



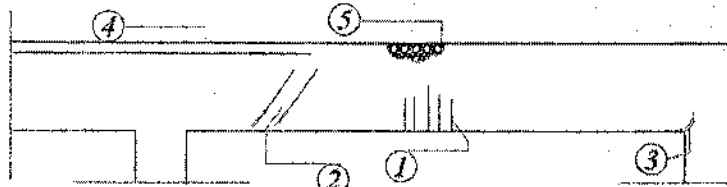
- Answer all the following question.
- Any missing data may be reasonably assumed.
- It is allowed to use the Egyptian code practice for **DESIGN AIDS**
- This exam satisfies ILOS of A4, A5 and A6- B4, B5 and B11- C3, C4 and C6- D1, D2, D6 and D7

يسمح باستخدام جداول ومساعدات التصميم الخرسانية

Question No. 1 (30%):-

a) Analyze the following cracks and State which can be repaired (showing how) or removing the beam.

تعرف على هذه الشروخ ثم حدد أي من هذه الشروخ يمكن ترميمها (مع الشرح) أو إزالة العنصر الإنشائي:



b) Define briefly the following (with sketch if any) الإجابة باختصار مع الرسومات التوضيحية إذا لزم:

Compressive strength of reinforced concrete (f_{cu})-target compressive strength -Shrinkage of concrete-Tensile strength of steel-Concrete tensile strength-Benefits of shrinkage bars-Embedment length (l_d)-Doubly reinforced.

c) Explain briefly and schematically the actual, idealized, designed for concrete compressive strength and steel? (Draw the curves, define briefly)

Question No. 2 (35%):-

a) Define the following:-

Over reinforced section-Cracking moment-Balanced section-Ultimate stage-T,R and L sections.

b) Calculate M_{cr} in Fig.1 ($f_{cu}=35 \text{ N/mm}^2$ - $f_y = 350 \text{ N/mm}^2$)

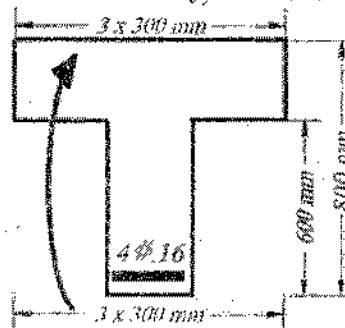


Fig. 1

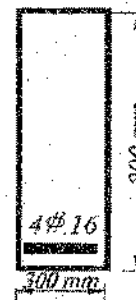


Fig. 2

c) For simply supported beam By knowing that $f_y = 350 \text{ N/mm}^2$ $f_{cu} = 35 \text{ N/mm}^2$ for cross section shown in Fig.2. calculate the follows:-

M_{cr} - M_u - M_b - A_s max- A_s min- A_{sb} - M_b - M_u - M_{max}

للشكل Fig. 2، تم تنفيذ أعمال الشد الخشبي وتم تسليم أعمال الحداده، وقبل الصب قامت الجهة المالكة بتغيير النظام المعماري للسقف مما أدى إلى زياده العزوم بنسبه تساوي $(1.1 * M_{max})$ ، اقترح حلين لتلك المشكله مع تقديم حسابات لاحد الحلين فقط. (فك الشد الخشبي مرفوض)

St. grade	240/350	280/450	360/520	400/600	450/520
R_{max}	0.214	0.208	0.194	0.187	0.180
μ_{max}	$8.56 * 10^{-4} f_{cu}$	$7.0 * 10^{-4} f_{cu}$	$5.0 * 10^{-4} f_{cu}$	$4.3 * 10^{-4} f_{cu}$	$3.65 * 10^{-4} f_{cu}$
c_{max}/d	0.50	0.48	0.44	0.42	0.40



Question No. 3 (40%):-

The given structural plan is for floor slab designed based on the following data:

Slab thickness (t_s) = 140 mm- Floor covering (F.C) = 1.50 kN/m²- Live Load (L.L) = 2.00 kN/m²- Wall density (γ_w) = 12 kN/m³- Wall thickness = 250 mm- Clear height is (h_{wall}) = 2.30 m- Column width = 300 mm- f_{cu} = 35 N/mm² & f_y = 350 N/mm².

It is required to:-

- 1- Draw the load distribution for the given structural plan.
- 2- CALCULATE LOADS ONLY for (B1), then by free hand draw reinforcement without calculations.
- 3- FOR B2 with a scale of 1:25 (1.00 m = 4.00 cm for drawing), Draw longitudinal section of reinforcement details of beam B2 respecting both l_a and l_d according to ECP (قيم القص و العزوم لحساب التسليح موضحة اسفل)
- 4- With a scale of 1:10 (1.00 m = 10 cm for drawing), draw cross sections for B2.

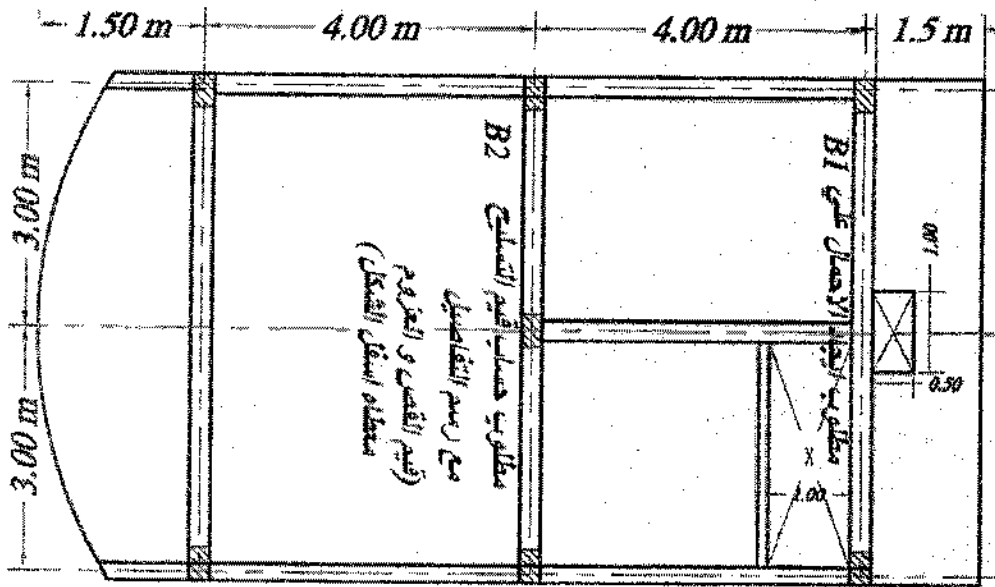


Fig. 3

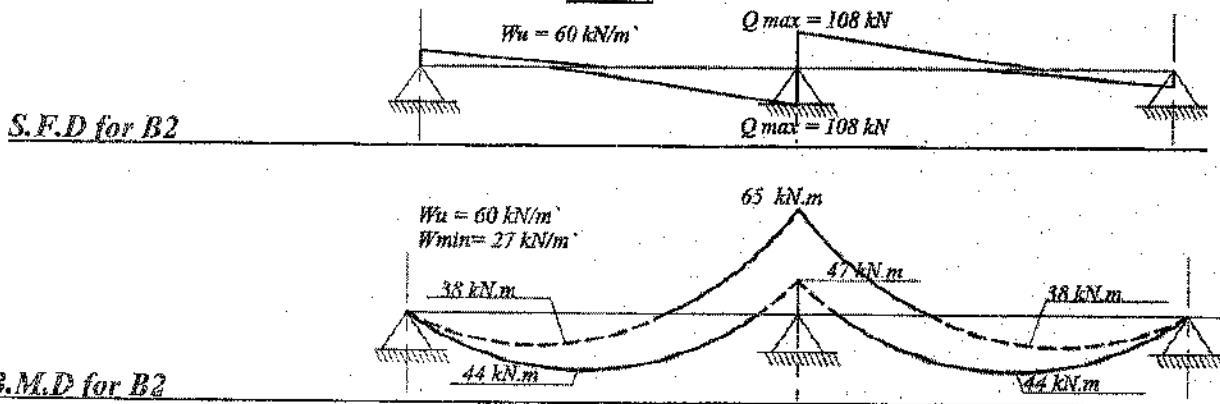


Fig. 4

مع خالص دعواتي القلبية بالاستفادة الكاملة بالمنهج المعطى
 د.م/ أحمد عبدالله أحمد حموده واللجنة