Paper / Subject Code: 31807 / Elective - I Advanced Concrete Technology

T.E (Sem V) / Civil / CBCS

18 DEC 2018

(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. Explain any one method in detail. [10]

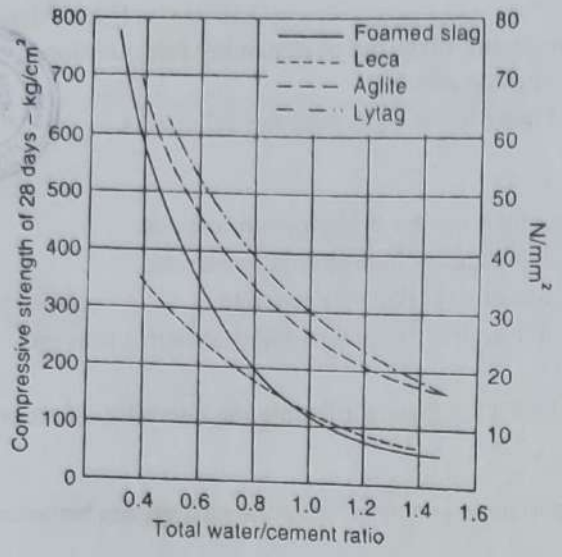

Figure 1 Relationship between the compressive strength 0f water stored cubes and total w/c

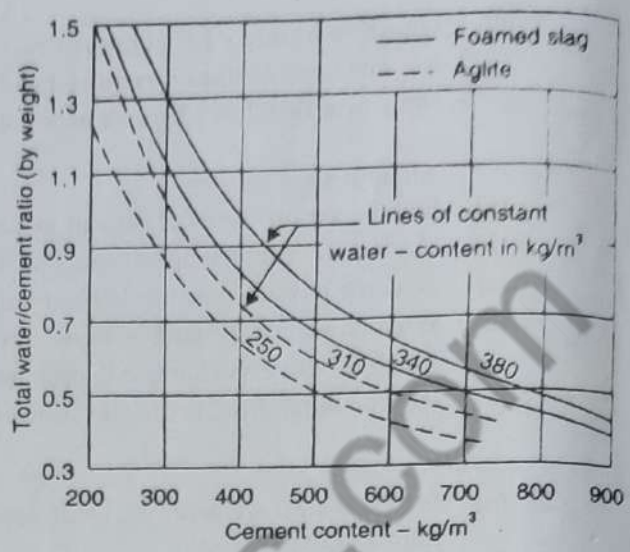

Figure 2 Relationship between the total w/c and the cement content

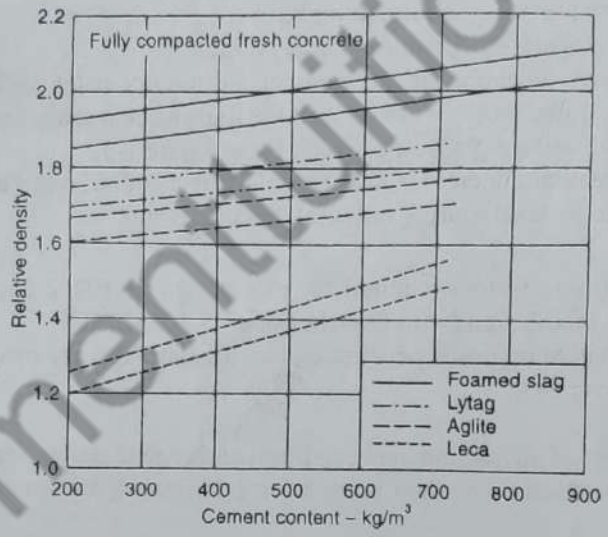

Figure 3 Relationship between the relative density & cement content for fully compacted fresh concrete

*****

CDC44DAE0E2D31E8085E42F231674A19