least three types of cements and discuss about their properties and uses in concrete construction. Discuss how the changes in properties are produced **07**

OR

(b) What is fineness modulus? How can it be measured in the laboratory? **07**

Q.3 (a) Lab experiment conducted at Poona on a particular mix showed a Strength of 310 Kg/cm² for fully matured concrete. Find whether form work can be removed for an identical concrete placed at Srinagar at the age of 16 days, when the average temperature is 6°C if the concrete is likely to be subjected to a stripping stress of 240 Kg/cm². (Take constants A & B are 21 & 61 respectively) **07**

(b) Define workability and the factors affecting it. **07**

OR

Q.3 (a) Enlist the tests on hardened concrete done in the laboratory and explain any one. **07**

(b) What is shrinkage? Describe briefly **07**

Q.4 (a) Justify cubical compressive strength is more than the cylindrical compressive strength **07**

(b) State the factors affecting strength of concrete & explain any three of them in detail. **07**

OR

Q.4 (a) Calculate the gel/space ratio & theoretical strength of a sample of concrete with 4000 gms of cement with 0.5 W/C ratio at 65% hydration. **07**

(b) What is curing of concrete? What are different methods? **07**

- Q.5 (a)** Define durability and discuss about the factor affecting it. What care is taken to assure good durability in concrete? **07**
- (b)** What is the difference between an admixture and an additive? **07**
Discuss the effect of air entrainment on the properties of concrete.

OR

- Q.5 (a)** Estimate the approximate split strength of a std. cylinder, if the load at failure is obtained to be 75KN **07**
- (b)** By using IS recommended guidelines design a concrete mix for a reinforced concrete structure to be subjected to mild exposure conditions for the following requirements (by volume as well as by mass) **07**

(a) Design stipulations

- i) Degree of workability = Medium (0.9 C For 75-100 mm slump)
- ii) Characteristic strength at 28 days = 20 MPa
- iii) Maximum nominal size of the agg = 20mm
- iv) Type of aggs = Angular (crushed) granite
- v) Degree of quality control = weigh batching, occasional supervision & tests. From past records $S = 5.5$ MPa
- vi) Grading zone of sand = III
- vii) Type of cement = 43 grade OPC

(b) Characteristics of Materials .

| Material | Specific Gravity | Bulk density | Moisture content | Water absorption |
|----------|------------------|------------------------|------------------|------------------|
| Cement | 3.15 | 1450 Kg/m ³ | ----- | ----- |
| FA | 2.60 | 1700 Kg/m ³ | 2.0% | ---- |
| CA | 2.65 | 1800 Kg/m ³ | ---- | 1.0% |
