King Saud University **CE 472 Reinforced Concrete II**
College of Engineering **1st Semester 1428-1429 H**
Civil Engineering Department **Duration: 1 hr and 30 min**

First mid-term Exam

The floor shown in Fig.1, part of 3-story building, is to be designed by two alternative methods: **as a solid one way slab** and **as a void one way joist slab of a typical section shown in Fig.2**.

Design Criteria f_c'= 25 MPa fy= 420 Mpa Concrete density = 25 kN/m^3

All beams have 300 mm width and 600 mm height. All columns have 300 x 300 mm sections, and Superimposed dead load = 2 kN/m^2, live load = 3 kN/m^2. External masonry wall of 3.0 m height and 0.2 m thickness on beam EF, knowing that masonry unit weight is 15 kN/ m^3.

A – Solid slab design (50 %):

A 180 mm thick solid one way slab is used.
a) Check the slab thickness for the SBC-Code deflection requirements.
b) Determine maximum factored negative and positive moments in 1-m wide typical slab strip.
c) Determine the main reinforcement for 1-m wide strip assuming a negative moment of 25 kN.m, as well as the bar spacing.
d) Calculate the factored load on beam CD.
e) Calculate the factored axial force on column E at the ground floor level (all floors are identical).

B – Joist slab design (50 %):

The typical rib cross-section used is shown in Fig.2. Ribs are spanned in the short direction.
a) Check the joist dimensions for SBC code requirements
b) Determine the factored load on a typical rib.
c) Determine maximum factored negative and positive moments in a typical joist.
d) Determine the main reinforcement for a typical joist assuming a negative moment of 28 kN.m.
e) Calculate the factored load on beam EF.

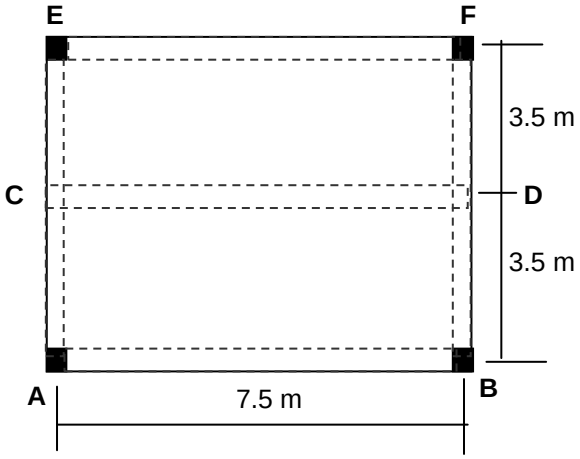

Fig. 1

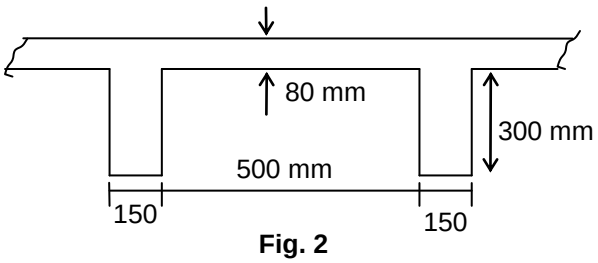

Fig. 2