Tanta University
Faculty of Engineering
Structural Engineering Dept. Time: 3hours

Structure Analysis (3)(CS3101)
Third Year (هندسة إنشاءات – لائحة قديمة)
1st Term Ex. Jan 2009

Solve as much as you can:

1- Problem (1) 20% of Max. credit:

Using the force methd, draw the B.M. diagram for the given beam shown in Fig. 1. I is contant for the whole beam.(20%)

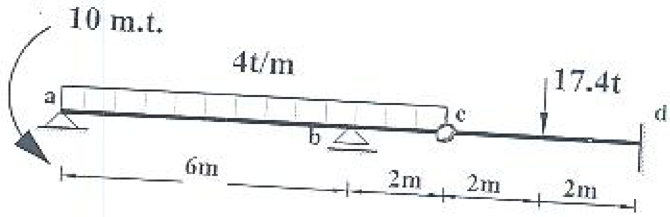


Fig. 1

2- Problem (2) 20% of Max. credit:

Using the force method, draw the B.M.D For the given frame of constant I shown in Fig. 2. Compute the horizontal displacement at joint (d), EI= 10000 t.m^2.

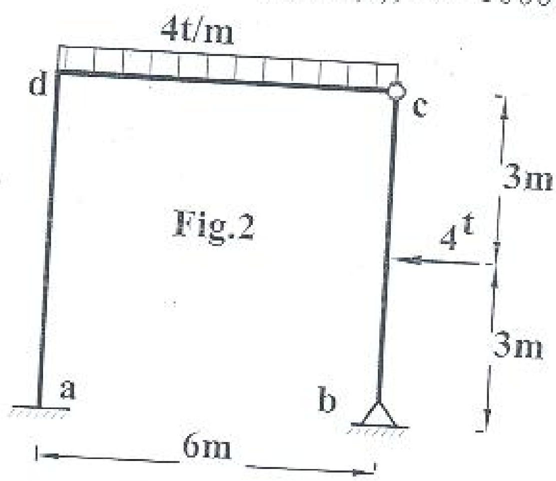


Fig.2

3- Problem (3) 20% of Max. credit:

Using the force method, draw the B.M.D For the given frame of constant I shown in Fig. 3.

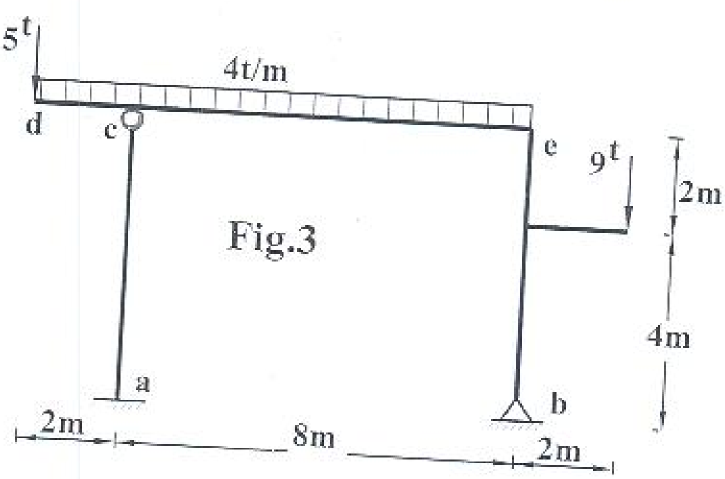


Fig.3

4- Problem (4) 20% of Max. credit:

Using the slope-deflection method, find the value of the force P1 such that the B.M. at a equals the B. M. at b in magnitude and sign ($M_a = M_b$), further draw the B.M.D. for the given beam of constsnt I shown in Fig. 4.

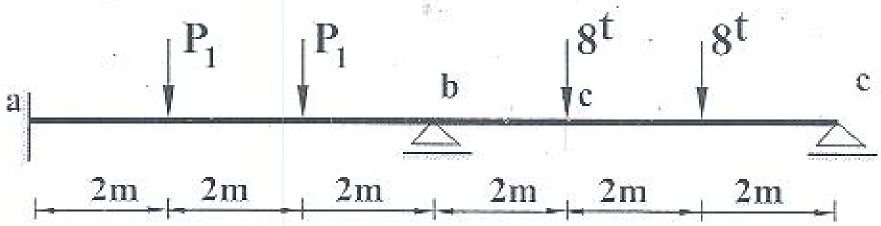


Fig. 4

5- Problem (5) 20% of Max. credit:

Using the slope-deflection method, draw the B.M.D. for the given frame of variable I shown in Fig. 5.

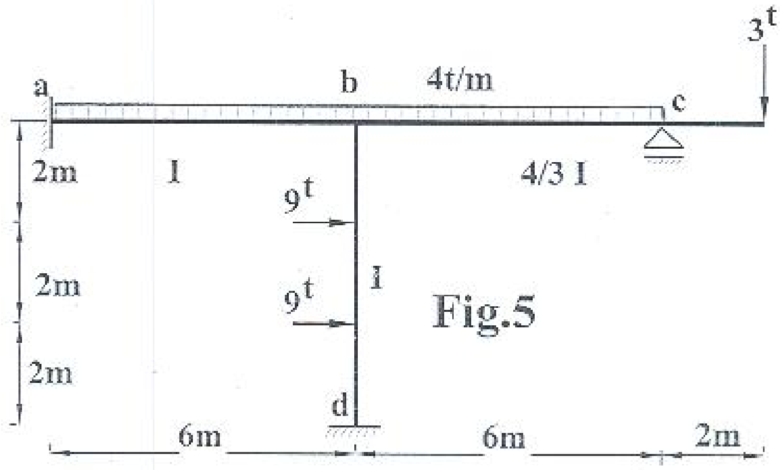


Fig.5

6- Problem (6) 20% of Max. credit:

Using the slope-deflection method, draw the B.M.D. for the given frame of constant I shown in Fig. 6.

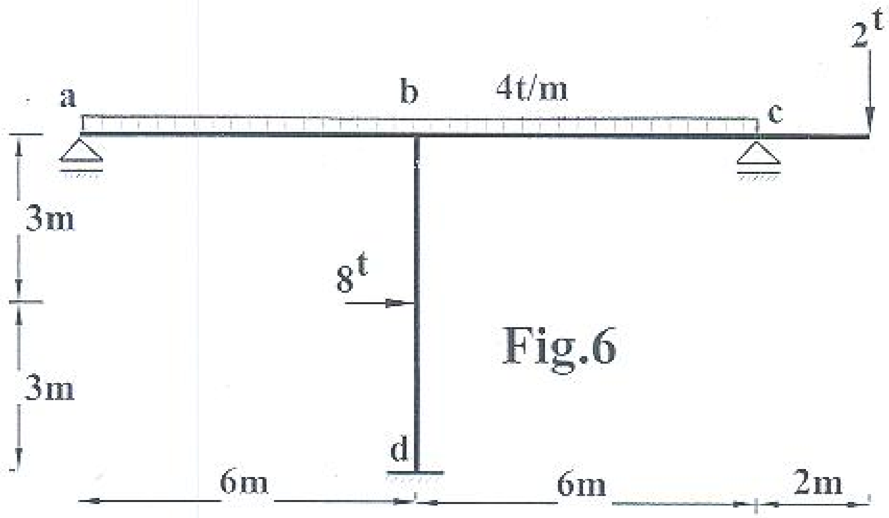


Fig.6

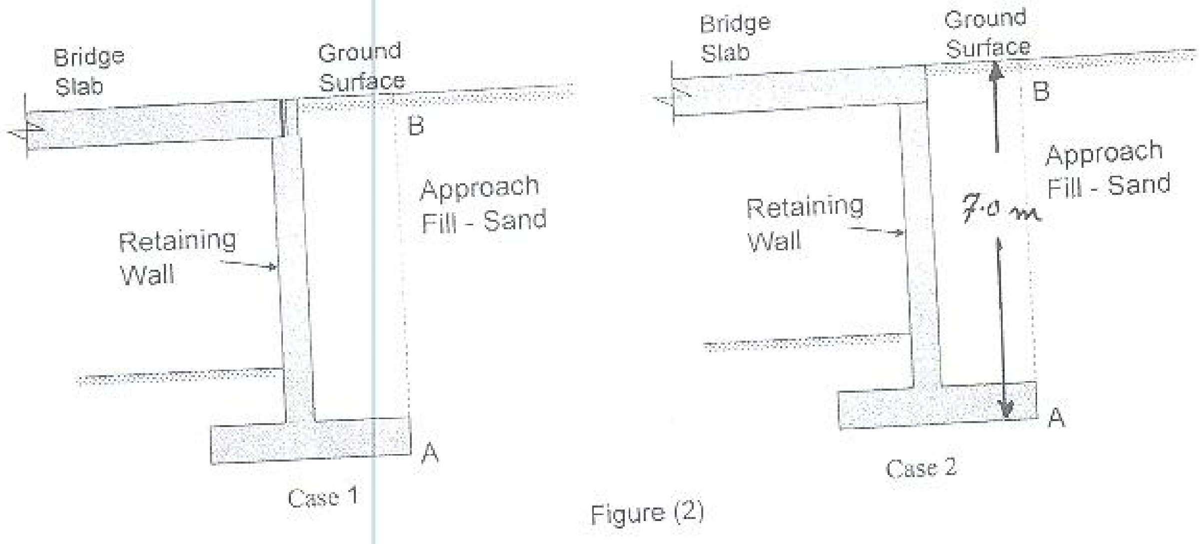


Figure (2)

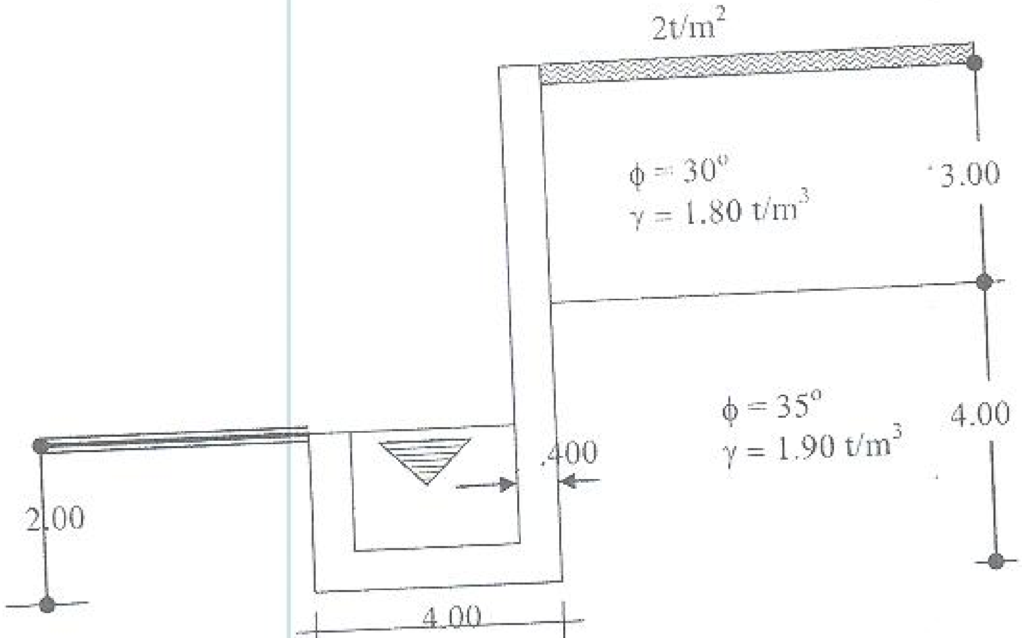


Figure (3)

Best Wishes.........

انشارات تدريبة الوردي

Tanta University
Faculty of Engineering
Structural Engineering Department

Soil Mechanics
First Term Exam 2008-2009
Third Year Structural – لائحة قديمة

- **Time allowed: 3 hours.**
- **Any missing data to be reasonably assumed.**

Question No. (1):

a. Show if the following expressions are true or false and why;
b. Penetration tests are the only means of supplying information about cohesionless soils in the field.
c. The bearing capacity of shallow footings is independent of footing size in case of cohesive soil; while it is proportional to the footing size in case of cohesionless soil.
d. The ultimate bearing capacity of shallow footings increases by increasing the foundation depth regardless to the soil type.
e. The measured values of (N) from standard penetration test should be corrected. Show what and why the different corrections; if any.
f. When a shallow footing is located on or near a slope, its stability will be reduced; in this case the bearing capacity can be obtained by using reduced B. C. factors.
g. The plate loading test does not give a satisfactory value of the ultimate settlement in the case of cohesive soil.

Question No. (2):

a. What and Why the Factor of safety in Bearing Capacity calculations.
b. What are the different methods to find out the bearing capacity of shallow footings?
c. Using clear sketches show the different causes of foundation failures.
d. A soil supporting a square foundation of 1.5 x 1.5 m in plan has a friction angle of 20 and cohesion of 15 kN/m^2. If the unit weight of the soil is 18 kN/m^3, determine the allowable bearing capacity and the allowable gross load using a factor of safety of 3, assuming that the depth of foundation is 1.0m. (N_c=17.7, N_q=7.4, and N_γ=5).

Question No. (3):

a. Outline in details, using clear sketches, how to perform the modified Proctor compaction test on a sample of sand in the laboratory.
b. State the main differences between the standard and the modified proctor tests.
c. The following results were obtained from a Proctor test:

Wc %	4	5	6	8	10	12
γ t/m^3	1.77	1.79	1.88	1.95	1.91	1.85

It is required to:

- Plot the moisture-dry density curve, and then determine the optimum moisture content "O.M.C", if the specific gravity of the tested soil equals 2.65.
- Comment on the curve behavior using the interpretation of the compaction theory.

- On the same axes, plot the curves of 80% and 90% degrees of saturation.

d. For the previous problem predict the expected field density of a sub-base layer of the same soil if the supplied field water content is 18% and the required compaction efficiency must not be less than 96%.

Question No. (4):

a. An infinite slope exists at an angle "β" to the horizontal in a clay soil having a unit weight "γ" and effective strength parameters "c' " and "φ' ". Derive an expression for the factor of safety against failure along a shallow slip plane parallel to the ground surface, and use this to find the maximum stable slope where $c' = 0$, $\varphi' = 20°$ and $\gamma = 19\ kN/m^3$ assuming that the water table can rise to the ground surface.

b. Fig. (1) shows the section through a cutting in clay. ABC is a trial slip surface and CD is an assumed tension crack, 4.5 m deep. The area ABCDE is 152 m^2 and its centroid is at G. The density of the soil is 1.92 t/m^3 and its cohesion is 43 N/m^2. Assuming $\varphi = 0°$, find the factor of safety against a slip along the surface ABC. Allow for the tension crack being filled with water after heavy rain.

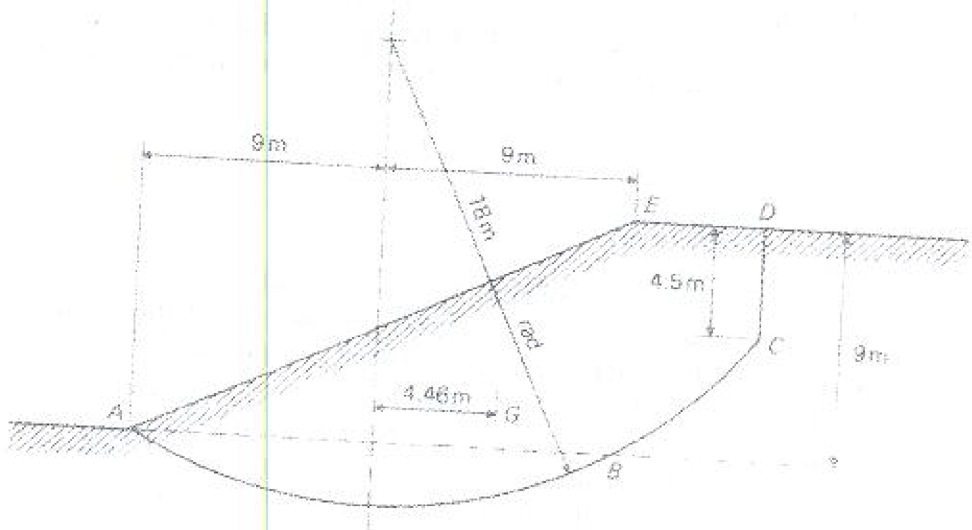


Figure (1)

Question No. 5

a) Figure (2) shows two cases of retaining walls that are retaining approach fill of a bridge. The Approach fill is sand with $\gamma = 2.0\ t/m^3$ and φ' of 33°. Calculate the earth pressures distributions on vertical line AB in cases 1 and 2.

b) For the given retaining wall channel (Figure 3), **calculate:**

(I) Factor of Safety against sliding in case of the channel is empty

(II) Factor of safety against overturning in case the channel is full of water

(III) The stress under the base in case the channel is full of water.

Q4) The **150 x 12 mm** plate shown in Fig. (3) is connected to **200 x 12 mm** plate with longitudinal fillet welds to support a tensile load. By Using LRFD, determine the design strength P_u of the member if F_y = 3.6 t/cm^2 and F_u = 5.2 t/cm^2.

(6 %)

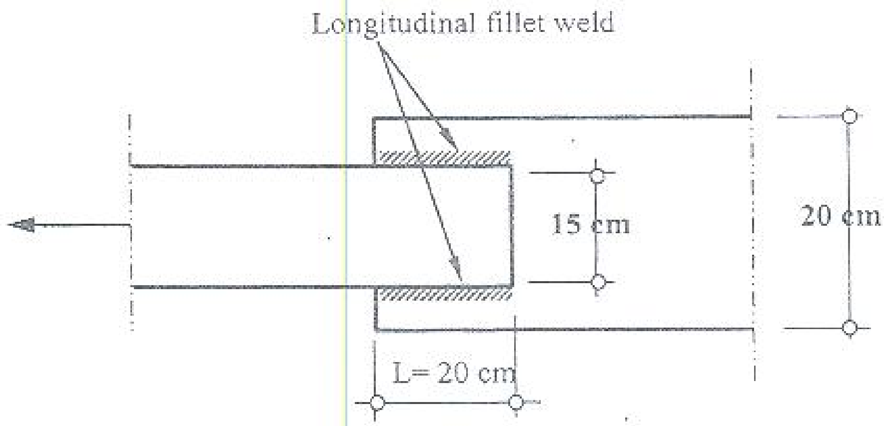


Fig. (3)

Q5) By using steel grade ST52 (F_y = ?? t/cm^2 and F_u = ?? t/cm^2) and welded connections of Fig. (4), it is required the following:

(1) Design the following individual truss members,
(2) Design the **required welds**
(3) To scale 1:10, draw the given joint.

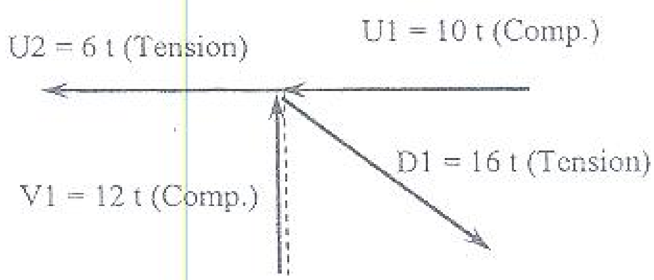


Fig. (4)

Member	Type of member	Design force F_u	Length or buckling length
U1	Upper chord (Use 2- unequal angles)	10 t (compression)	L_{bx} = 3.0 m L_{by} = 6.0 m
U2	Upper chord (Use 2- equal angles)	6 t (tension)	L = 3.0 m L_h = 3.0 m
D1	Diagonal (Use …..?).	16 t (tension)	L = 5.0 m L_h = 4.0 m
V1	Vertical member used also for connecting vertical bracing (Use…..?).	12 t (compression)	L_{bx} = 3.0 m L_{by} = 3.0 m

(30 %)

Best wishes
Prof. Dr. Mohamed A. Dabaon

a. Calculate D.L., and L.L. acting on the upper chord joints. (8 %)

b. Calculate **only** the design ultimate forces in marked members 1, 2 & 3. (6 %)

c. Design an intermediate purlin as C- rolled steel section. (15 %)

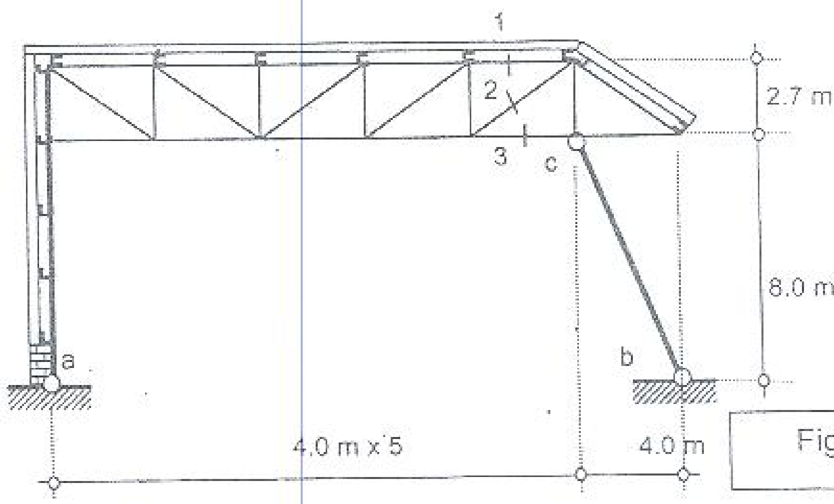


Fig. (2)

Q3) The following table shows D.L, L.L and W.L . By **calculating the design ultimate forces** of the following separate truss members, **design** the members as rolled steel sections taken into consideration that all the members are connected with the gusset plates with **ordinary bolts M16 mm of Grade 6.8** (F_y = ? and F_u = ?). **Calculate, also, the number** of bolts required for connecting the following separated members with their gusset plates (Use category A).

(21%)

member	D.L [t]	L.L [t]	W.L [t]	Length L_h [m]	L_{bx} [m]	L_{by} [m]	notes
1	7.0 (comp.)	8.0 (comp.)	3.0 (comp.)	5.0	5.0	10.0	upper chord
2	2.0 (tension)	9.0 (tension)	5.0 (tension)	7.0	--	--	Vertical
3	Zero	Zero	Zero	4.0	?!	?!	----

Dept.: Structural Engrg.	**Faculty:** Engineering	**University** : Tanta
Time allowed: 3 hr. **Date:** January 2009	**Course:** Design of steel structures (a)	**Course code:** :

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).

Q1) Fig. (1) gives the general layout and the main dimensions of a workshop which is a part of an industrial building. The columns of the hall a-b-c-d-d'-b'-c'-a' are allowed **only at the outer sides (no internal columns are allowed).**

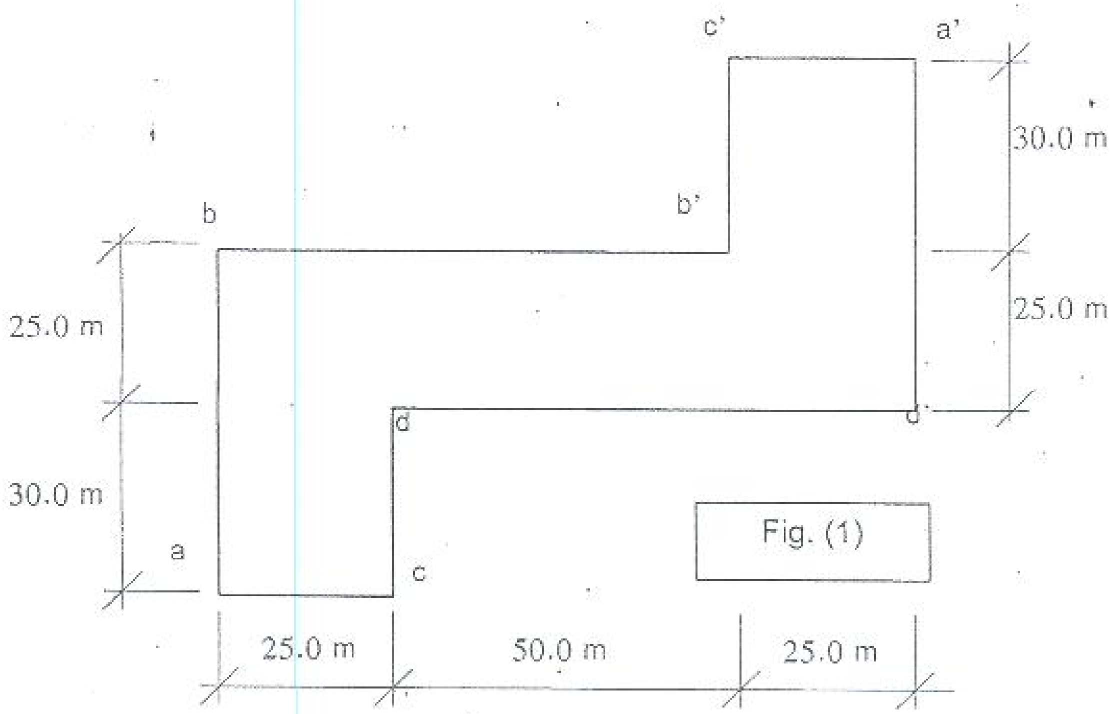


Fig. (1)

It is required to give convenient systems to cover this area. By using suitable scale, draw plan, elevation and different views to show the main systems and the arrangement of the bracing system. **(25 %)**

Q2) The following truss, Fig. (2), is used to cover an area of 24x36 m^2 with spacing between trusses of **6.0** m. The cover is a corrugated steel sheet of weight 10 kg/m^2. The own weight of steel and the live load may be assumed 40 and 80 kg/m^2 **of the covered area**, **respectively**. **Neglecting Wind** pressure and using steel 52 (F_y = ? and F_u = ?), answer the following:

٣ قديم انشاءات

Tanta University
Faculty of Engineering
Public Works Department
3rd Year, Structural Engineering

Final Exam
2008-2009
Time: 3 hours

Traffic and Highways Engineering

* Try all questions, if possible
*Assume reasonably any missing data
*Use clear and net sketches to illustrate your answers as much as you can

يسمح باستخدام الجداول والمنحنيات الخاصة بالمادة

Question (1)

a. Drive the relationship between jam density, free-flow speed and maximum traffic volume.

(6 Marks)

b. Write briefly what is meant by the following terms:

1. Free flow speed
2. Space mean speed
3. Time mean speed
4. Jam density

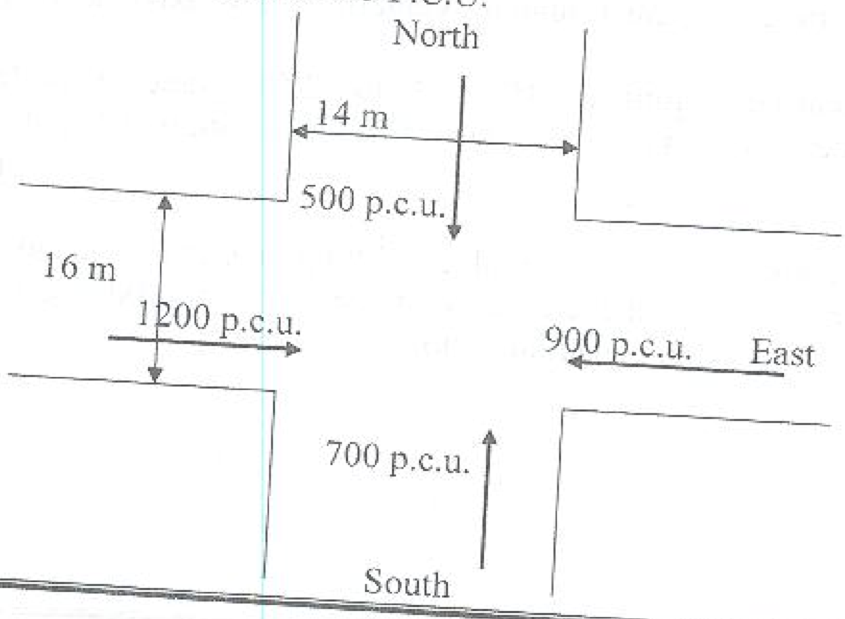
(4 Marks)

c. Design the signalized intersection shown in the figure below if the following data were obtained:

	North	South	East	West
Gradient	-2%	-3%	0	+2%
Left-turn	3%	4%	10%	15%
Right-turn	10%	9%	13%	15%
Bus	5%	3%	2%	2%
Truck	5%	2%	3%	7%

It is required to calculate the saturation flow for each approach taking into consideration the corrections. Calculate the optimum cycle time and the green time for each approach at the intersection. Sketch the timing diagrams for this intersection. Assume starting delay of three-second per phase. Assume that the truck is equivalent to 3.0 P.C.U and bus is equivalent to 2.5 P.C.U.

(15 Marks)



Question (2)

a. The following table gives the particulars collected for a section of road 0.7 Km long during the course of moving car observer method for overall traffic stream volume and speed calculations. The equivalent factors for the truck and bus are 3.0 and 2.5, respectively. Calculate the journey and running speed of flow. **(16 Marks)**

From East to West

Run Number	Running Time (sec)	Delays (sec)	Vehicles met with			Vehicles in the same way	
			Car	Truck	Bus	Overtaking	Overtaken
1	64	4	11	0	5	1	0
2	56	6	13	0	0	2	1
3	68	8	19	2	11	1	1
4	64	4	14	2	4	1	0
5	48	8	2	0	11	0	1
6	66	6	19	1	7	2	1

From West to East

Run Number	Running Time (sec)	Delays (sec)	Vehicles met with			Vehicles in the same way	
			Car	Truck	Bus	Overtaking	Overtaken
1	69	6	10	0	3	1	1
2	76	5	2	0	2	1	0
3	62	6	23	1	6	2	1
4	54	6	7	0	1	2	0
5	43	4	8	0	1	1	1
6	60	6	11	0	8	2	0

b. A circular curve connects two tangents (*2-lane undivided highway*) that deflect at an angle of 54°. If the point of intersection is at station (347+38.5), design speed is 70 mph and superelevation is 8%.

i) Determine the station of PC, PT and the deflection angles for setting out the curve at 100 ft stations from PC.

ii) Draw to a reasonable scale, the progress of obtaining the required superelevation when revolving the pavement around the centerline of the pavement. **(10 Marks)**

c. An existing vertical curve joins a +4% grade to −2.5% grade. If the length of the curve is 250 ft. Grades intersect at station 340+00 at an elevation of 1323ft. What is the max. safe speed ?

(6 Marks)

d. A vertical curve connects a (−1.5%) with a (+2%) grade. If the design speed of the highway is 60 mph, compute the elevation of the curve at 100ft stations. Grades intersect at station 263+16 at an elevation of 90ft.

(6 Marks)

Question (3)

a. A corner of a building is 36 ft from the centerline of a curved section of a 4-lane rural highway. If this section has a grade of 5% and the radius of the curve is only 320 ft, what speed limit will you recommend at this section if :

i. The highway has no median,

ii. The highway has an 8 ft median. **(8 Marks)**

b. The weight of a soil sample having a volume of 44.8 cm^3 is 85.4 gm. After oven drying reduces to 76.4 gm. Find the degree of saturation if the volume of specific gravity is 2.66. What would be the water content at full saturation? **(6 Marks)**

GOOD LUCK

Dr. Islam Abu El-Naga

مقرر تخصصي اختياري (١) - نظرية الألواح والقشريات

TANTA UNIVERSITY
FACULTY OF ENGINEERING
STRUCTURAL ENG. DEPT.
FINAL EXAMINATION

لطلبة اللائحة القديمة

2008-2009

THIRD YEAR STRUCURAL
STRESSES IN PLATES & SHELLS
ELLECTIVE COARSE (1)
TIME ALLOWED 3 HOURS

Answer the following questions, neat sketches are required.

Question (II)

Choose the suitable answers:-

1. In simply supported circular plate, one of the boundary conditions is that:
   (a) 'Mr' is constant at the outer edge.
   (b) 'Mr' equals zero at the outer edge.
   (c) 'Mt' equals zero at the outer edge.

2. Torsional moment in circular plates is:
   (a) equals zero due to symmetry.
   (b) neglected to simplify the problem.
   (c) acting about vertical axis..

3. Bending moments in circular plate could be calculated if:
   (a) both shear equation and boundary conditions are givin.
   (b) loads and shear equation are only givin.
   (c) boundary conditions are only givin.

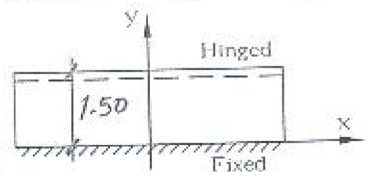
4. The governing equation of circular plates is a relation between;
   (a) loads and deflection.
   (b) rotation and deflection.
   (c) rotation and shear force.

5. The plate rotation at any point (ϕ) is :
   (a) a function of the plate bending rigidity 'D' and the plate raduis.
   (b) not a function of the plate bending rigidity 'D'.
   (c) not a function of the plate loading.

Question (II)

a- Starting from the Bi-harmonic equation of rectangular plate, derive the governing equation for the Narrow plate shown in Figure (1).

b- Write down the boundary conditions for the Narrow plate shown in Figure (1).



Figure(1)

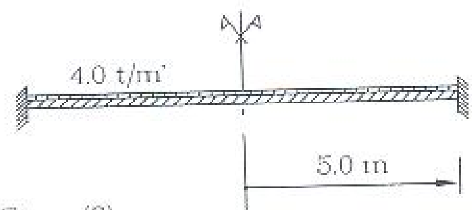
Question (III)

a- State (without derivation) the equations of Mr and Mt in circular plate.

b- The circular plate shown in Figure (2) is fixed at outer edge. The plate is subjected to a uniformly distributed load of entensity 4.0 t/m'. It is required to draw the distributions of Mr, Mt and value of the maximum deflection w.

(Data)

μ = 0.10
t = 10.0 cm
E = 2100 t/cm2



Figure(2)

TANTA UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF STRUCTURAL ENGINEERING
EXAMINATION (THIRD YEAR) STUDENTS OF CIVIL ENGINEERING هـ مدنية _ لائحة جديدة

COURSE TITLE: DESIGN OF REINFORCED CONCRETE STRUCTURES (2) a		COURSE CODE: CSE3110
DATE: January - 2009	TERM: FIRST	TOTAL ASSESSMENT MARKS: 85
		TIME ALLOWED: 4 hours

Systematic arrangement of calculations and clear neat drawings are essential. Any missing data can be reasonably assumed. The exam consists of FOUR questions in two pages.

For all problems consider: f_{cu}= 40MPa, f_y= 400MPa for main RFT

Problem # One (20 mark) **TRY ALL QUESTIONS**

1. In design of beams subjected to torsion, why the solid section is assumed to be thin-walled tube? Proof the code equation $q_{tu}= M_{tu}/2A_o{*}t_e$ for the nominal ultimate torsional shear stress.
2. Differentiate by sketches only between open and closed stirrups recommended by Egyptian Code and ACI.
3. Figures 1-*a* shows an isometric of cantilever AB of length 6m carries a cantilever slab of thickness 150mm. The cantilever slab carries a half-brick wall 1.5m height at its end of density γ_{brick}= 12kN/m^3. The beam cross section (b×t) = 400×800mm. Consider the following data: cover= 1.5kN/m^2 and L.L= 3kN/m^2. It is required to carry out the following:
   i- Draw the B.M.D, S.F.D and T.M.D for the cantilever AB.
   ii- Without any calculations, draw the bending, shear and torsional stresses distribution along the beam height.
   iii-Draw the expected failure mode of the cantilever AB.
   iv-Check design the section shown in Fig. 1-*b* subjected to the following straining actions: M_u= 400kN.m, Q_u= 500kN, M_{tu}= 130kN.m.

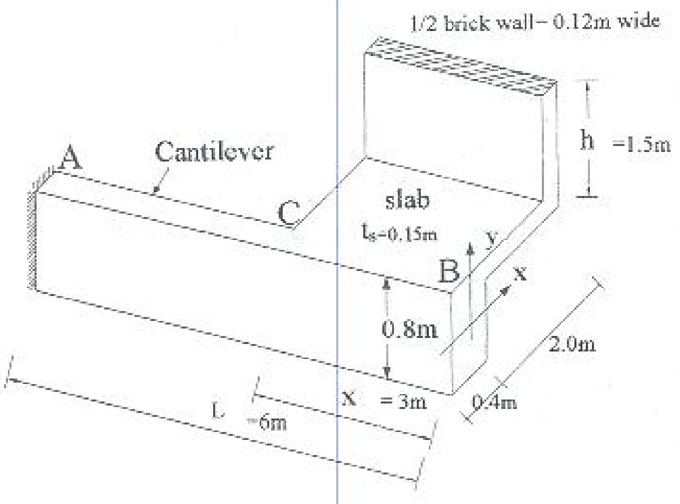


Fig. 1-*a*

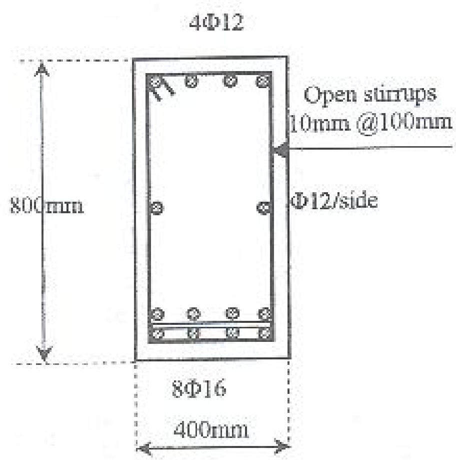


Fig. 1-*b*

Problem # Two (9 mark)

Figure 2 shows the layout of the first floor resting on eight columns with area of 11.2x14.4m. The panelled beams system is required to cover this floor using the beam modules shown in figure. The slab is subjected to L.L= 5kN/m^2 and cover= 1.5kN/m^2. The slab thickness is 100mm. It is required to make a complete design (design + drawing details) of the panelled beam B1 only. Determine the load applied on supported beam B2.

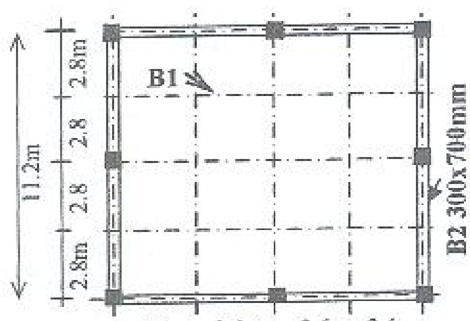


Fig. 2

P.T.O →

TANTA UNIVERSITY
FACULTY OF ENGINEERING
DEPARTMENT OF STRUCTURAL ENGINEERING
EXAMINATION (THIRD YEAR) STUDENTS OF CIVIL ENGINEERING هـ مدنية ـ لائحة

COURSE TITLE: DESIGN OF REINFORCED CONCRETE STRUCTURES (2) a		COURSE CODE: CSE3110
DATE: January - 2009	TERM: FIRST	TOTAL ASSESSMENT MARKS: 85	TIME ALLOWED: 4 hours

Problem # Three (35 mark)

a- Differentiate between waffle and two-way ribbed slab.

b- Explain with sketches the reason of choosing solid slab as structural system for the cantilevers less than 1.5m in a hollow – block slabs?

c-

Figure 3 shows structural plan of a roof ABCDEF with cantilevers. The roof is rest on four beams that supported on six columns. The system of slabs is to be **two-way ribbed** slabs. Consider that: live load is 4kN/m^2; flooring cover is 1.5kN/m^2. The cross section of all beams is 250*700mm. It is required to carry out the following:

i- Calculate the loads on ribs and on cantilevers.

ii- Draw B.M.D and S.F.D of the critical strips.

iii- Calculate the width of solid part for shear and moment.

iv- Design the slabs (S1, S2, and S3).

v- Draw to scale 1:50 the plan and needed cross sections showing the reinforcement details and the arrangement of ribs.

vi- Calculate the loads carried by the supporting beam AB.

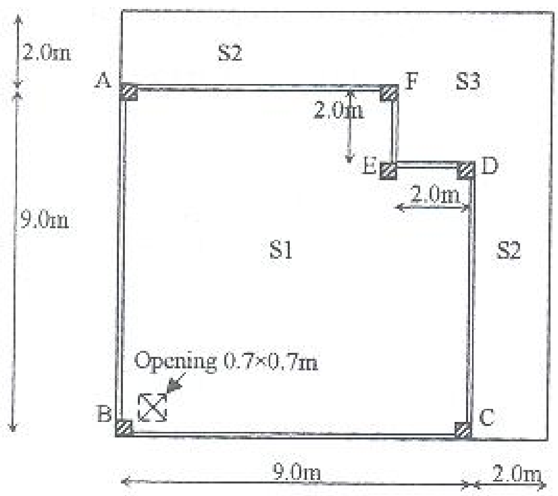


Fig. 3

Problem # Four (30 mark)

Figure 4 shows plan of typical floor of RC flat slab with panel 8m×7.2m and slab thickness 0.25m (t_s= 250mm) without drop panel and with column head 1.85m×1.85m. The flat slab is resting on square columns 0.5mx0.5m. The marginal beams 0.3mx0.9m are used at the outer edges of the flat slab AB, AC, and BD. The edge CD is free without marginal beam. The flat slab is subjected to a uniformly live load 5kN/m^2 and cover flooring 1.25kN/m^2. Using the empirical method of the Egyptian code of practice for design of flat slab, it is required to carry out the following:

i- Determine the critical bending moment in column and field strips in X-direction only.

ii- Design the critical sections due to bending moment of strips in X-direction only.

iii-Check one-way and two-way shear stresses for the interior column C1 considering the case of total loads.

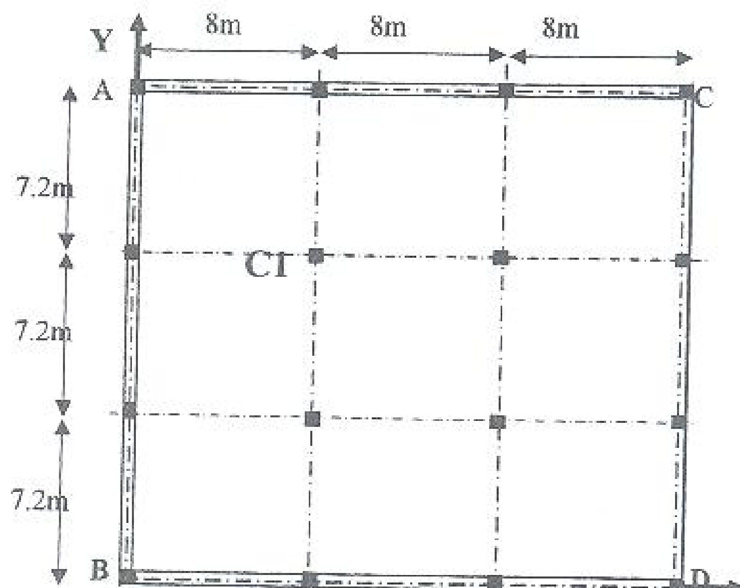


Fig. (4)

iv-Draw on plan the reinforcement details of the column and field strips in X-direction only. Draw in cross section the reinforcement details of the column head.

v- Calculate the load acting on the marginal beam in y-direction and calculate Mu, Qu, and Mtu at critical sections.

أطيب الأمنيات بالتوفيق

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

٣ انشاءات قديم

مقرر اختياري تخصصي (٢) تداخل المنشآت

Tanta University
Faculty of Engineering
Structural Engineering Department

Elective Course (2) Soil Structure Interaction
First Term Exam 2008-2009
Third Year

- **Any missing data to be reasonably assumed.**

Question No. 1

(1.a) Using clear sketches draw the different types of combined footings and draw the stress distribution under each case.

(1.b) Figure (1) shows the dimensions of a raft foundation for a residential building. The total load of the structure = 8000.0 t acting in the right bottom quarter with e_x = 0.40 m and e_y = 0.55 m. The acting moment on the raft due to considering the lateral loads in Y direction = 2000 tm.

Determine the actual stresses under the raft foundation at corners A and F:

(i) under vertical loads only

(ii) under both vertical and lateral loads

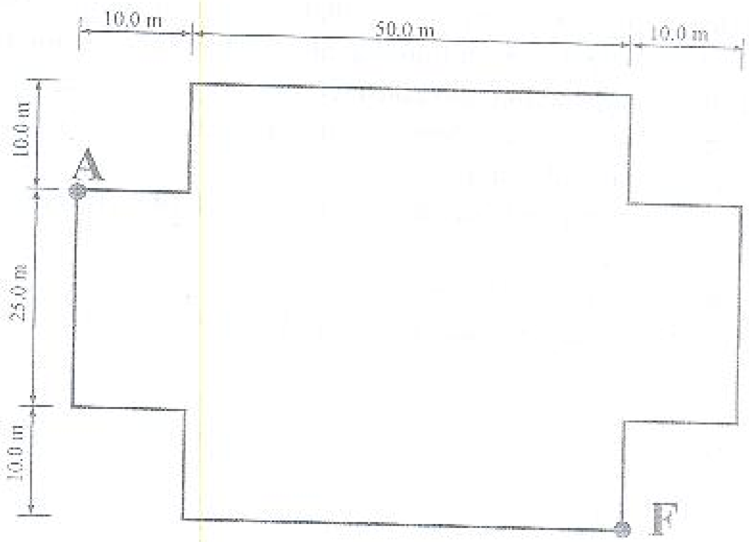


Fig. (1)

Question No. 2

(A) What is the meant by reinforced earth retaining walls?

(B) For the retaining wall shown in figure (2) calculate the followings:-

1. The minimum length of the tie rod, Lt, to provide stability.
2. The required cross section of the steel tie rod.
3. check the stability of the wall against sliding

Data:

The allowable stress of steel is 2000 kg/cm^2

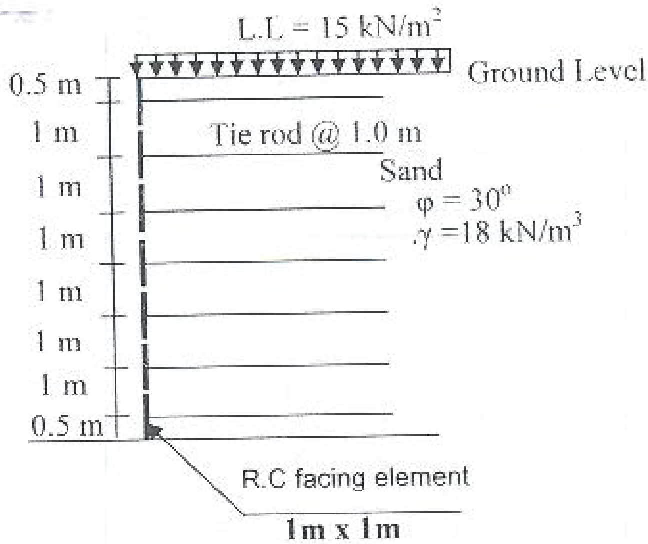


Figure (2)

Question No. 3

An 11 story building with one basement is to be constructed on a site that contains a thick soft clay layer over dense sand. A raft over piles shall be used as a supporting foundation as shown in Fig. (3). If the height of each floor equals to 3.0 m, it is required to:

I) Design the raft over pile taking into consideration the effect of earthquake.

II) Draw to an appropriate scale the detail of reinforcement of the raft.

Consider the following in your calculations:

1- All columns at the basement floor have dimensions of 50 x 100 cm.

2- Pile diameter = 0.60 m.

3- Allowable capacity of pile = 50 ton.

4- f_c=45 kg/cm², f_s=2000 kg/cm², q_{sh}=6 kg/cm², k_1= 0.392, and k_2= 1248

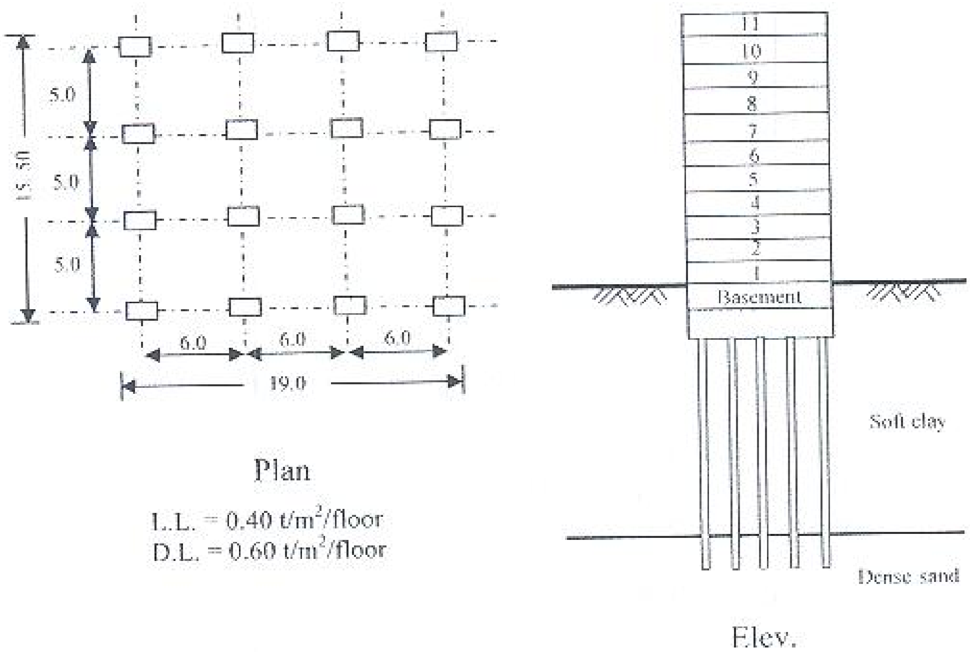


Fig. (3)

Question No. 4

a) Explain the difference between drained and undrained deformation modulii

b) Use sketches to explain what is the unload/reload deformation modulus.

c) The results of a plate load test on sand are shown in the following table:

Pressure (kPa)	10	25	50	100	150	200	400	600
Settlement (mm)	0.01	0.12	0.44	1.03	1.66	2.5	5.5	9

d) Plot pressure-settlement curve.

e) Calculate the modulus of subgrade reaction of the plate in the stress range 25 to 200 kPa.

f) Estimate the modulus of subgrade reaction for a footing 5mx5m resting on the sand for pressure range 25 to 200 kPa.

Question No. 5

A flexible Raft 20mx20m is carrying a building and a tower (Figure 4). The building is imposing uniform pressure of 125 kPa and the tower is imposing additional uniform pressure of 175 kPa. The building and tower are resting on the profile in Figure (4). Estimate at the center of the raft A, at edge of the tower B and at edge of raft C

a) settlement

b) modulus of subgrade reaction

(Hint: *use approximate method to calculate change in stresses with depth)*

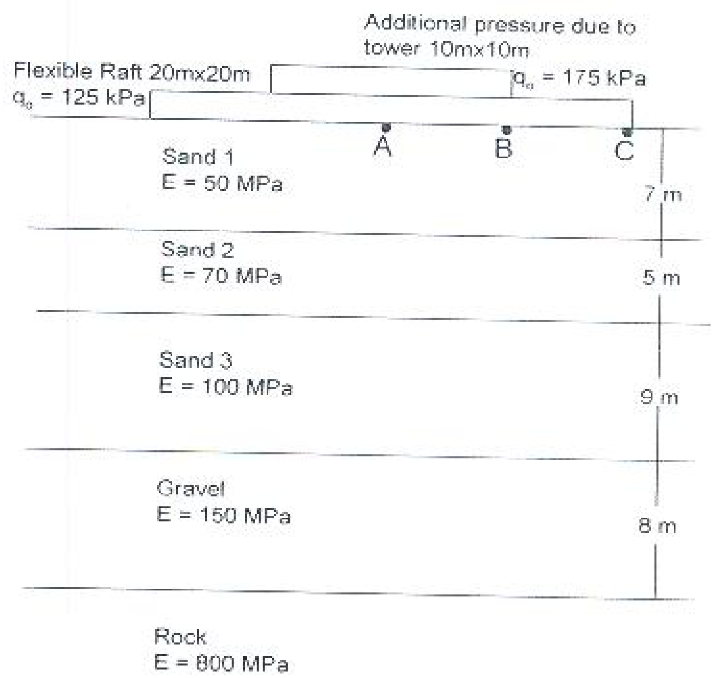


Figure (4)

٣ انشاءات قديم
مقرر اختياري تخصصي (٢) ديناميكا الانشاءات

Tanta University
Faculty of Engineering
Structural Engineering Department

Optional course (2) Structural Dynamic
Third Year, January 2009
Allowable time: 3 hours

Answer all the following questions.

Question (1)

(a) Using clear sketches, illustrate the difference between free and forced vibration.

(b) Define the shear building and the assumptions that are considered for the multistory shear building

Question (2)

The beam shown in figure 1 supports a machine which exerts vertical harmonic loading (*F=500 sin5.5t) N*. The cross section of the beam is 20*40 cm and the modulus of Elasticity of the beam, E = 200 t/cm^2. The spring stiffness is 10 t/cm. The weight of the machine W = 5 kN and the damping ratio = 5 %. Draw the mathematical model and the free body diagram and determine:

(a) The natural frequency and time period of vibration

(b) The maximum normal stresses in the beam

Question (3)

The frame shown in figure 2 is subjected to sinusoidal ground motion y_s = **(0.25 sin5.5t) cm**. The columns section is (40x100) cm and, E = 200 t/cm^2. Assuming 5 % of the critical damping, determine:

(a) The maximum displacement and the relative displacement.

(b) The maximum dynamic shearing force in the columns.

Question (4)

For the frame shown in figure 3, the columns section is 30*100 cm and the modulus of Elasticity, E = 2000 t/cm^2. If the frame is subjected to horizontal dynamic load *F =5000sin 6.5t N* at the level of girder. Assuming damping ratio = 4 %, determine:

(a) The steady state amplitude

(b) The maximum stresses in columns

(c) The transmissibility and the maximum force transmitted to foundation

Question (5)

For the two story shear building and the impulsive triangular forces shown in figure 4 with E = 200 t/cm^2, I = 0.001 m^4, $(DLF)_{1\ max}$ = 1.4 and $(DLF)_{2\ max}$ = 1.8, determine:

(a) The natural frequencies and the normal modes.

(b) The modal matrix

(c) The maximum floor displacements

(d) The maximum shear forces in the columns

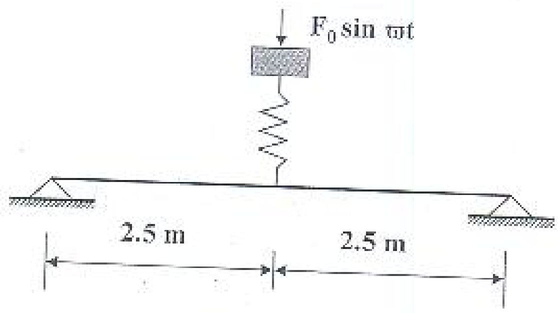


Figure 1

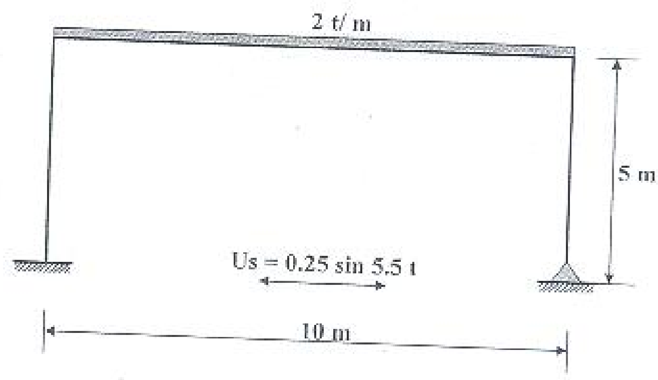


Figure 2

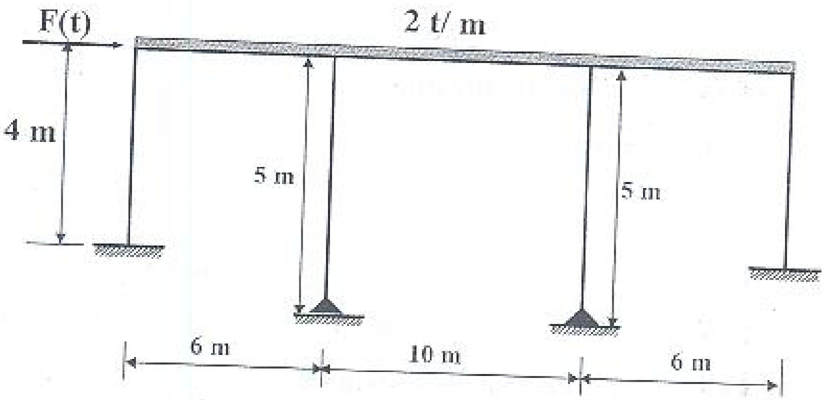


Figure 3

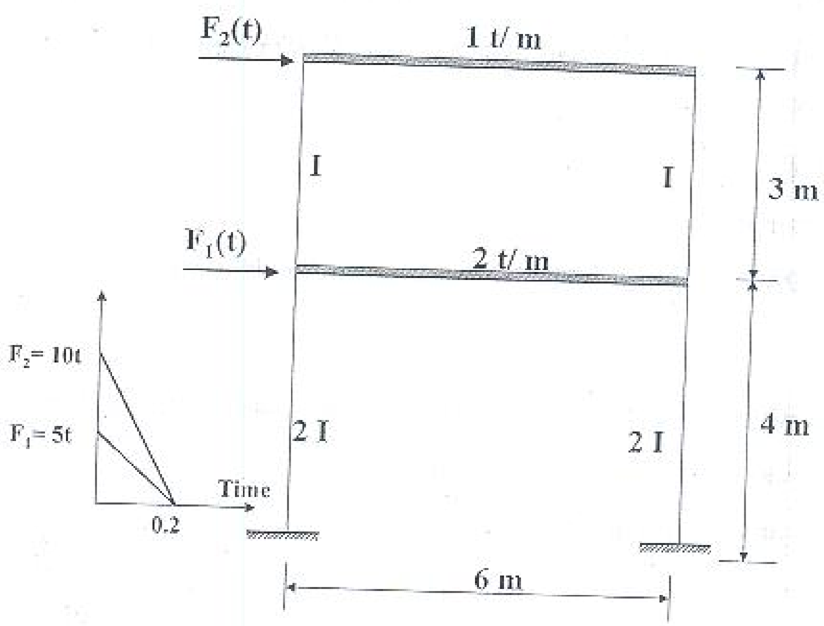


Figure 4

٣- انشاءات فرعي - مقرر اختيار تخصصي (٢) قطاع الألواح والقشريات

TANTA UNIVERSITY
FACULTY OF ENGINEERING
STRUCTURAL ENG. DEPT.
FINAL EXAMINATION

الطلبة الخارج

2008-2009

THIRD YEAR STRUCTURAL
STRESSES IN PLATES & SHELLS
ELLECTIVE COARSE (2)
TIME ALLOWED 3 HOURS

Answer the following questions, neat sketches are required.

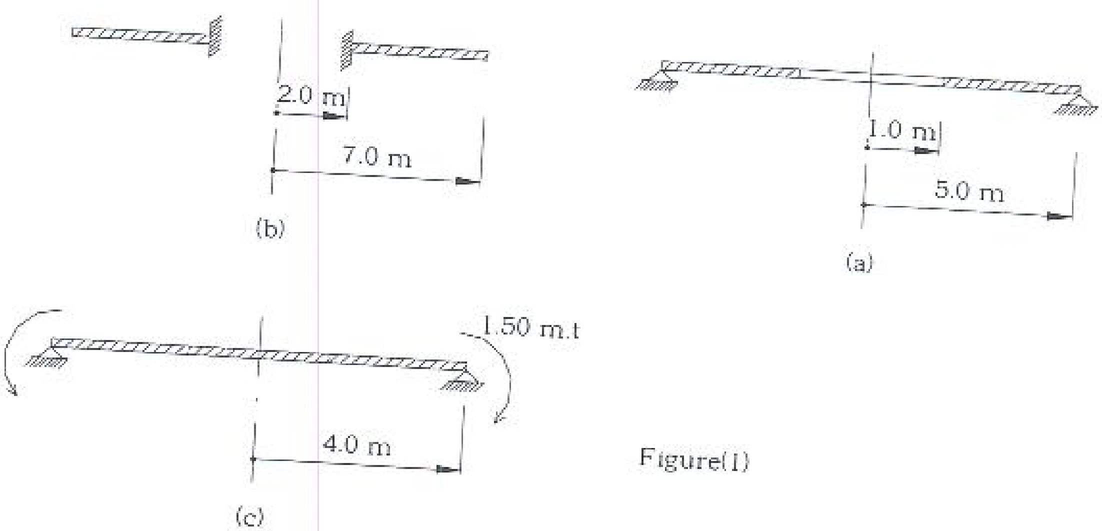
Question (I)

Choose the suitable answers:

1. The bending moment is the resultant couple of
   (a) tangential shear stresses.
   (b) normal stresses.
   (c) transverse shear stresses.
2. The plate is a
   (a) three dimensional structure.
   (b) mixed structure.
   (c) two dimensional structure.
3. The plate rigidity (D) represents
   (a) the relative bending stiffness.
   (b) the plate resistance to elongation.
   (c) the relative torsional stiffness.
4. In circular plate, there is only one variable, that is
   (a) the angle of rotation.
   (b) the radial bending moment.
   (c) the plate radius.
5. In symmetrically loaded shells of revolution,
   (a) loads are transfered by membrane action.
   (b) loads are transfered by shear and bending action.
   (c) loads are transfered according to the type of loading.

Question (II)

a- State the boundary conditions for circular plates shown in Figures (1a, 1b& 1c).



Figure(1)

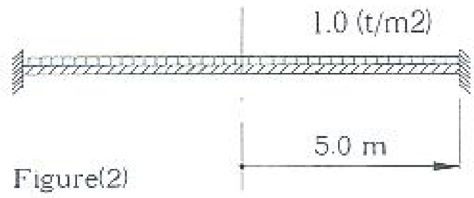
(تابع)

Question (II)

b- The circular plate shown in Figure(2) is fixed at outer edge and subjected to a uniformly distributed load of entensity 1.00 t/m2, draw the distributions of Mr, Mt and find the maximum deflection w.

(Data)

μ = 0.10
t = 10.0 cm
E = 2100 t/cm2



Figure(2)

Question (III)

Find the distribution of the miridian force Nϕ and the ring force Nθ for the shown half spherical concrete dome of radius 6.0 m and under its own weight considering that the shell thickness is 10 cm.