

(3 Hours)

(Total Marks: 80)

- Note:** 1. **Question number 1** is compulsory; attempt **any three** out of remaining five questions.
2. Assume suitable **data** if **required** and mention it clearly.
3. Draw neat sketches wherever necessary. Figure to the right indicates full marks.

1. Attempt any four.
- (a) List the various types of cement indicating their use for different applications. [05]
 - (b) Explain in detail the advantages and disadvantages of high strength concrete. [05]
 - (c) State the physical and mechanical properties of steel fibers in concrete. [05]
 - (d) What do you understand by destructive, non-destructive and partial destructive tests on concrete? Give an example in each test. [05]
 - (e) Explain durability of concrete structure. Enlist the factors affecting the durability of concrete. [05]
2. (a) Why is water – cement (w/c) ratio so important in concrete? State the relationship between w/c ratio and workability. [04]
- (b) A light weight concrete mix is required for structural concrete work. A minimum 28 days cube strength of 25 MPa is required based on structural considerations. [06]
Mean Design Strength: 34 N/mm^2
The relative density of the concrete, not to exceed a value of 1.85.
Workability required is medium to high.
Available aggregates are Foamed slag & Aglite.
Design the most economical mix and set out the dry batch weights and also the field mix quantities per cubic meter of concrete, if the fine and coarse aggregates contain 4 & 2.5 percent of moisture by dry weight, respectively. Refer figure 1-3.
- (c) Define hot weather concreting. What are the effects of hot weather on concrete? What are the precautions to be taken during hot weather concreting? [10]
3. (a) Enlist the various factors required for mix design IS 10262:2009. Explain the step by step method for a mix design (with fly ash) as per IS 10262:2009. [10]
- (b) Write a short note on probe penetration test. Explain how the result is interpreted to check the quality of concrete? [10]
4. (a) State the effect of interaction between fibers and cement paste in cracked and uncracked matrix. [05]
- (b) Explain how Maturity method is used for determining the strength of concrete with suitable sketch. [05]
- (c) Define mass concrete. What are the problems faced during mass concreting? Explain the remedial measures to overcome the effects of mass concreting. [10]
5. (a) Explain the procedure of American Concrete Institute method of mix design 211.1 for air entraining concrete. [08]
- (b) What is pull out test? Explain its suitability and procedure. [08]
- (c) What do you understand by Rapid hardening cement? Why that is rapid rate of strength gain? [04]
6. (a) State the properties of polymeric and glass fibers in fiber reinforced concrete. [05]
- (b) Explain the effect of alkali aggregate reaction on concrete. [05]
- (c) What is corrosion? State the causes of corrosion. Enlist the methods to curb corrosion. [10]
Explain any one method in detail.

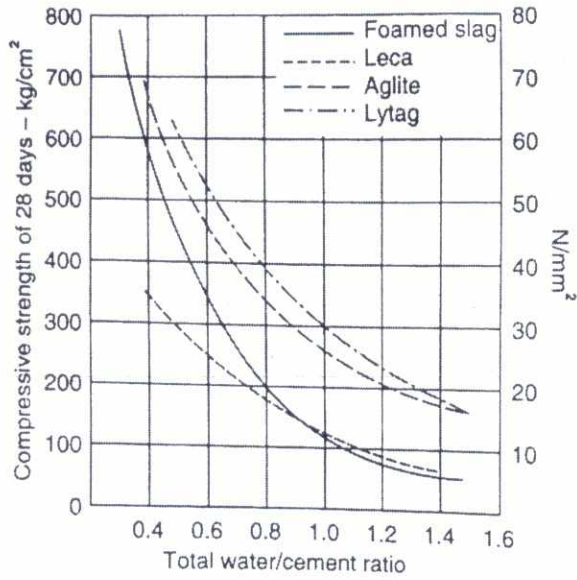


Figure 1 Relationship between the compressive strength of water stored cubes and total w/c

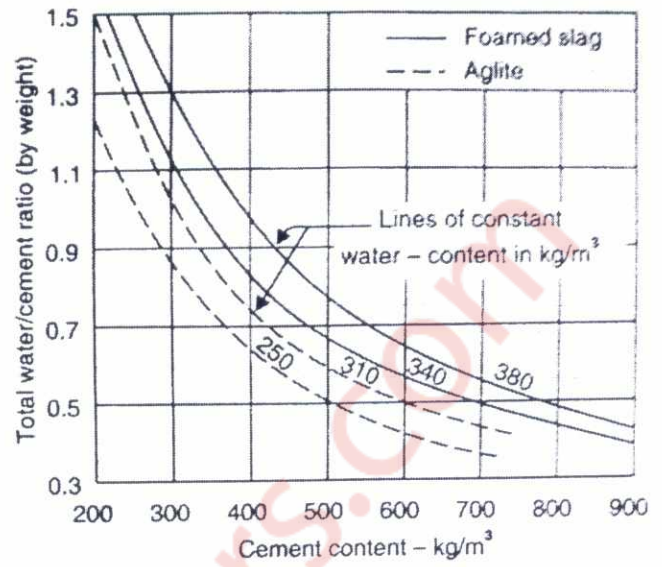


Figure 2 Relationship between the total w/c and the cement content

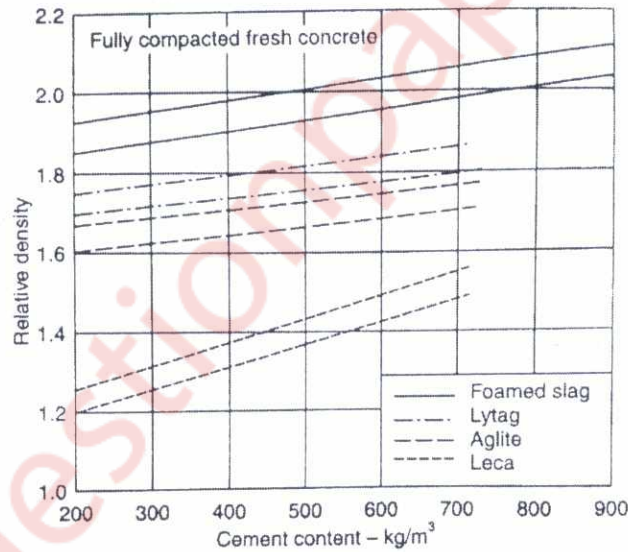


Figure 3 Relationship between the relative density & cement content for fully compacted fresh concrete
