Kafr El-Sheikh University
Faculty of Engineering
Civil Engineering Department
2nd Year Civil , 2nd Term

Full mark = 75

Reinforced Concrete 1
Final exam
Date: May,27th 2019
Time: 4 hours

- **Answer all the following question.**
- **Any missing date may be reasonably assumed.**
- **This course satisfy ILOS of A4, A5 and A6- B4, B5 and B11- C3, C4 and C6- D1, D2, D6 and D7**

يسمح باستخدام جداول و مساعدات التصميم الخرسانيه

Question No. 1 (25%):-

a) Define briefly with sketch (if any):-

*The difference between **braced** and **un-braced** structures—slenderness ratio (λ)—**Minimum reinforcement** for RC **walls**— reinforcement details for **openings** in **wall**—difference between **column** and **wall**— **zones** of **compressive** eccentric section (M&-N)—**zones** of **tensile** eccentric section (M&-N).*

b) *What are the possible ways to resist **deflections** and **cracks**?*

c) *The given longitudinal section is for continuous beam with cross section (A_c = 250x800mm^2) and steel reinforcement (A_s) shown in **Fig.1**. It is required to draw the reinforcement details presenting longitudinal section and the **determined cross section only.** **NOTE; assume column width is 300 mm.***

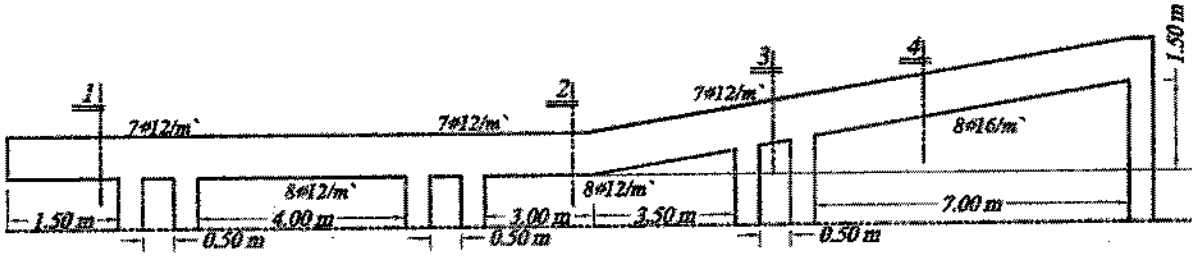

Fig. 1

Question No. 2 (25%):-

باختصار تكلم عن استلام : ألأ عمده (نجاره و حداده) - الكمرات (حداده) – البلاطات (حداده) – الحوائط (حداده)

b) *For the shown corner column in **Fig. 2**, it is required to **identify** the mentioned **cracks**, and **provide** the reasons for each one.*

c) *= By knowing the column cross section is **400x400 mm^2** for **Fig. 2**, what is the ultimate capacity (P_u)? **NOTE**: f_{cu}=35 N/mm^2, f_y=350 N/mm^2*

*= An external plate with thickness of **4mm** have been used to improve the shown column, by considering the concept of **external composite action** what will be the new ultimate. capacity of the composite section $f_{y\ plate}$ = 300 N/mm^2 .*

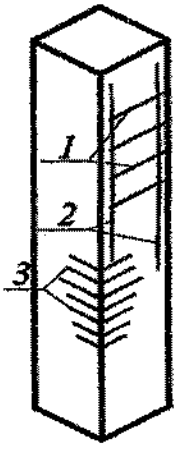

Fig. 2

d) *The given straining actions are for RC frame shown in **Fig. 3**, if you know that f_{cu}=35 N/mm^2, f_y=350 N/mm^2 **provide a complete design for the marked sections.***

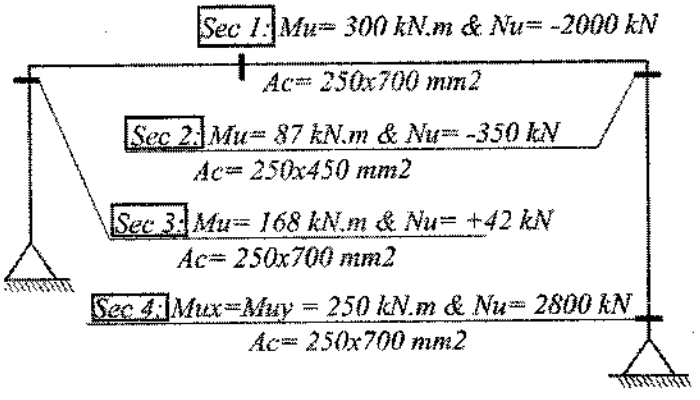

Fig. 3

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Question No. 3 (55%):-

The given structural shown in ***Fig. 4*** *is for a building designed based on the following data: Slab thickness (t_s) = 150 mm - Floor covering (F.C) = 2.00 kN/m^2- Live Load (L.L) = 2.00 kN/m^2 -Wall density (γ_w) = 18 kN/m^3-Wall thickness = 250 mm – Number of floors=**10 floors** - f_{cu}=35 N/mm^2 & f_y = 350 N/mm^2- **All beams have $A_{c\ beam}$=250x700 mm^2** - **the building is braced in both directions**.*

It is required to execute the follows:-

a- *Provide a* ***full design*** *followed by reinforcement details with scale of 1:50* ***FOR ONLY strip I-I.***

b- ***Sketch*** *with a suitable scale the total RFT of slabs for the whole plane.*

c- *Estimate the load carried over column* ***C1****,followed by a design as a* ***tied rectangular column****. Then, With the same estimated load , Re-design column* ***C1*** *as a* ***spiral one.***

d- *Redesign the column of C1 as a* ***composite section*** *with I.P.E 200 A_{shape}=2850 mm^2 f_y=300 N/mm^2.*

e- *IF you know that the building is* ***braced in both directions****, design Column* ***C2*** *with a predicted dimensions about* ***(300x700)mm^2*** *to resist an ultimate load of* ***P_u=3000 kN.***

f- *without calculation and step by step provide how can you* ***check deflection*** *and* ***cracking.***

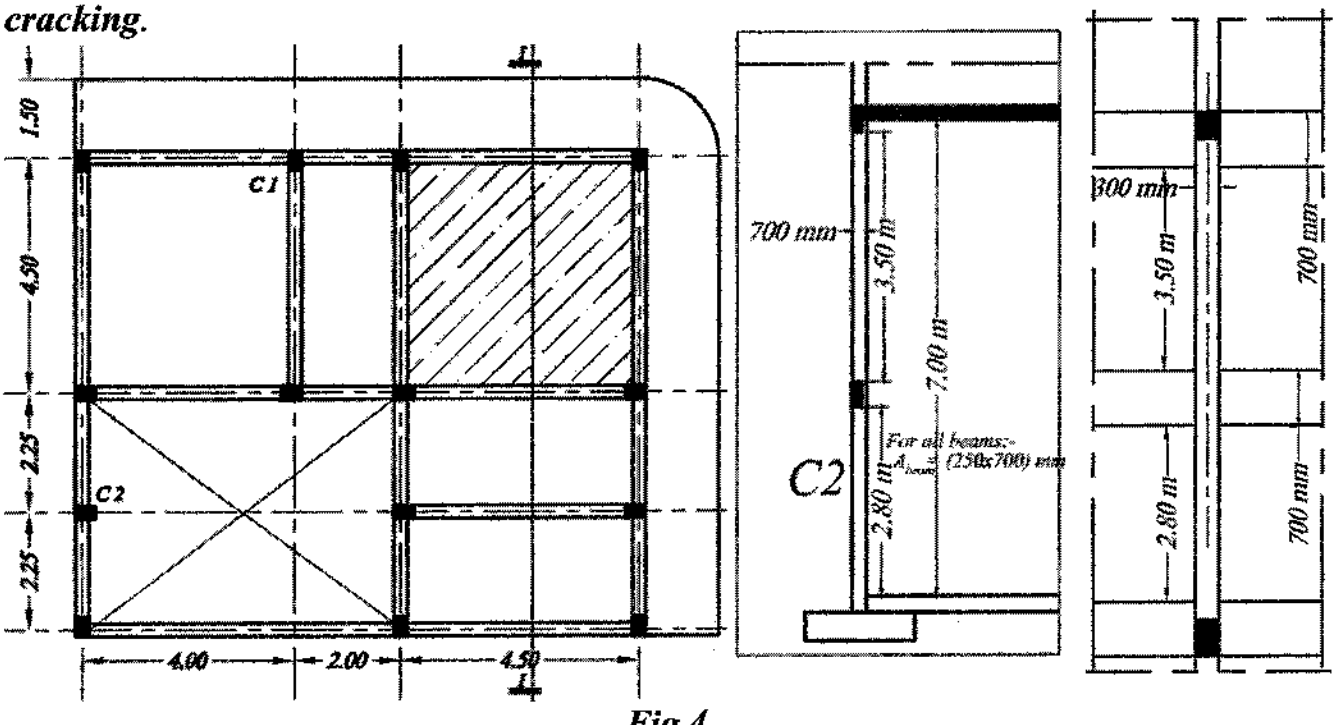

Fig.4

مع خالص دعواتي القلبية بالاستفادة الكاملة بالمنهج المعطي

د.م/ أحمد عبدالله أحمد حموده واللجنه

رمضان مبارك و كل عام و حضراتكم خير