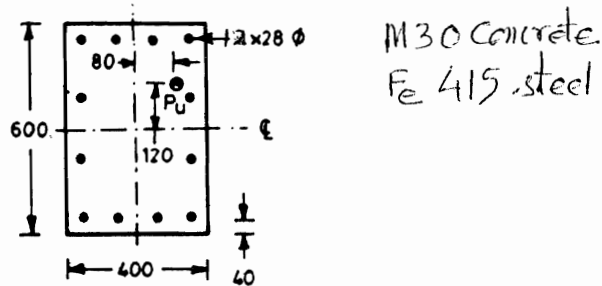


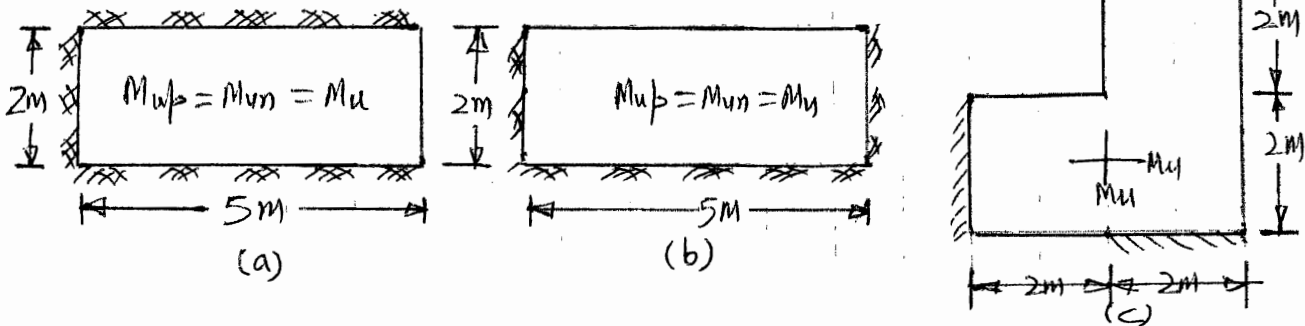
**CIVIL ENGINEERING DEPARTMENT**  
**SUBJECT: CEL 721- DESIGN OF CONCRETE STRUCTURES**  
**MAJOR TEST : II SEMESTER 2008 - 2009**  
**Full marks: 40, Date: 21-11-2008, Time: 10.30 to 12.30**  
**Please answer all questions**

- Q.1 (a) Define short and slender columns. Derive expression for additional moment in slender column. (4)
- (b) Determine the ultimate load carrying capacity  $P_u$  of column as shown below. (8)



- Q.2 (a) What do you understand by Upper bound, Lower bound and Unique solution. (4)

- (a) Determine ultimate load capacity ( $W_u$ ) for the following slabs: (12)



- Q.3 (a) What is provision of shear capacity of reinforced concrete beam at cut-off region. (4)

- (b) Determine ultimate load of the frame shown below by beam Mechanism, side sway mechanism and combined mechanism (8)

