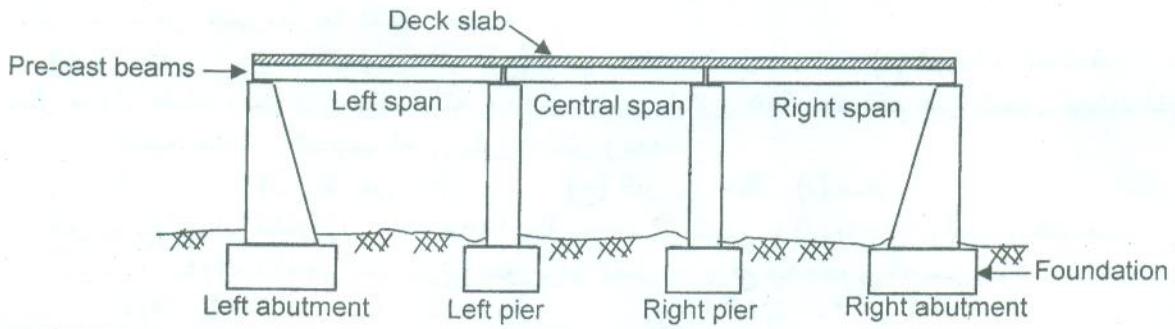
Question 3: (10 Marks)

The following figure shows a sketch of a 3-span bridge. The activities involved are given in the table below. Each activity will be executed by a single crew.

a. Assuming resources are available whenever required, specify logical relationships of activities. **(5 marks)**

b. If resources are limited to ONLY one crew for each type, revise logical relationships of activities specified in (a) above. **(5 marks)**



ID	Activity Name	Crew Type	ID	Activity Name	Crew Type
A	Set up site	---	J	Construct left abutment	P
B	Excavate left abutment	E	K	Construct left pier	P
C	Excavate left pier	E	L	Construct right pier	P
D	Excavate right pier	E	M	Construct right abutment	P
E	Excavate right abutment	E	N	Erect beams, left span	C
F	Foundation left abutment	F	O	Erect beams, central span	C
G	Foundation left pier	F	P	Erect beams, right span	C
H	Foundation right pier	F	Q	Deck slab	P
I	Foundation right abutment	F	R	Clear site	---
E: Excavation Crew, F: Foundation crew, P: Concreting crew, C: Crane					

السؤال الرابع: (١٨ درجة)

(أ) بعض العبارات الآتية غير صحيح. انقل جميع العبارات إلى كراسة إجابتك مصححة (عند اللزوم) مع التوضيح:

١. في المقاولة من الباطل، يعمل المقاول من الباطل تحت إشراف المقاول الأصلي.

٢. يهدف إعداد طريقة تنفيذ الأعمال (Method Statement) إلى حساب التكلفة المباشرة وتحديد المصاريف الإدارية للمشروع.

٣. لا يكفي المهندس المشرف علي تنفيذ المشروع أن يبذل عناية من في مستواه من المهندسين كما لا يكفي المقاول أن يبذل في تنفيذ المشروع أكبر عناية ممكنة.

٤. يمكن للمقاول من الباطن وكذلك لعمال المقاول الرئيسى رفع دعوى مباشرة علي رب العمل للمطالبه بالأجر.

٥. إذا تم سحب العمل من المقاول، فلرب العمل أن يصادر إما التأمين النهائي أو الآلات أو أدوات المقاول.

٦. ينتهى عقد المقاولة من الباطن بموت المقاول الأصلى إذا كانت مؤهلاته الشخصية محل اعتبار.

٧. إعطاء رد فعل مناسب من قبل المقاول تجاه أحد أنواع المخاطر يلغى تأثيرها على المشروع.

٨. لرب العمل الحق في فسخ العقد مع المقاول في الحال إذا امتنع المقاول عن العدول عن طريقة التنفيذ المعيبة.

(ب) انقل رقم السؤال ورقم الإجابة الصحيحة فقط (مع توضيح الحسابات الضرورية:) **(١٠ درجات)**

١. أفضل وسيلة لتحديد معدلات الأداء:

(أ) الكتب والنشرات المتخصصة فى هذا المجال. (ب) خبرات المهندسين ورؤساء العمال

(ج) المعدلات المسجلة من المشروعات المماثلة السابقة.

٢. إذا كانت التكاليف المباشرة لبند ما ٤٠٢٣٠جنيه، التكاليف المباشرة للمشروع ٢٧٠٠٠٠٠جنيه، إجمالي قيمة العطاء ٣٢٠٠٠٠٠جنيه، فان سعر هذا البند عند عمل عطاء متوازن يكون:

(أ) ٤٧٦٨٠جنيه (ب) ٤٧٨٦٠جنيه (ج) ٤٧٠٦٨٠جنيه

٣. يستطيع رب العمل تمكين المقاول من إنجاز المشروع عن طريق:
(أ) حل المشاكل مع الهيئات العامة للمرافق (ب) عدم تغيير تصميمات المشروع
(ج) زيادة الدفعة المقدمة (د) كل ما سبق.

٤. مدة الضمان لمشروع عمره الافتراضى ٥ سنوات هى:
(أ) سنة واحدة (ب) ٥ سنوات (ج) ١٠ سنوات

٥. المسؤول عن حساب التكلفة واعداد العطاءات:
(أ) المهندس (Engineer) (ب) مقرر التكلفة (Estimator) (ج) وكيل المشروع (Agent)

٦. العامل المحدد فى اختيار طريقة التنفيذ المناسبة:
(أ) أقل تكلفة (ب) أقل زمن تنفيذ (ج) توافر عناصر العمل (د) الجودة و السلامة.

٧. اختار مقاول هامش ربحه فى عطاء قيمته ٢٠٠٠٠٠٠جنيه ليكون ٥%. عند تقدم نفس المقاول لعطاء آخر قيمته ٥٠٠٠٠٠٠جنيه، فانه من المناسب له أن يكون هامش ربحه:
(أ) ٥% (ب) أقل من ٥% (ج) أكبر من ٥% (د) صفر.

٨. إذا كان تاريخ التسليم الابتدائي ١٩٩٥/٤/١٠ وتاريخ التسليم النهائي ١٩٩٦/٤/٢٤ وأثبت المالك حدوث تهدم كلى بتاريخ ٢٠٠٥/٤/١٠، فان آخر تاريخ يحق لرب العمل أن يرفع فيه دعوى الضمان هو:
(أ) ٢٠٠٥/٤/٩ (ب) ٢٠٠٨/٤/٩ (ج) ٢٠٠٦/٤/٢٣.

السؤال الخامس: (١٤ درجة)

(أ) يوضح الجدول التالى عطاء متوازن وآخر غير متوازن لمشروع مكون من ٥ بنود. المطلوب دراسة تأثير تحميل الأسعار على أرباح المقاول اذا زادت كمية العمل المنفذة بالبند ٤٠ بمقدار ٢٥%. هل يعتبر ذلك فى مصلحة المالك أم المقاول؟ ولماذا؟ **(١٠ درجات)**

(ب) ما الأسلوب الذى يجب أن يتبع لتقييم العطاءات محملة الأسعار بطريقة غير متوازنة؟ **(٢ درجة)**

(ج) لماذا لا يحتاج المقاول لتحميل الأسعار عند استخدام دفتر الكميات المرتبط بطريقة التنفيذ؟ **(٢ درجة)**

البند	الكمية	عطاء متوازن (١٠٠٠)		عطاء غير متوازنا(١٠٠٠)	
		سعر الوحدة	الاجمالى	سعر الوحدة	الاجمالى
١٠	١٠٠	٥	٥٠٠	٨	٨٠٠
٢٠	١٠٠	١٠	١٠٠٠	١٤	١٤٠٠
٣٠	١٠٠	٢٠	٢٠٠٠	٢٠	٢٠٠٠
٤٠	١٠٠	٢٠	٢٠٠٠	١٤	١٤٠٠
٥٠	١٠٠	١٠	١٠٠٠	٩	٩٠٠
		الاجمالى	٦٥٠٠		٦٥٠٠

السؤال السادس: (١٥ درجة)

تنص الفقرة الأولي من المادة ٦٦٣ من القانون المدني علي: "**لرب العمل أن يتحلل بإرادته المنفردة من العقد و يوقف التنفيذ فى أى وقت بعد إتمامه، على أن يعوض المقاول عن جميع ما أنفقه...**".

١. فى ضوء دراستك، صحح ما فى العبارة السابقة من أخطاء. **(١ درجة)**
٢. ما المقصود بالعقد فى الفقرة السابقة. وماهى أركانه. **(٢ درجة)**
٣. ما المقصود بإرادة رب العمل المنفردة. **(١ درجة)**
٤. لماذا أعطى القانون هذا الحق لرب العمل دون المقاول. **(١ درجة)**
٥. ما هى شروط تحلل رب العمل بإرادته المنفردة من العقد. **(٢ درجة)**
٦. ما الذى يترتب على تحلل رب العمل بإرادته المنفردة من العقد. **(١ درجة)**
٧. عن ماذا يعوض المقاول اذا تحلل رب العمل من العقد. ما هى الحالات التى يمكن للمحكمة أن تخفض فيها تعويض المقاول. **(٢ درجة)**
٨. هل يمكن للمقاول الأصلى أن يتحلل بإرادته المنفردة من العقد. اذا كانت الاجابة نعم، متى يمكنه ذلك **(١ درجة)**
٩. ما هى الصور الأخرى الغير مألوفة لانتهاء العقد، وما هى الصور المألوفة. **(٢ درجة)**
١٠. هل يعتبر موت رب العمل سبب لانتهاء العقد، و لماذا. **(٢ درجة)**

Tanta University	Faculty of Engineering	Structural Eng. Department
Final Term Exam	3rd Year (Structural)	Construction Proj. Mang. (1)
Date: 14/06/2011	Code: CSE3231	Time allowed: 3.0 hours

Answer all questions. Any missing data may be reasonably assumed. ***(Full Marks: 85)***

Question #1: (9 Marks)

The table below gives data required to schedule a small contract of 6 similar units. A minimum buffer of 6 days should be maintained.

a. Draw the contract LOB. State overall duration of the contract. **(6 marks)**

b. Give a suggestion as to how overall duration of the contract could be reduced. **(3 marks)**

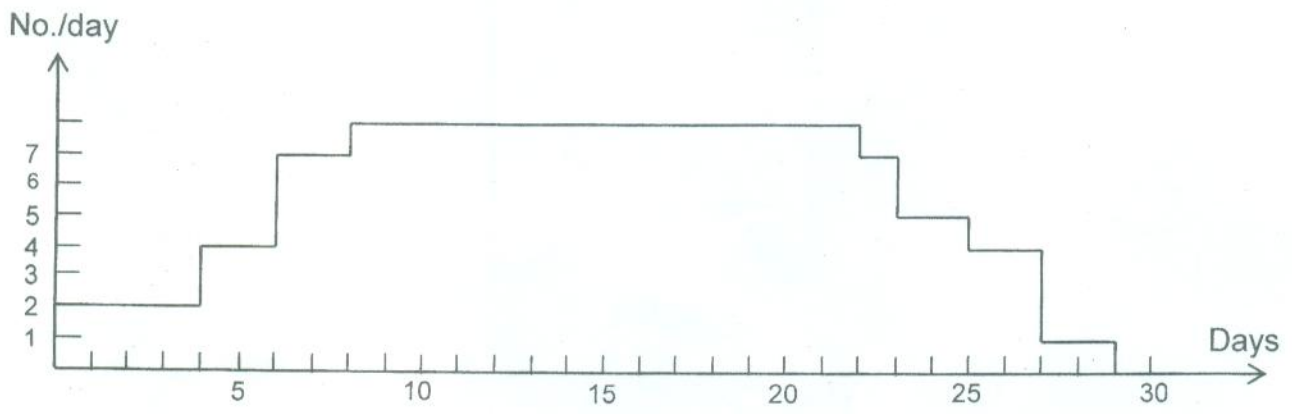
Sequence of activities	Unit duration (days)	Slope of LOB
X	11	1/11
Y	13	1/13
Z	11	1/11

Question #2: (20 Marks)

The activities given in the table below represent a section of work being undertaken by a subcontractor. The activities' predecessors, duration, early start, total float, free float and labour requirements are also listed. The labour profile made up of the preferred limits chosen by the subcontractor is shown in the figure below.

What are the scheduled timings of the activities that satisfy the preferred profile?

Activity	Predecessor s	Duration	ES	TF	FF	No. of Labour
K	---	4	0	0	0	2
L	K	2	4	19	7	3
M	K	6	4	9	0	4
N	K	9	4	0	0	4
O	N	10	13	0	0	4
P	M	3	10	12	0	3
Q	M	8	10	9	9	4
R	L, P	2	13	12	12	2
S	O	4	23	0	0	2
T	Q, R, S	2	27	0	0	1



Best Wishes: ***Prof. Adel Eldosoky***

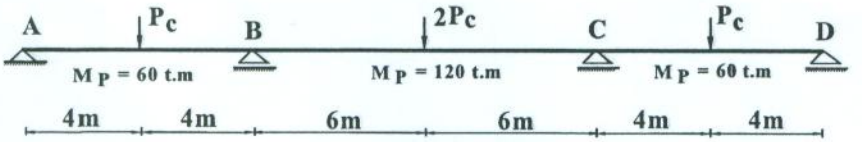


Fig. (3-b)

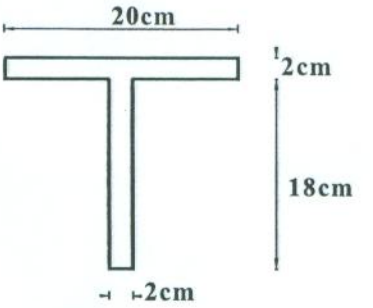
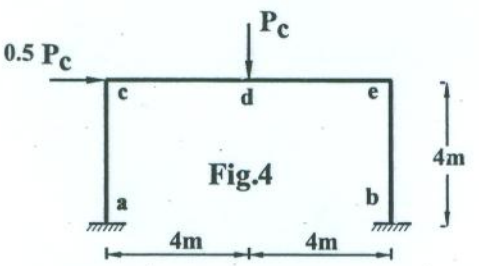
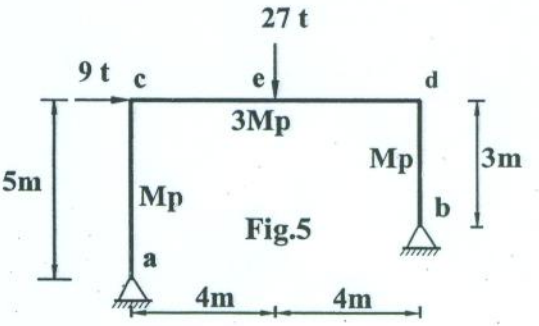


Fig.(3-a)

4- Problem (4) 13 Marks:

Determine the collapse load p_c for the given portal frame shown in Fig.(4), if the plastic moment Mp= 60 t.m is constant for the beam and columns . Also draw the corresponding collapse **B.M.D**





5- Problem (5) 15 Marks:

The two-hinged frame shown in Fig. (5) carries vertical and horizontal loads. If the plastic moment Mp= 30 t.m, determine:

(a) The critical collapse mechanism.

(b) The load factor against collapse.

(c) The B.M.D at collapse.

With the best wishes

Course Examination Committee

Prof. Dr. Mohamed A. Kasem

Dr. Tarek Mohamady Khalifa

Course Title: Structure Analysis (3) (ب)	Course Code: CSE3122	Year: Third Year (هندسة إنشائية - لائحة جديدة)
Date: June, 2011 (Second term)	Allowed time: 3 hrs	No. of Pages: (2)

Remarks: (answer the following questions… assume any missing data…)

1- Problem (1) 15 Marks:

For the given indeterminate beam shown in Fig. (1) construct the influence lines for Y_a, M_a, Y_b, Q_{s-s} and M_{s-s}.

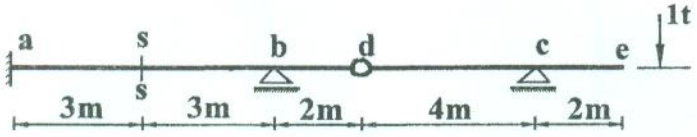


Fig. 1

2- Problem (2) 17 Marks:

For the given two hinged frame shown in Fig. (2), construct the influence lines for Y_a, X_a, N_{s-s}, Q_{s-s} and M_{s-s}.

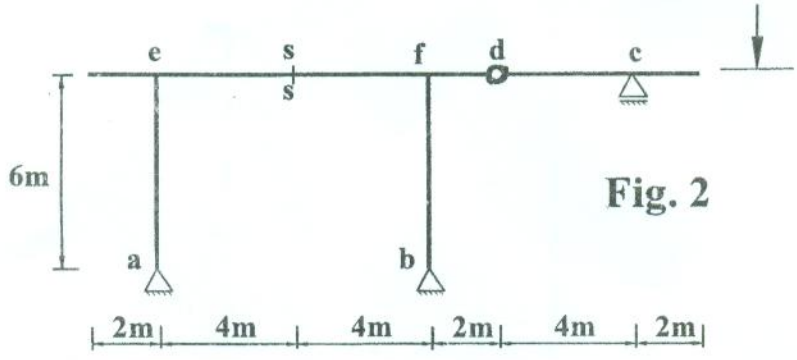


Fig. 2

3- Problem (3) 15 Marks:

Find the plastic modulus and plastic moment for the sections shown in Fig.(3-a) and Fig.(3-b) if the yield stress is 2.5 t/cm^2.

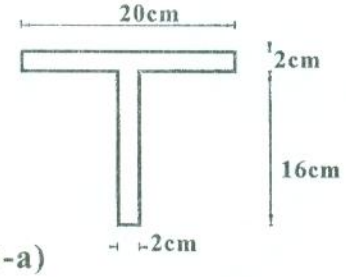


Fig.(3-a)

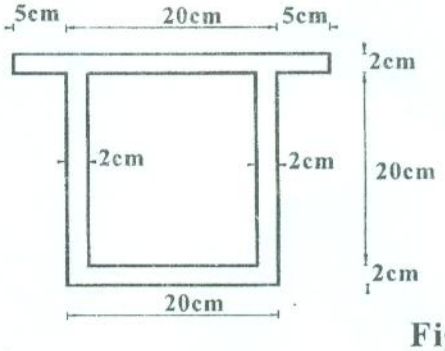


Fig.(3-b)

4- Problem (4) 15 Marks:

For the given continuous beam ABCD as shown in Fig.(4) each span has different section and thus plastic moment. Determine the collapse load p_c and draw the corresponding collapse **B.M.D** .

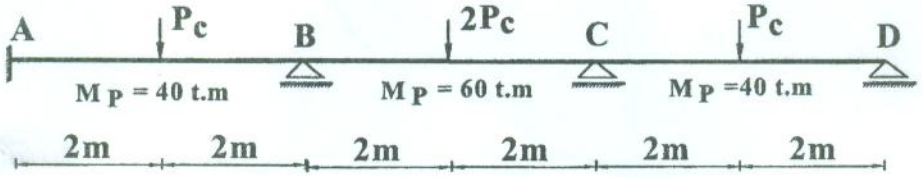


Fig. (4)

5- Problem (5) 15 Marks:

For the given portal frame fixed at **a** and hinged at **b** as shown in Fig.(5), the plastic moment of each column equal 50 t.m and the plastic moment of the beam equal 100 t.m . It is required to determine the load factor at collapse of the frame. Also draw the corresponding collapse **B.M.D**

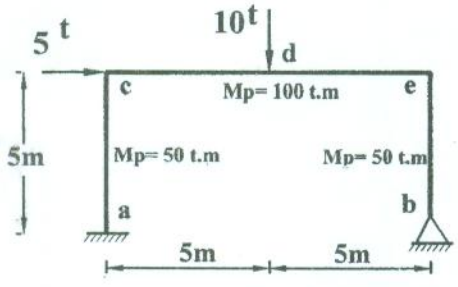


Fig.5

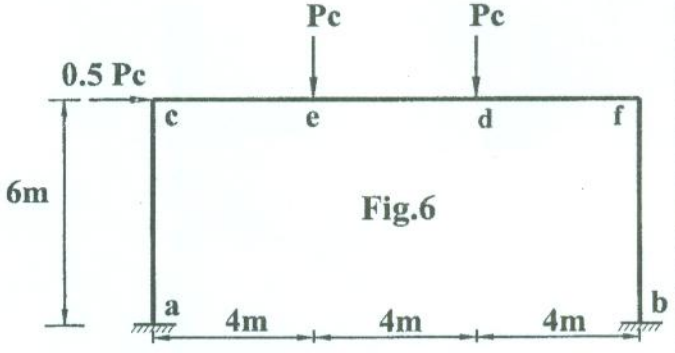


Fig.6

6- Problem (6) 17 Marks:

For the given frame fixed at **a** and **b** as shown in Fig.(6), the plastic moment M_p=60 t.m is the same in all members . Determine collapse load p_c and draw the collapse **B.M.D**

With the best wishes

Course Examination Committee

Prof. Dr. Mohamed A. Kasem

Dr. Tarek Mohamady Khalifa

Tanta University

Department: Structural Engineering
Total Marks: 70 Marks

Faculty of Engineering

Course Title: Structure Analysis (3) | Course Code: CS3201 | Year: Third Year (هندسة إنشائية – لائحة قديمة)
Date: June, 2011 (Second term) | Allowed time: 3 hrs | No. of Pages: (2)

Remarks: (answer the following questions… assume any missing data…)

1- Problem (1) 15 Marks:

For the given beam shown in Fig. (1) construct the influence lines for the reactions Y_a and Y_b.

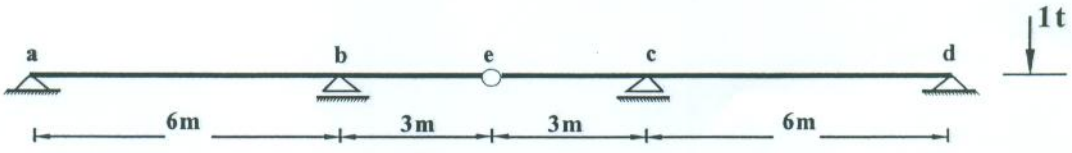


Fig. 1

2- Problem (2) 17 Marks:

For the given frame shown in Fig. (2), construct the influence lines for the reactions at **a** and **b**. Also construct the influence lines of the straining actions **(N, Q and M)** at sections **s-s**

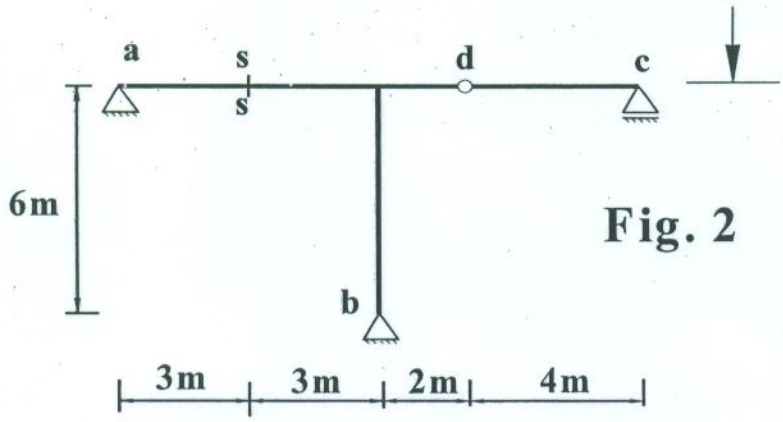


Fig. 2

3- Problem (3) 18 Marks:

a- Find the plastic modulus and plastic moment of the section shown in Fig.(3-a), if the yield stress is 2.5 t/cm2.

b- For the given continuous beam ABCD as shown in Fig.(3-b), each span has different section and thus plastic moment. Determine the collapse load p_c and draw the corresponding collapse **B.M.D .**

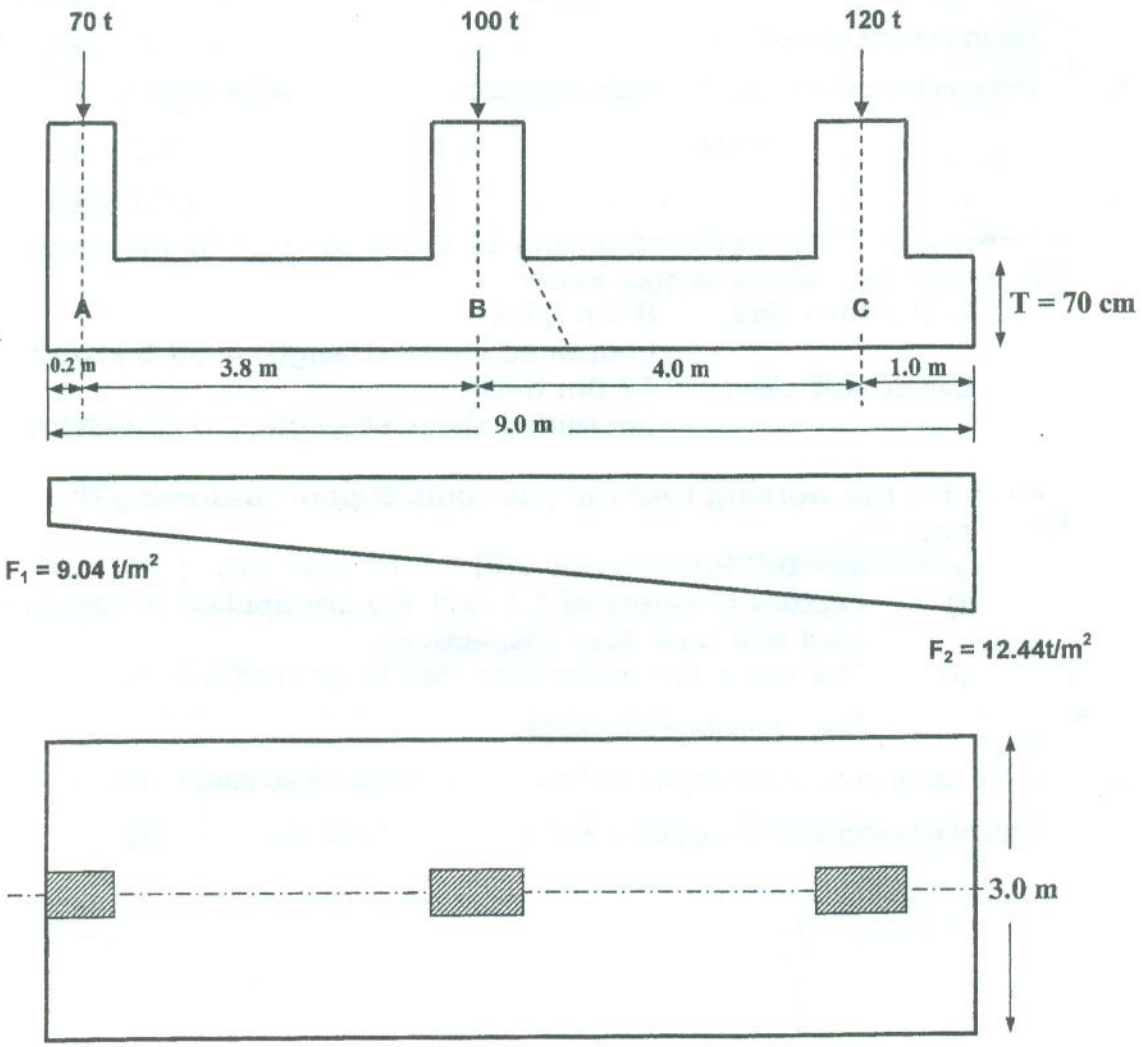
Question No. (6) (12 point)

The figures show the plan, section elevation and the stress distribution for a strip footing. The allowable net soil pressure is 1.25 kg/cm^2 and the thickness of plain concrete=20 cm. The left column is (30 x 40) cm, and both the middle and right columns are (30 x 70). You are required to:

(i) Determine the maximum negative moment in the span AB **(4 point)**

(ii) Check the shear stress at the right of the middle column **(4 point)**

(iii) Determine the reinforcement in the transfer direction under the right column **(4 point)**



Best of luck

Question No. (4) (16 point)

(a) Discuss in details the problems encountered with footing adjacent to property line showing the different structural solutions **(3 point)**

(b) Given rectangular footing (4.5 x 2.5) m, the number of steel reinforcement in short direction $= 42\,\Phi_{16}$, the number of steel reinforcement in long direction of $= 20\,\Phi_{16}$
Draw sectional elevation of the footing showing the bars distribution **(3 point)**

(c) Given the vertical load of 40 cm square column = 100 t and the net allowable soil pressure is 0.90 kg/cm^2. Determine **only** the dimensions of the reinforced concrete footing and draw section elevation of both the plain and reinforced footings if:

(i) the thickness of plain concrete = 20 cm **(2 point)**

(ii) the thickness of plain concrete = 50 cm **(2 point)**

(d) Using clear sketch, discuss how to check punching in raft foundation **(3 point)**

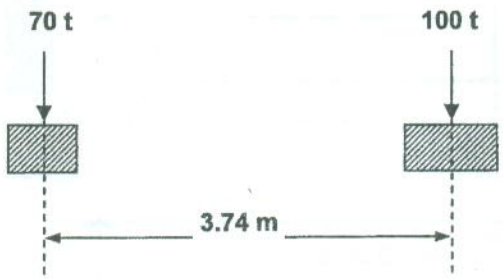
(e) Discuss in details how to design smell beams to resist:

(i) Differential settlement (ii) Lateral loads **(3 point)**

Question No. (5) (14 point)

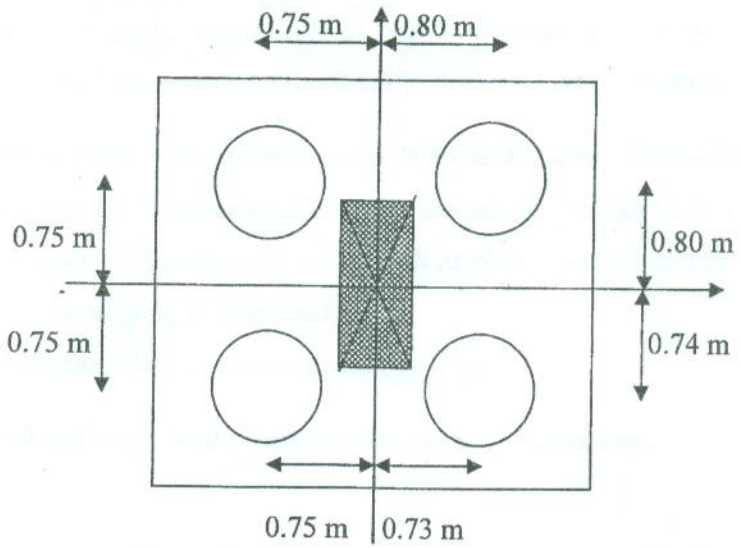
The figure shows the plan of two adjacent columns. The left column is (30 x 40) cm and carries 70 t and the right column is (30 x 60) cm and carries 100 ton. The distance center to center of columns is 3.74 m and the allowable net soil pressure is 1.00 kg/cm^2. Considering the projection of the footing of the outer face of the left column is 50 cm and the thickness of plain concrete layer=20 cm.

Give complete design of the reinforced concrete combined footing for the two columns. **(14 point)**



Question No. (2) (14 point)

For the shown forth piles cap if the safe pile load is 70 tons and pile diameter is 50 cm if the column load is 280 tons check the safety for this pile caps

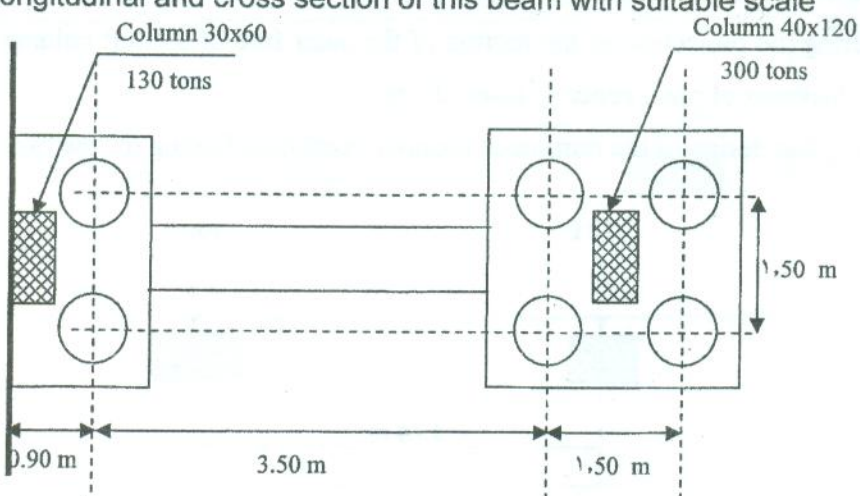


Question No. (3) (14 point)

(a) b) For the pile cape shown in figure (1), if the allowable pile load is 90 tons, the pile diameter is 0.60 m and piles spacing is 1.50

1-Design the strap beam and internal cap **(8 points)**

2- Drawn a longitudinal and cross section of this beam with suitable scale **(6 points)**



Tanta University
Faculty of Engineering
Structural Engineering Department
3rd year Civil (structure Engineering)

Design of Foundations (1); CSE3232
Term Exam, June. 2011
Saturday; 18 / 6 / 2011
Allowable time: 3 hours

٣ (هندسة إنشائية – لائحة جديدة) - تصميم الاساسات (١)

Answer all the following questions. (Exam mark =85)

Question No. (1) (15 point)

Use Clear sketches:

A. What are the different types of pile foundations?.....(02 Points)

B. Some situations lead to the down drag on a pile. What are the precautions to be taken in such cases?.....(02 Points)

C. Discuss the defects due to construction technique in different types of piles. .....(02 Points)

D. .....(06 Points)

A bored pile, 750mm diameter and 12.0m long, is to be installed on a site where two layers of clay exist:

Upper firm clay; 8.0m thick;
undrained shear strength = 50.0 kN/m^2.

Lower stiff clay; 12.0m thick;
undrained shear strength = 120.0kN/m^2.

Determine the working load the pile could support assuming the following:

i) α = 0.7 for firm clay and 0.5 for stiff clay ; N_c = 9
ii) Factors of safety of 1.5 and 3.0 are applied to the shaft load and base load respectively
iii) The top 1.0m of the firm clay is ignored due to Clay / concrete shrinkage.

E. For the same ground conditions and assumptions described above, determine the length of pile required to support a working load of 1200 kN.....(03 points)

Examiners; Prof. Mohamed A. Sakr; Ass. Prof. Mostafa A. El-Sawwaf & Ass. Prof. Ashraf K. Nazir

VIII- Fig. 3 shows a Vierendeel girder of span 25m. It is required to carry out the following: Draw the B.M.D, S.F.D and N.F.D diagrams of the V.G under the given loads. Draw the reinforcement details of the part marked (A). What are the assumptions must be considered to solve the V.G using the empirical method. **(9 marks)**

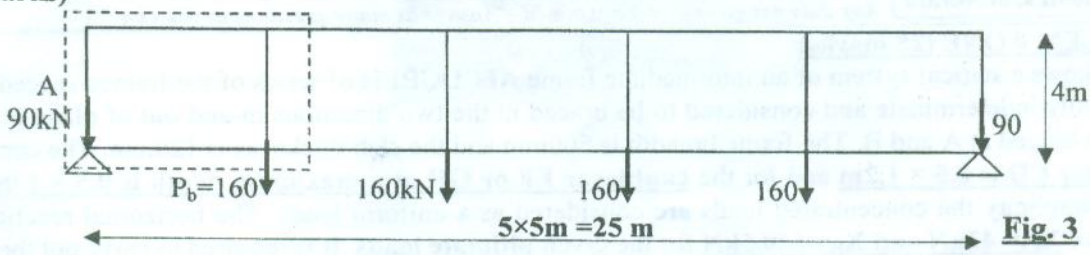


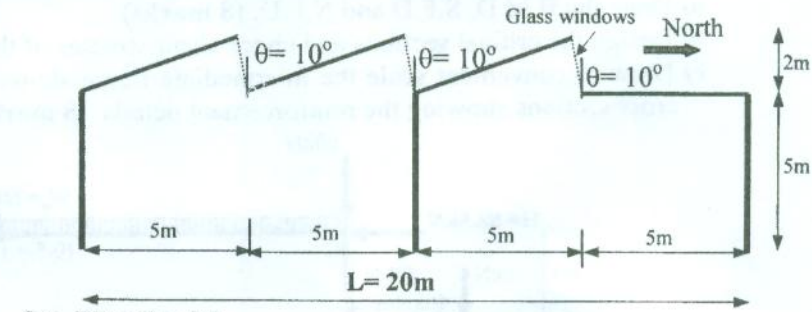
Fig. 3

PROBLEM # THREE (32 marks)

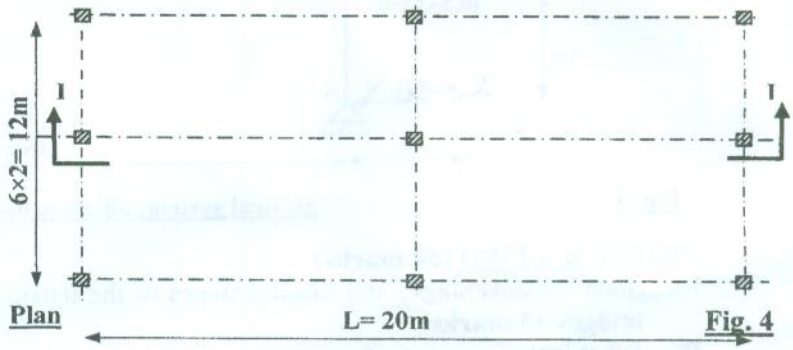
I. Fig. 4 shows a saw – tooth roof structures. The columns shown in figure are only allowed. A uniform stresses under a footings is required. It is required to carry out the following:

a) Draw to convenient scale, sectional elevation showing all necessary structural elements and its concrete dimensions. **(5 marks)**

b) Using diagrammatic sketches show the statical actions of all structural elements "without any calculations". If a uniform stress under footing is required, locate the foundations of the columns showing its reinforcement. What are the requirements for the north light roof structures? **(5 marks)**



Sec. Elevation I-I



Plan **Fig. 4**

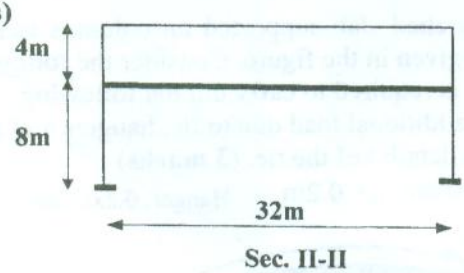
II. Fig. (5) shows a plan of an industrial hall **(32×50m).** The columns are allowed only in the outer perimeter of the hall. The roof is in different levels as shown in sections I-I and II-II as shown in the figure. The spacing between the main supporting elements **(MSE)** is **5m**. It is required to carry out the following:

a. Suggest the systems of more economical **MSE** and for the roof slabs. Draw to convenient scale the sections I-I and II-II and part of plan showing the concrete dimensions of all structural elements. **(7 marks)**

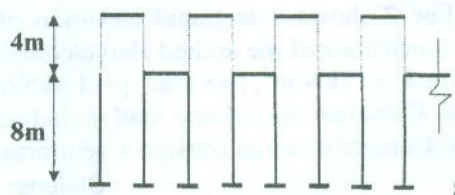
b. Calculate the total ultimate loads carried by the **MSE** of the hall if the average ultimate dead and live loads, (g_u and p_u) of the roof slab are 12kN/m^2 and 5kN/m^2, respectively. The weight of the MSE may be estimated. **(4 marks)**

c. Design the **MSE** of the hall and its elements. **(6 marks)**

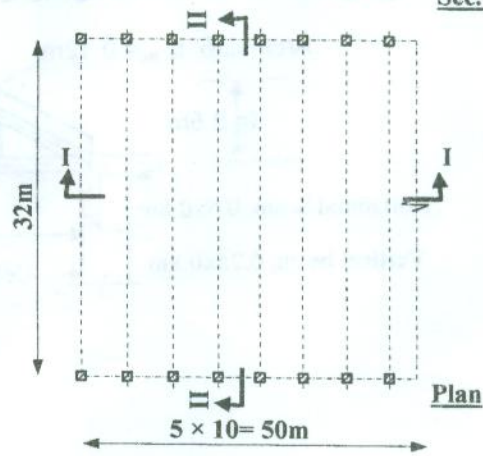
d. Draw to convenient scale the section II-II of the **MSE** showing the reinforcement details of the MSE and its elements. **(5 marks)**



Sec. II-II



Sec. I-I



Plan

Fig. 5

مع أطيب الأمنيات بالتوفيق

أ.د. محمد أحمد قاسم أ.د. طارق فوزى الشافعى

TANTA UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF STRUCTURAL ENGINEERING مدنى وإنشاءات لائحة جديدة
EXAMINATION (THIRD YEAR) STUDENTS OF CIVIL AND STRUCTURAL ENGINEERING

COURSE TITLE: DESIGN OF REINFORCED CONCRETE STRUCTURES (2) b			COURSE CODE: CSE3210/3223
DATE: 11-JUNE-2011	TERM: SECOND	TOTAL ASSESSMENT MARKS: 75	TIME ALLOWED: 4 HOURS

For all problems consider that: f_{cu}=30MPa, St.360/520

Systematic arrangement of calculations and clear neat drawings are essential. Any data not given is to be assumed – Answer as many questions as you can

الإمتحان مكون من 3 أسئلة فى صفحتين

PROBLEM # ONE (25 marks)

Fig. 1 shows a statical system of an intermediate frame AFCDGBEH of series of the frames spaced 5m. The frame is statically indeterminate and considered to be braced in the two directions in-and-out of plane of the frame. The frame is hinged at A and B. The frame breadth is 500mm and the slab thickness is 120mm. The concrete section of the **girder CD is 0.5 × 1.2m** and for the **cantilever EF or GH at a maximum depth is 0.5 × 1.0m**. For the sake of the simplicity the concentrated loads are considered as a uniform loads. The horizontal reactions at hinges A and B are **XA= 42kN and X_B= 130.5kN** for the given **ultimate loads**. It is required to carry out the following:

a) Draw the B.M.D, S.F.D and N.F.D. **(8 marks)**

b) Design the critical sections and check shear stresses of the frame. **(9 marks)**

c) Draw to convenient scale the intermediate frame showing clearly the concrete dimensions in elevation and in cross sections showing the reinforcement details. **(8 marks)**

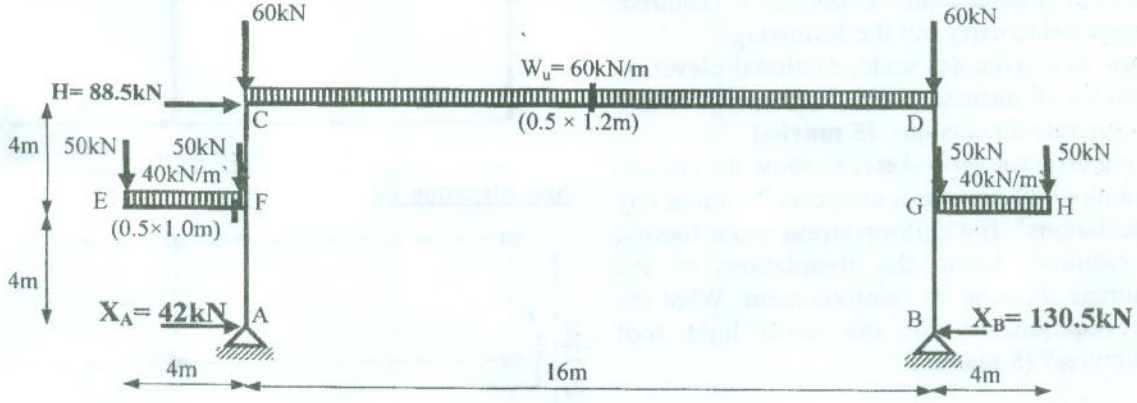


Fig. 1 **Statical system, ultimate loads and horizontal reactions**

PROBLEM # TWO (30 marks)

I- State the advantages and disadvantages of the tension structure. Explain the load transfer of the suspension bridges. **(3 marks)**

II- What is the meaning of more economy main supporting elements? **(2 marks)**

III- Why the horizontal reaction of the three hinged arch is increased by 5% than that of the two hinged arch? **(1 mark)**

IV- State the significances of the stiffeners in the arched slabs. Why the system of the arched slab is chosen 3-hinged? What is the importance of each element of the arched slab? **(5 marks)**

V- Why the spacing between the windows centerlines of the saw – tooth roof structures don't exceeds than 10m. **(1mark)**

VI- How obtain a uniform stress under footing subjected to vertical, horizontal forces and bending moment. **(2 mark)**

VII- Fig. 2 shows a sectional elevation of an arched slab supported on columns spaced, S= 5m. The concrete dimensions of the arched slab elements are given in the figure. Consider the following loads of the slab: dead load, g= 5kN/m^2, live load, p= 1.5kN/m^2. It is required to carry out the following:

a- Calculate the column load including the additional load due to tie, hangers and stiffener. **(4 marks)**

b- Complete design (design + reinforcement details) of the tie. **(3 marks)**

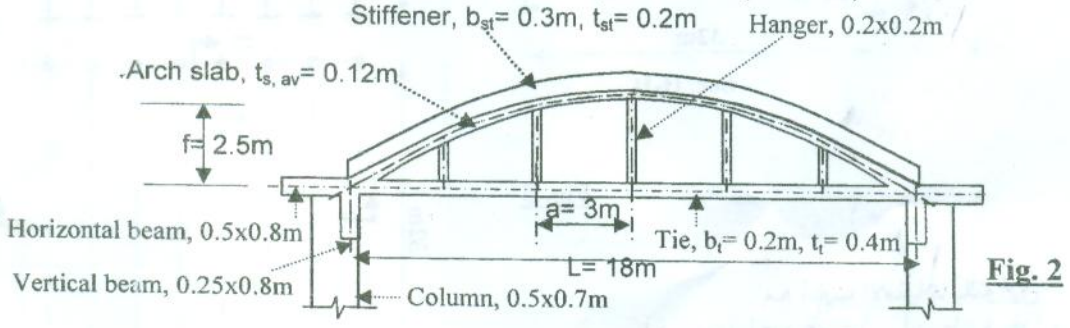


Fig. 2

Please Turn Over ⟶

Question 2:

a. Design the beam column (a-c) of the frame shown in Fig. (2). The straining actions, **neglecting the effect of wind** loads, are as follows:

- At section (a) $M_u = 0$, $P_u = 15$ t compression, and $Q_u = 4.0$ t
- At section (c) $M_u = 30$ t.m $P_u = 15$ t compression, and $Q_u = 4.0$ t

- To calculate the effective buckling length, use the end relative stiffness of the columns as: $\underline{G_a}$ = for (hinge) and $\underline{G_c}$ =1.85.

- Try cross section of the column HEB300mm.

- Use St52 ($F_y = 3.6$ t/cm^2 and $F_u = 5.2$ t/cm^2). **(14 %)**

b. For the typical beam - column connection at (c), it is required to be designed as Category **(C).** The connection is subjected to : **(36 %)**

$M_u = 22$ t.m.
$P_u = 4.1$ t. (comp.)
$Q_u = V_u = 15.2$ t,

It is required the following:

1- Number of used high strength bolts of type **10.9**.
2- Check of weld between the end plate and the rafter of the frame.
3- Thickness of end plate connecting the rafter and the frame column.
4- Check of panel-zone web shear (Refer to page 10-7, 10-8 and 10.9) of ECP2008 LRFD, first edition.
5- Do you need additional stiffeners at the corner? (Refer to page 10-10 and 10.11) of ECP2008 LRFD, first edition.
6- **Draw** the part enclosed by dotted rectangle to scale **1:10.**

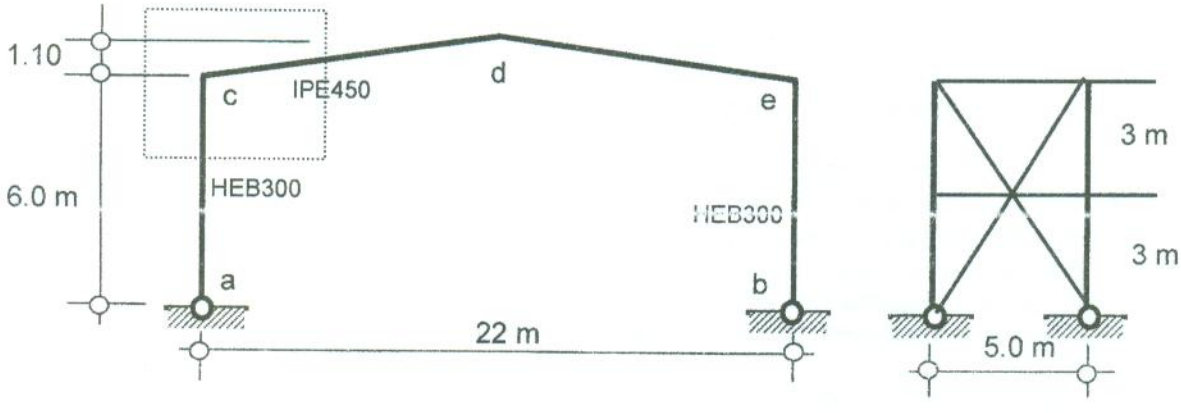


Fig. (2)

Question 3: (10 %)

a- Without calculation draw to scale 1:10 different views of the following items:
   i. Typical composite beam.
   ii. Typical composite slab.
   iii. Types of composite columns.

b- Fig. (3) shows a composite column of the type concrete-encased I-section. The maximum normal ultimate load is 210 ton. The used reinforcement is 8 bars of 16 mm diameter. The yield and ultimate stresses of the steel profile and reinforcement are 3.6 t/cm^2 and 5.2 t/cm^2, respectively. The characteristic 28-days cube strength of concrete (f_{cu}) is 0.300 t/cm^2. The effective buckling lengths of the column are ($L_{ex} = L_{ey} = 6.00$ m).

- Check the maximum axial normal force capacity of the column.
- It is also required to find the maximum moment that can be carried by the column using the interaction curve. **(15 %)**

Solution guides:

1- Main column data:
   - Steel section
   - Reinforcement
   - Concrete section

2- Axial Load:
   - Axial column resistance according to the code is given as follows:

$$\phi_c P_n = \phi_c A_s F_{cr}$$

$$F_{ym} = F_{ys} + c_1 F_{yr} \frac{A_r}{A_s} + c_2 F_{cu} \frac{A_c}{A_s}$$

$$E_m = E_s + c_3 E_c \frac{A_c}{A_s}$$

$$\lambda_m = \frac{L_b}{\pi \times r_m} \sqrt{\frac{F_{ym}}{E_m}}$$

$$F_{cr} = \left[1 - 0.384(\lambda_m)^2\right] \times F_{ym}$$

3- Plastic bending moment:
   - Consider $M_n = M_p$

4- Interaction curve:

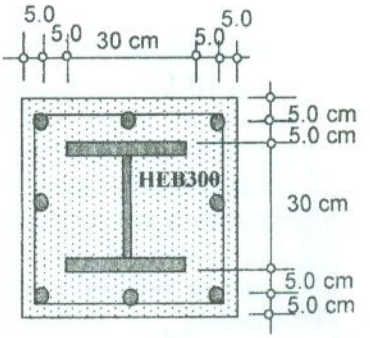
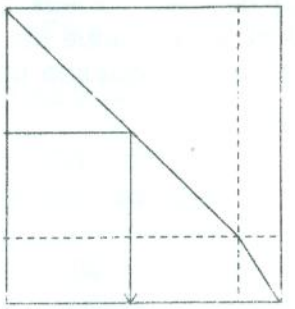


Fig. (3)



"Good luck and may God help you."
Prof. Dr. Mohamed A. Dabaon and the exam. committee

Dept.: Structural Engrg.	**Faculty:** Engineering	**University** : Tanta
Time allowed: 3 hr. **Date:** June 2011	**Course:** Design of steel structures (b)	**Course code:** CSE3224 :

Note:

- It is allowed to use any tables or Egyptian Code of Practice books.
- Any missing data may be reasonably assumed.
- Attempt all questions. Max. Credit 100 % only.
- Number of examination pages: (3).

Question 1:

It is desired to design car-shed units beside the main entrance of the Faculty of Engineering-Tanta University. Each unit should cover an area of **12 x 12** m^2. The suggested statical system is shown in Fig. (1). The spacing between the main systems is **4.0 m**.

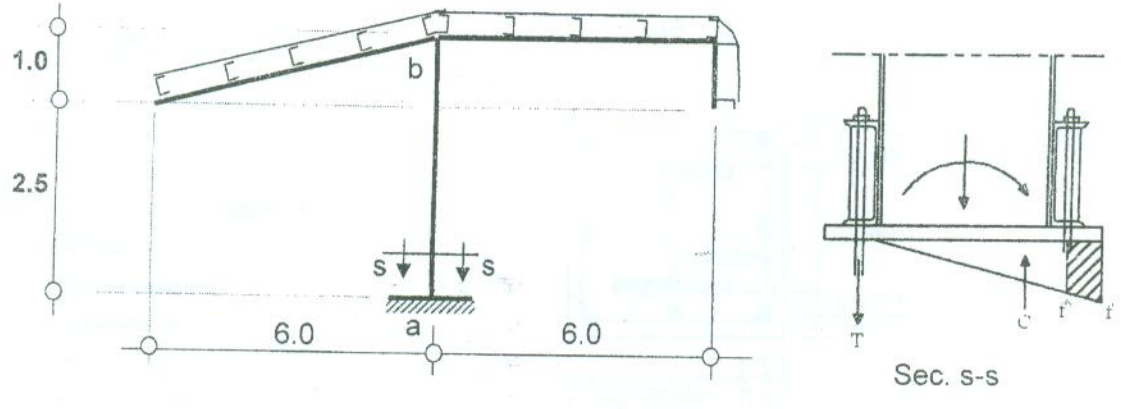


Fig. (1) Statical system of an intermediate frame

The weight of the cover is assumed to be ≈ **10 kg/m²**. Live load intensity is **60 kg/m²** and wind load are to be taken according to Egyptian Code.

For an intermediate main system, it is required the following:

a- Draw to scale 1:100 plan, elevation and side view showing the bracing system. **(15 %)**

b- Calculate the applied loads assuming one meter between each two purlins. **(5 %)**

c- Tabulate the **factored** design **normal force, shearing force** and **bending moment** for the critical sections at a and b (case of loading is necessary). **(10 %)**

d- Design the fixed base at (a) assuming a suitable column dimensions. **(20 %)**

e- Estimate the buckling length of the column. **(02 %)**

IV. A retaining wall of 4.0 high is to be constructed to carry a road with an equivalent traffic L.L. of 1.0 t/m^2 using geotextile reinforcement. A woven geotextile with allowable wide-width tensile strength of 0.73 t/m can be used. The wall is to be backfilled with a granular material that has γ_1=1.76 t/m^3 and ϕ_1= 36°. It is required to **design** the wall considering a safety factor of 1.5. It is required also to **check** the factor of safety against overturning and sliding of the wall if the in situ soil has the following parameters: γ_2= 1.8 t/m^3, ϕ_2 = 15° and c = 0.25 kg/cm^2. **Draw** in full details to an appropriate scale the final chosen dimensions of the geotextile layers and the wall.

Question (5): (15Points)

I. **Write** a brief notes on: a) lime stabilization. and; b) Stabilization by flay ash.

II. **What** are the factors governing the choice of chemical grouting?.

III. A site has a soil profile as shown in Figure 1. It is required to construct a five stories building. **Propose** an appropriate soil improvement method that can be used to improve the weak soil and **suggest** a foundation level and foundation types.

level	Soil description	legend
0 1 2	Fill	
3 4 5 6 7 8	Collapsing soil	
9 10 11 12 13 14 15	Medium to dense sand	

Figure 1. Geological soil profile of the site

Best Wishes..... Prof. Mohamed A. Sakr & Committee

Tanta University | **Soil Improvrement_ Final Term Exam**

Faculty of Engineering | **Third Year Structural Engineering**

Structural Engineering Dept. | **June 2011 _Time Allowed: 3Hrs**

- **Try all questions**
- **Any missing data to be reasonably assumed**

Question (1): (15Points)

I. List the different types of problematic soils – Clarify why each of these problematic soils needs improvement.
II. What are the best methods of foundation on different types of problematic soils?
III. Some situations lead to the down drag on a pile. What are the precautions to be taken in such cases?

Question (2): (15Points)

I. Some precautions have to be taken in site exploration in the case of problematic soils, Discuss with clear sketches.
II. How to find the free swell experimentally in the laboratory.
III. Mention a simple method in the field to confirm the presence of collapsible soils.

Question (3): (25Points)

I. **Where** do soft clay deposits dominate in Egypt.
II. **Illustrate** briefly the reasons behind the need for improvement of soft clays for foundation applications.
III. **Define** what is meant by vacuum consolidation. Using clear sketch, differentiate between Vacuum method and classical surcharge to be used for soft clay improvement.
IV. Using clear sketch, **show** the measures to be considered in the case of vertical drains improvement of deep marine soft clay deposits overlain by granular layer.
V. **Explain** briefly with clear sketch the monitoring techniques to be used in the case of soft clays improvement by vertical drains and vacuum preloading.

Question (4): (15Points)

I. **Discuss** the similarity between soil and concrete upon which the soil reinforcement technique is based.
II. **State** the main types of soil reinforcement.
III. Using only clear sketches, **show** the construction procedures and consequences for a geotextile retaining wall.

i-The maximum dynamic shear force in column **ab**.

ii-The maximum dynamic normal stresses in column **ef**.

iii-The amplitude of harmonic load (Fo sin 6.25 t t) acting at the level of girder that gives the same displacement at point (b) due to the ground motion.

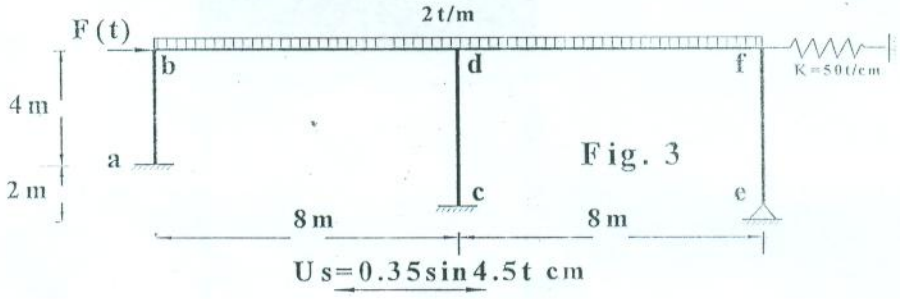


Fig. 3

4- Problem (4) 18 Marks:

The water tank shown in Fig. (4-a), is subjected to the blast loading shown in Fig. (4-b). If the stiffness of the column ab k= 800 t/cm, determine:

i- The lateral displacement of the tank after (0.6 sec).

ii- The maximum shear force in column **ab**.

iii- The amplitude of sinusoidal ground motion (uo sin 5.2 t cm) that gives the same maximum displacement of the tank due to the blast loading.

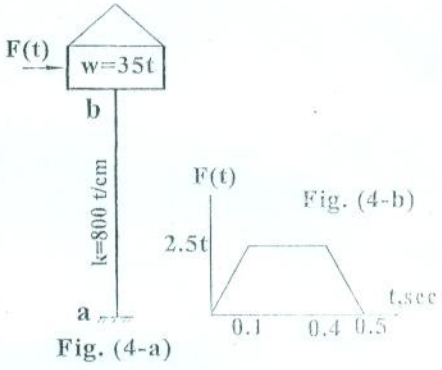


Fig. (4-b)

Fig. (4-a)

5- Problem (5) 24 Marks:

a. Draw the free body diagram and mathematical model for three story shear building and obtain the equation of motion.

b. The shear building shown in Fig. (5-a), is subjected to horizontal dynamic forces shown in Fig. (5-b). If $E = 200 t/cm^2$,and $I = 0.001\ m^4$, determine:

i- The modal shapes.

ii- The modal matrix.

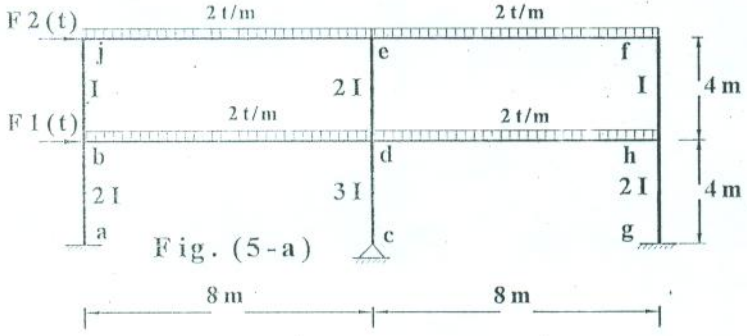


Fig. (5-a)

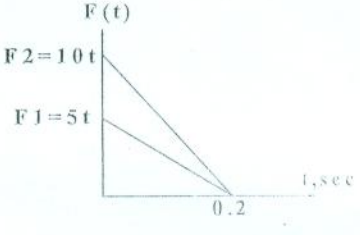


Fig. (5-b)

With the best wishes

Course Examination Committee

Prof. Dr. Saher Raaft Elkhoreby

Dr. Tarek Mohamady Khalifa

Tanta University

Department: Structural Engineering
Total Marks: 85 Marks

Faculty of Engineering

Course Title: Optional course (2) Structural Dynamic | Course Code: CSE3235 | Year: Third Year (هندسة إنشائية - لائحة جديدة)
Date: June, 2011 (Second term) | Allowed time: 3 hrs | No. of Pages: (2)

Remarks: (answer the following questions… assume any missing data…)

1- Problem (1) 15 Marks:

a. Using clear sketches illustrate the difference between:

i- Static and dynamic loading ii- Free and forced vibration

b. The cantilever beam shown in Fig. (1) , supports a machine which exerts vertical harmonic loading F(t) = 7.5 sin 5.5t t. The cross section of the cantilever beam is (30x60 cm) and the modulus of Elasticity of the cantilever beam, E=200t/cm^2. The machine supported on two springs. The stiffness of each spring is 10t/cm. The weight of the machine W= 5.0t and the damping ratio =4%. Draw the mathematical model and determine:

i- The natural frequency and time period of vibration.

ii- The maximum dynamic normal stresses in the beam.

iii- The maximum dynamic force transmitted to support

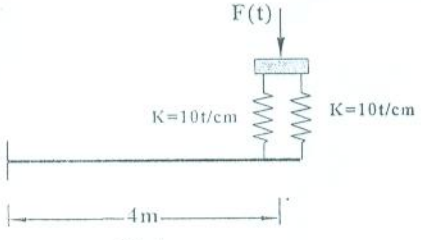


Fig.1

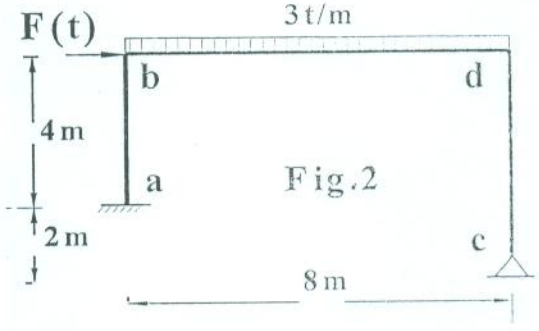


Fig.2

2- Problem (2) 18 Marks:

a. Draw the mathematical model for a damped system subjected to harmonic force and obtain the amplitude of the steady state motion.

b. The frame shown in Fig. (2), is subjected to horizontal dynamic force at the girder level F(t)=10sin 10t t, with damping ratio = 4% if the cross section of columns are (40x100 cm) and E=200t/cm^2 determine:

i- The steady state amplitude.

ii- The maximum dynamic normal stresses in column **ab**

iii- The maximum dynamic force transmitted to foundation.

3- Problem (3) 17 Marks:

For the frame shown in Fig. (3), the columns section are (40x100 cm) and the modulus of elasticity, E=200t/cm^2. If the frame is subjected to the shown harmonic ground motion and assuming damping ratio = 4% determine:

P.T.O.

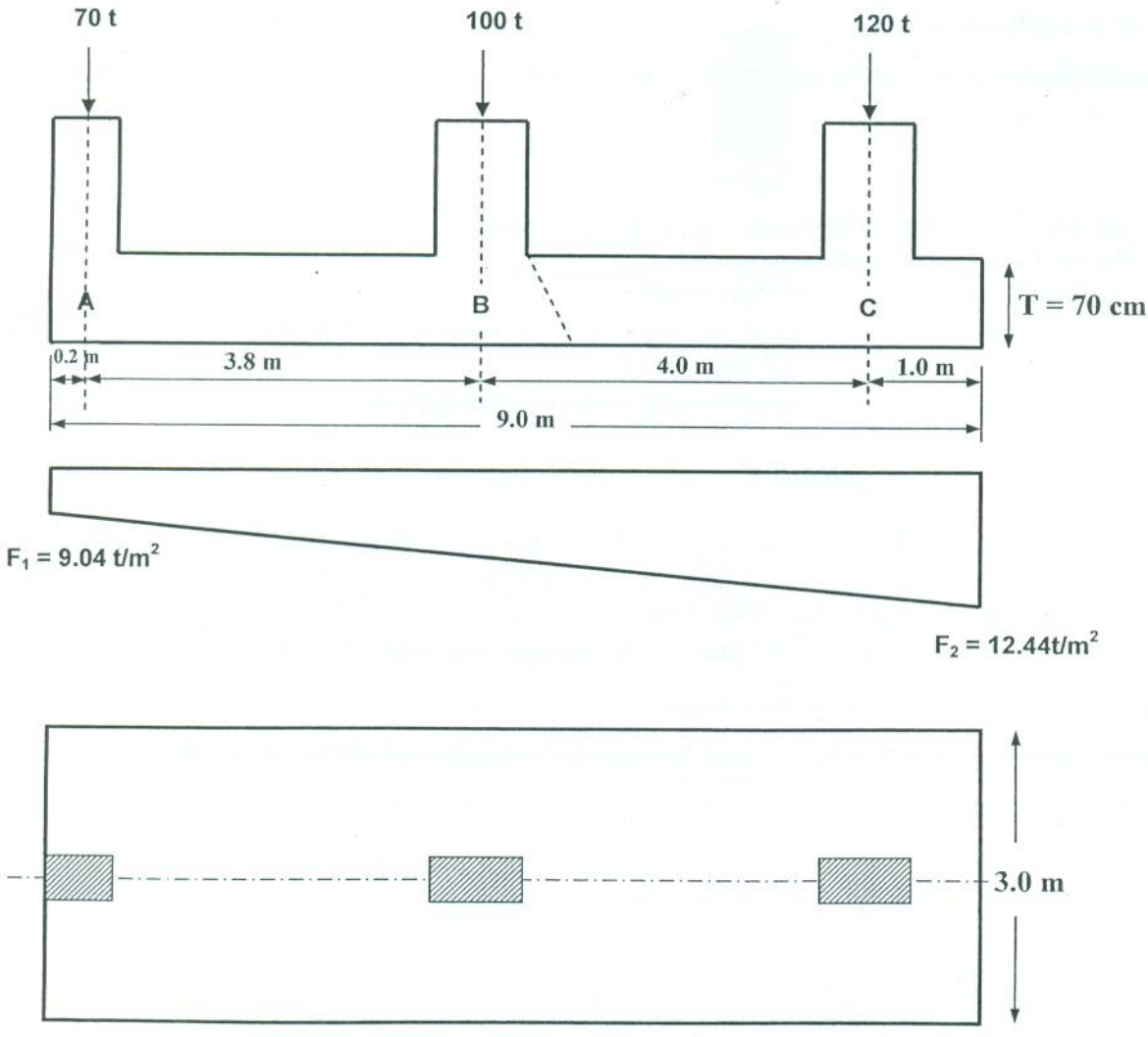
Question No. (6) (12 point)

The figures show the plan, section elevation and the stress distribution for a strip footing. The allowable net soil pressure is 1.25 kg/cm^2 and the thickness of plain concrete=20 cm. The left column is (30 x 40) cm, and both the middle and right columns are (30 x 70). You are required to:

(i) Determine the maximum negative moment in the span AB **(4 point)**

(ii) Check the shear stress at the right of the middle column **(4 point)**

(iii) Determine the reinforcement in the transfer direction under the right column **(4 point)**



Best of luck

Question No. (4) (12 point)

(a) Discuss in details the problems encountered with footing adjacent to property line showing the different structural solutions **(3 point)**

(b) Given rectangular footing (4.5 x 2.5) m, the number of steel reinforcement in short direction $= 42\,\phi_{16}$, the number of steel reinforcement in long direction of $= 20\,\phi_{16}$
Draw sectional elevation of the footing showing the bars distribution **(3 point)**

(c) Given the vertical load of 40 cm square column = 100 t and the net allowable soil pressure is 0.90 kg/cm^2. Determine **only** the dimensions of the reinforced concrete footing and draw section elevation of both the plain and reinforced footings if:

(i) the thickness of plain concrete = 20 cm **(1 point)**

(ii) the thickness of plain concrete = 50 cm **(1 point)**

(d) Using clear sketch, discuss how to check punching in raft foundation **(2 point)**

(e) Discuss in details how to design smell beams to resist:

(i) Differential settlement (ii) Lateral loads **(2 point)**

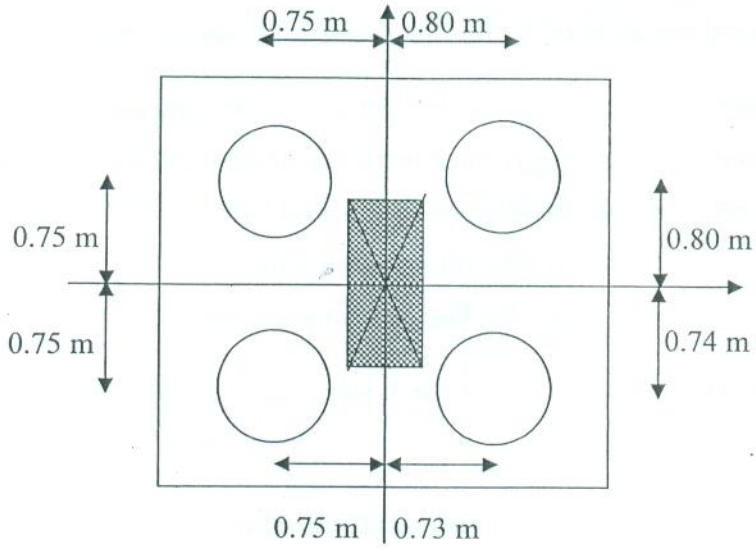
Question No. (5) (11 point)

The figure shows the plan of two adjacent columns. The left column is (30 x 40) cm and carries 70 t and the right column is (30 x 60) cm and carries 100 ton. The distance center to center of columns is 3.74 m and the allowable net soil pressure is 1.00 kg/cm^2. Considering the projection of the footing of the outer face of the left column is 50 cm and the thickness of plain concrete layer=20 cm.

Give complete design of the reinforced concrete combined footing for the two columns. **(11 point)**

Question No. (2) (11 point)

For the shown forth piles cap if the safe pile load is 70 tons and pile diameter is 50 cm if the column load is 280 tons check the safety for this pile caps

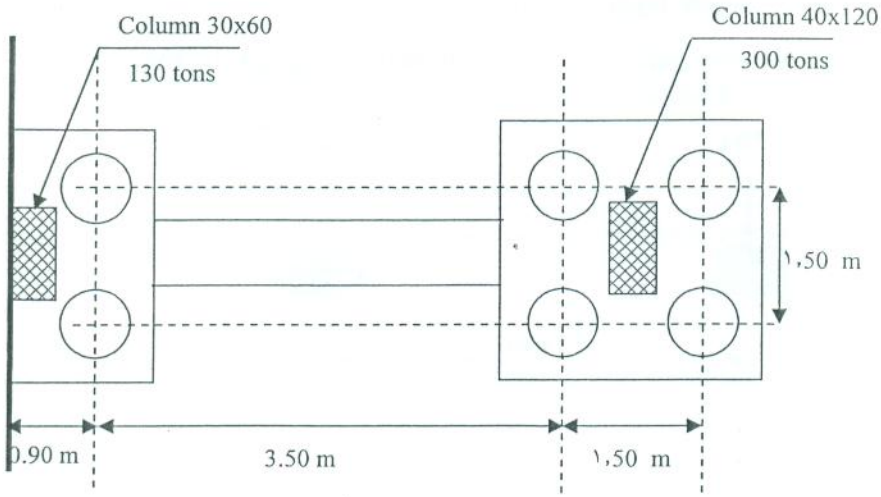


Question No. (3) (12 point)

(a) b) For the pile cape shown in figure (1), if the allowable pile load is 90 tons, the pile diameter is 0.60 m and piles spacing is 1.50

1-Design the strap beam and internal cap **(8 points)**

2- Drawn a longitudinal and cross section of this beam with suitable scale **(4 points)**



Tanta University
Faculty of Engineering
Structural Engineering Department
3rd year Structural Engineering

Foundations Engineering (1), CS3205
Term Exam, June. 2011
Saturday; 18 / 6 / 2011
Allowable time: 3 hours

(هندسة إنشائية – لائحة قديمة) ٣ - هندسة الاساسات (١)

Answer all the following questions. (Exam mark =70)

Question No. (1) (12 point)

Use Clear sketches:

A. What are the different types of pile foundations?.....(01 Point)

B. Some situations lead to the down drag on a pile. What are the precautions to be taken in such cases?.....(01 Point)

C. Discuss the defects due to construction technique in different types of piles.
.....(01 Point)

D. .....(06 Points)

A bored pile, 750mm diameter and 12.0m long, is to be installed on a site where two layers of clay exist:

Upper firm clay; 8.0m thick;
undrained shear strength = 50.0 kN/m^2.

Lower stiff clay; 12.0m thick;
undrained shear strength = 120.0kN/m^2.

Determine the working load the pile could support assuming the following:

i) α = 0.7 for firm clay and 0.5 for stiff clay ; N_c = 9
ii) Factors of safety of 1.5 and 3.0 are applied to the shaft load and base load respectively
iii) The top 1.0m of the firm clay is ignored due to Clay / concrete shrinkage.

E. For the same ground conditions and assumptions described above, determine the length of pile required to support a working load of 1200 kN.....(03 points)

Examiners; Prof. Mohamed A. Sakr; Ass. Prof. Mostafa A. El-Sawwaf & Ass. Prof. Ashraf K. Nazir