DEPARTMENT OF CIVIL ENGINEERING: IIT DELHI

CVL 771: ADVANCED CONCRETE TECHNOLOGY. MINOR TEST-II

DURATION: 1.0 Hour FIRST SEMESTER-2017-2018 Max. marks:=20

DATE:- 05/10/2017 TIME:- 4.00 P.M. - 5.00 P M Venue: LH 308

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1. Consider a poorly maintained batching plant, with errors in cement (C), water (W), total aggregate (A) measurements being $\Delta C = \pm 10 kg$, $\Delta W = \pm 5$ kg and $\Delta A = \pm 15$ kg, and about 1500 kg of material is handled by the pan mixer for a batch, What is the range for variation of water cement ratio? What will be its implication on strength as par DOE guidelines given that a concrete with 0.5 W/C for same ingredients exhibited a strength of 33MPa. What is the likely variation in paste content? The specific gravity of combined aggregate, and cement are 2.65 and 3.15 respectively. The intended mix proportion is 320kg/m³, water 160kg/m³, and wet density of concrete is 2460 kg/m³ respectively. What is the like standard deviation of strength assuming it is mostly controlled by W/C. Is there a possibility of encountering compaction pores in some batches? Justify from by calculation. What is likely grade of the actual concrete? 10

2. Explain the mechanism of action of air entraining agent. 3

3. Explain what is understood by "saturated state" in the context of pump-able concrete? Draw a typical graph and state at what w/c ratio the concrete becomes saturated? 2

4. Draw diagrams to explain what plug flow in the context of concrete pumping is and also explain the situation in the Bingham model. 3

5. What is the maximum pumping distance for a saturated concrete if the initial pressure at the pump end is 35 kg/cm², diameter of the pipe is 150 mm, and flow resistance per unit area of the pipe is $3.5 \times 10^{-3}$ kg/cm²? 2

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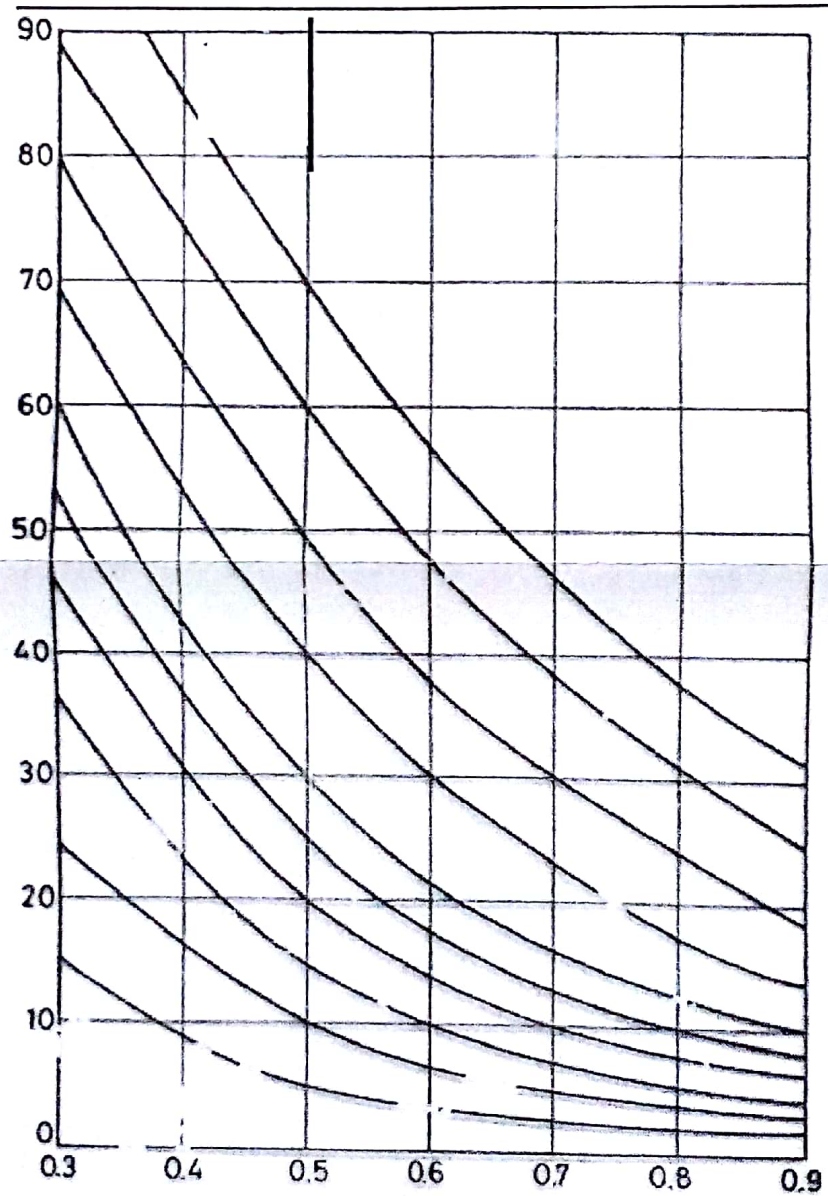
28 days Strength against Free W/C