

DEPARTMENT OF CIVIL ENGINEERING: IIT DELHI

CVL 771: ADVANCED CONCRETE TECHNOLOGY. MINOR TEST-I

DURATION: 1.0 Hour FIRST SEMESTER-2018-2019 Max. marks:=20

DATE:- ~~23~~ 08/2018 TIME:- 8.00 A.M. - 9.00 A M Venue: LH 527

1. Consider a cement, having following composition: $C_2S=21\%$, $C_3S=55\%$, $C_3A=8\%$ and $C_4AF=10\%$ is used in actual construction of a beam with water to cement ratio (W/C) 0.5. Length of the beam element to be considered is 2 m and is exposed to rain; depth of the beam is 600 mm. The beam is saturated with water up to a depth of 40 mm from the surface. The estimated degree of hydration is 80 % at the age under consideration. Cement content in the concrete is 350 kg/m^3 . The lime can dissolve only in capillary pores and solubility of lime in water at 25°C is about 1.7 gm/L . Is all the lime produced would be dissolved? If all soluble lime leaches out, how much would be the quantity of leached out lime?
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2. Measured specific surface by permeability method for aggregate of size from 5 mm to 10 mm is 0.95 mm^{-1} , assume average size as geometric mean. The volume of 6 random particles measured by water displacement method are 420, 500, 520, 470, 510 and 595, all in mm^3 . What is the angularity factor? What is void content of the aggregate when packed in a random manner whereby it is known that for angularity factor of 1 the void content is 0.45 and that for angularity factor of 2 it is 0.6.
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3. Explain how water reducing agents can affect cement saving? Explain the mechanism of action of air entraining agents? If the surface tension of air water interface is $72 \text{ (milli N) mN/m}$ and reduced to 65 mN/m , what would be change in radius of air entraining pore given that the pressure inside and outside the pores remain same.
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