Kafr El-Sheikh University
Faculty of Engineering
Civil Engineering Department
Third Year Civil, 1st term

Reinforced Concrete 2
Final Exam
Date: Jan, 5th, 2020
Time: 4.00 Hours

Full mark: 85

- **Answer all the following question.**
- **It is allowed to use Egyptian code-design aids.** يسمح باستخدام جداول و مساعدات التصميم
- **Any missing date may be reasonably assumed.**
- **Grade of used steel is 350/520 & 240/350 for steel and stirrups. The used f_{cu} is *35 N/mm²***
- **This course satisfy ILOS of A4, A5 and A6- B4, B5 and B11- C3, C4, C6 and C7- D1, D2, D6 and D7**

Question No. 1 (25%):-

A- Mention briefly seven methods showing how could you resist punching shear in flat slab especially with collapse besides openings.

B- Without writing any steps, show the mechanism of resisting punching shear in flat slab بدون ذكر قوانين

C- The shown hall is supposed to be designed with the given data: F.C = 2.5 kN/m² L.L = 4.0 kN/m² Floor height = 3.00 m. It is required to:

1- Make a full analysis followed by complete design for the given flat slab.
2- Execute a check of punching for column C.
3- Without use drop beam, provide closed stirrups resisting the expected punching shear respecting ECP
*4- With a **scale of 1:100**, **draw RFT for only one column and field strip**. **Also draw RFT around opening.***

Question No. 2 (25%):-

= Explain which is the better to be used an even or odd number of paneled beams and why?
*The given hall with area of (18*9) m² shown below is supposed to be designed as **continuous paneled beam**. By knowing that: L.L = 0.5 kN/m² , F.C= 0.75 kN/m² , γ_{water} = 10 kN/m³,*
By neglecting the lateral water pressure, It is required to answer the follows :-
*1-Provide a full design for only critical solid slabs **(Sec. I-I)**.*
*2-Provide a full design for the paneled beams **(only one beam for each direction)***
*3- **Take in your consider that marginal beam with depth of (1.00 x 0.25)** estimate the loads and design.*
*3-With a **suitable scale** draw reinforcement details;* **(Draw details of slab RFT., longitudinal and cross section *for the designed two beams at both directions*).**

Question No. 3 (20%):-

= Provide the benefits of solid part.
= Provide the benefits of cross-rib.
The given slab is supposed to be designed as a hollow block slab. If you know that F.C = 2.50 kN/m², L.L = 3.00 kN/m²:-
1-Make a full design of hollow block slab.
*2- With a **suitable scale**. **Draw reinforcement details (Plan & Cross section I-I).***

Question No. 4 (25%):-

*A=Mention briefly the **progressive collapse** and provide its obstacles on the corner columns.*
B=The given stair is supposed to be designed to resist L.L = 3.0 kN/m², F.C= 2.50 kN/m² it is required to execute the following:-
*1- **Provide** the **best statical** system.*
2- Make a full design for the given stairs.
Step by step make a complete analysis of beam B and provide torsion design.
*3- With a **suitable scale**, **draw RFT for only cross section of strip I-I.***

Question No. 5 (15%):-

- المطلوب عمل تغطيه زجاجيه لكامل المسطح الموضح بالرسم، اقترح تفصيلا النظام الانشائي مع رسم الابعاد الافتراضيه و كذلك يدويا تفصيل التسليح و ذلك في ورقه الاجابه وليست اللوحه.

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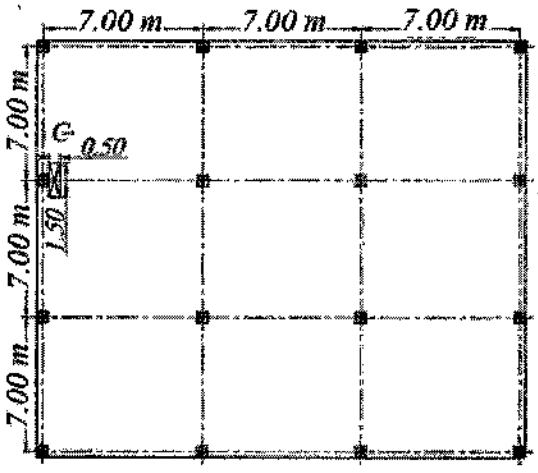
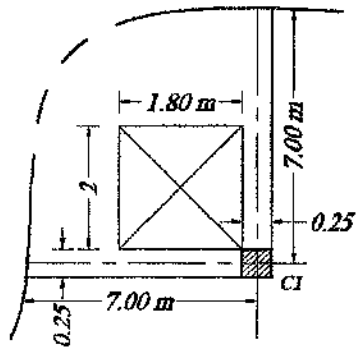
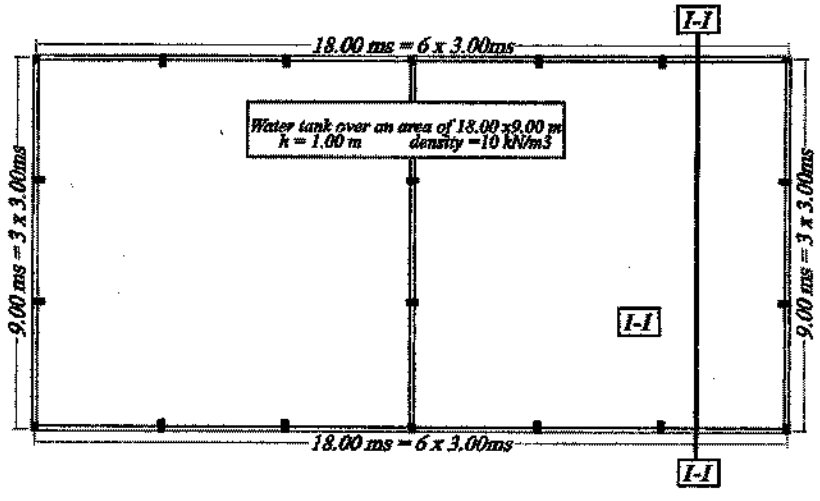
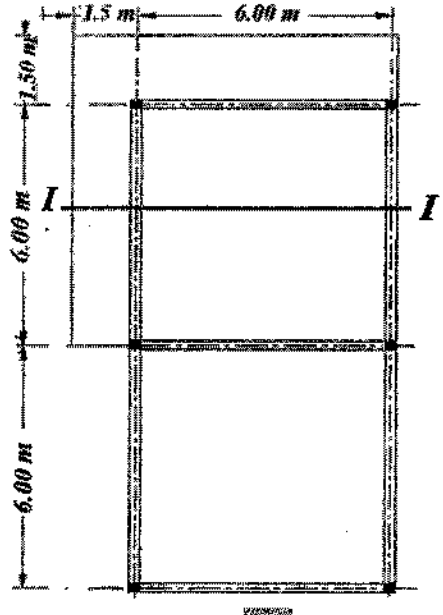




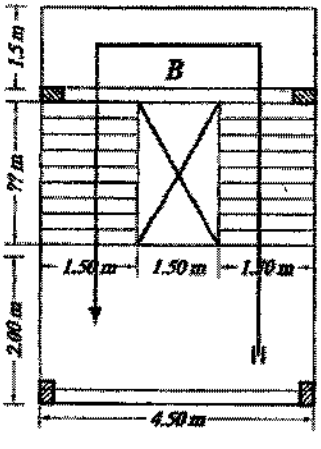
Q/1



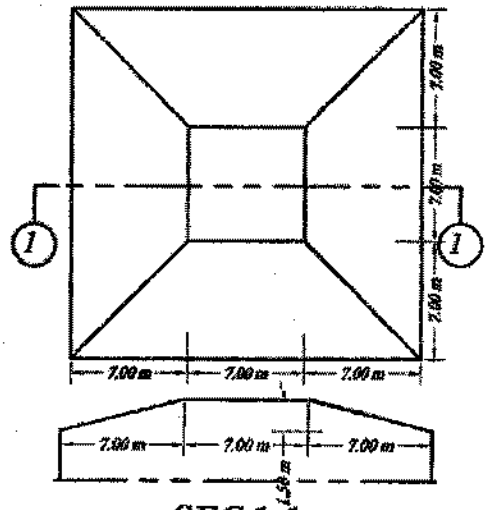
Q/2



Q/3



Q/4



SEC 1-1

Q/5

With all the best/ Dr. Ahmed Hamoda