DEPARTMENT OF CIVIL ENGINEERING: IIT DELHI
CEL 774: CONSTRUCTION ENGINEERING PRACTICES. MAJOR TEST
DURATION: 2.0 Hours. FIRST SEMESTER-2006-2007. Max. marks:=50
DATE:- 30/11/2006 TIME:- 10.30 A.M. – 12.30 P M Venue: V 315

All relevant charts are supplied and only chart supplied need be used.
DRAW DIAGRAMS TO EXPLAIN YOUR ANSWER WHERE-EVER REQUIRED
BE BRIEF AND ANSWER TO THE POINT
ASSUME MISSING DATA SUITABLY IF REQUIRED

1. Draw a diagram showing relationship between shear strength of fresh concrete and the confining pressure before, during and after vibration also explain the implieation. Draw diagram relating height of concrete and time of vibration and express their relationship in form of the relevant equation. Hence obtain an expression for time required to obtain 90 % eompaction in terms of relevant factors affeeting. 9

2. A, 1:1.8:4.5 mix has a water cement ratio of 0.6 and a cement content of 300 kg/m3, the temperature of the ingredients are as follows cement: 30°C, aggregates: 40°C and water: 25°C, What is the likely temperature of fresh concrete? Temperature of aggregate can be brought down by 5°C by sprinkling water on it, in addition how much ice shaal be used if thc permissible maximum temperature of concretc at the time of casting as speeified in the contraet is 27°C? 6

3. Concrete cubes of a givcn mix are subjccted to four different curing conditions, namely; a) continuously submerged moist curing, b) curing with wet hessian cloth, c) steam cured for 8 hours from 2 hours after casting and, d) cured using curing compound applied after setting by brush application. Draw a figure to show their comparativc ratc of strength developmcnt with age till 28 days. Justify your answer. 4

4. In a site you havc encountered a steel have excess Carbon, Manganese, Sulphur and Phosphorus than maximum specified in code, state and explain thc implications in the properties of stecl. 4

5. Draw a diagram and explain the barrel and wedge system of anchorage for post tensioned strand/wires. 5

6. Draw diagrams to explain types of general lay out patterns of casting yard plants. Production capacities of 4 main units in the plant are 30 elcments/ day, 32 elements/ day, 35elements/day and 29 elements /day. An element occupies $8m^2$ space and 5 such elements can be stacked. It is expected that not more than 3 days breakdown is possible in case of erection crane or erection in general. A maximum break down in casting plant can be for a period of 2 days, how ever the curing period at the stacking yard is 7 days , furthcr a buffcr stock of 6 days are to be maintained for flexibility. What is thc area required for the stacking yard assuming 20% area for circulation? 10

7. Explain the importance of tolerances in batching. 4

8. The strength of concrete follows Abraham,s law. You have designed mixcs for M30 and M 20 concrete with w/c of 0.47 and 0.55 respectively and with watcr content of 180 kg/m^3 for slump in the range of 60-100mm. Assume any othcr data suitably and obtain the mix proportion for M 25 grade of concrete for the same slump and a higher slump of 120mm. 8

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