DEPARTMENT OF CIVIL ENGINEERING: IIT DELHI
SEMESTER I : : 2008-09
CEL 339 : CONCRETE TECHNOLOGY AND MECHANICS
MAJOR TEST

Max. marks = 40 All questions compulsory Time allowed = 2 hrs.

Q.1 Derive an expression for the discharge of pumpable concrete through a pipe.
8 marks

Q.2 (a) State one failure criterion for concrete.

(b) Using the above failure criterion, predict the strength of concrete in state of pure shear, i.e., ($\sigma_1 = \sigma$, $\sigma_2 = 0$, $\sigma_3 = -\sigma$).
3+5 = 8 marks

Q.3 (a) Using Griffith's Fracture Mechanics approach, discuss the effect of W/C ratio on the strength of concrete.

(b) Relevant Indian Standard Code dealing with measurement of compressive strength of concrete recommends that, while testing, load should be applied in a direction parallel to the face which was at the top while casting.
Justify the above Codel recommendation.
5+5 = 10 marks

Q.4 (a) Derive an expression describing the effect of specific surface of cements on their initial rate of hydration.

(b) Low Heat Portland Cements (LHPC) are preferred for mass construction. Explain the rationale for such preference.

(c) A concrete mix has been designed for specified strength, workability and durability. However, the workability of the trial mix concrete is found to be lower than its expected value. How will you alter the concrete mix proportions for the next trial mix.
5+5+4 = 14 marks