

Abhulakshu shukla

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2016

B.Tech IV Semester

COURSE CODE: 11B11CE411

MAX. MARKS: 15

COURSE NAME: CONCRETE TECHNOLOGY

COURSE CREDITS: 4

MAX. TIME: 1 HR

*Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.*

1. a) The post peak behavior is the function of stiffness of the testing machine in relation to the geometry of the test specimen. (T/F) (0.5)  
b) Shape of  $C_2S$  is generally rounded. (True or False) (0.5)  
c) Cement ground in high pressure roller mills set faster than cement produced from ball mills. (True or False) (0.5)  
d)  $C_3A$  helps the combination of lime and silica during manufacture of clinker. (T/F) (0.5)  
e) \_\_\_\_\_ are used for drying partially calcination of raw meal in the cement manufacturing process. (0.5)  
f) Why endothermic peak is observed during cement hydration before the exothermic reaction starts? (0.5)  
g) What is responsible for the grey colour of ordinary Portland cement? (0.5)  
h) What are the different moisture states in which aggregate exist? (0.5)  
i) Which one of the following does not react with concrete? (0.5)  
(i) Sewage Water (ii) Sulfuric acid (iii) Vegetable oil (iv) Alcohol (v) None of the above.  
j) The \_\_\_\_\_ ratio determines the reactivity of the aggregate in the alkali carbonate reaction. (0.5)
2. What happens when the A/F ratio  $< 0.64$ ? (1)
3. Discuss why the strength of the interfacial transition zone is generally lower than the strength of the bulk hydrated cement paste. Explain why concrete fails in a brittle manner in tension but not in compression. (2)
4. When concrete is exposed to fire, why the elastic modulus shows a relatively higher drop than the compressive strength? (2)
5. In regard to sulfate resistance and rate of strength development, evaluate the properties of the portland cement which has the following chemical analysis:  $SiO_2 = 20.9$  percent;  $Al_2O_3 = 5.4$  percent;  $Fe_2O_3 = 3.6$  percent;  $CaO = 65.1$  percent;  $MgO = 1.8$  percent; and  $SO_2 = 2.1$  percent. Why is  $C_3S$  more reactive, and  $\gamma C_2S$  nonreactive with water at normal temperatures?  $MgO$  and  $CaO$  have similar crystal structures, but their reactivities are very different from each other. Explain why. (3)
6. Assume 100% hydration and no drying; calculate the volume of capillary pores. W/c ratio = 0.50, Mass of cement = 100 g, Mass of water = 50 g and specific gravity of cement = 3.15. (2)