Tanta University
Faculty of Engineering
Public Work Department
January, 2011

جامعة طنطا
كلية الهندسة
قسم الأشغال العامة
يناير 2011

Highway Engineering Final Term Exam
Civil, Forth year
Time allowed: Three Hour.

هندسة الطرق
السنة الرابعة مدني
الزمن : ثلاث ساعات

The number of pages of this exam is two only.
It is allowed to use Highway Data Sheet.
Assume any missing data

Answer all the following questions:

السؤال الأول:

أ-أي أنواع من الخلطات الإسفلتية التي يتم رصفها في المطارات وأي منها يرصف بأماكن الانتظار.

ب- أشرح ما تعرفه عن المصطلحات التالية (المدلول – الاستخدام- المكونات):

- SC-0.
- MC-0.
- RC-2.
- AC60-70.

Question No. 2

a- Why Compaction is made for Highway Sub-grade?

b- Explain the various types of Rollers used for compaction and their efficiency in compacting various types of soils.

c- Specimens of a given soil were compacted in the laboratory using AASHO standard test method. The unit weights for varying soil moisture contents were as follows:

% moisture Contents	12.5	14.4	16.8	17.5	18.8
Wet weight (lb/ft3)	113.8	118.2	123.4	123.5	123.1

- On a single graph, plot the dry weight curves as well as the zero-air – voids curve for the soil, assuming that soil particles have a specific gravity of 2.67.
- Determine the maximum dry density (lab) and optimum moisture content.

السؤال الثالث:

الرسم التالي يوضح شكل ومناسيب الأرض الطبيعية بمنطقة يراد إنشاء طريق خلوي بها، والمطلوب:

أ- ارسم القطاع العرضي عند المقطع I- I،مبينا جميع البيانات والأبعاد اللازمة، وذلك إذا علم أن الطريق مكون من حارتين مرور لكل اتجاه، وأن عرض الحارة والأكتاف قياسي.

Examiners: *Prof.Dr.Ing. M. Hafez Fahmy Aly and Committee*

Highway Engineering Final Term Exam
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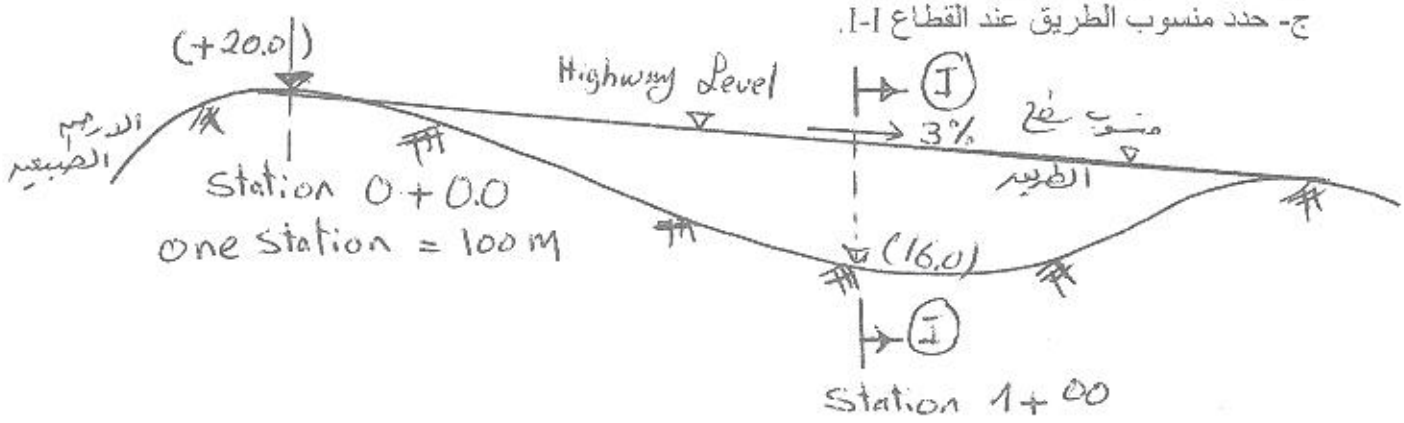
هندسة الطرق
السنة الرابعة مدني
الزمن : ثلاث ساعات

ب- رسم قطاع تصميمي لرصف الطريق مبينا عليه المكونات الأساسية للرصف المرن (جميع البيانات التصميمية والتنفيذية اللازمة).
ج- حدد منسوب الطريق عند القطاع I-I.



Question 4

a-Draw a neat sketch of a longitudinal section of a Highway, illustrating all the design data.

b-A plate loading test using a 30-inch diameter rigid plate was made on a sub-grade as well as on 10 inches of gravel base course. The unit load required to cause settlement of 0.2 inch was 10 and 40 psi respectively. Determine the required thickness of the pavement to carry a single wheel load of 50000 lb with 100 psi tire pressure.

Question 5

A new ring road in Tanta City has the following data:
Two traffic lanes of 7.5 m wide, design speed =85 km/hr, Degree of curve=10°, Cross slope=3%, Longitudinal grade=4%, The constant of transition curve = 200. The tangent – spiral point (TS) has a station of (215+00) and elevation on centerline of 50 m. Each station equal to 50 m. The circular curve has an external angle equal to 80° . It is required to:

a- Compute the length of the transition curve.
b- Draw a neat sketch showing the execution of the super-elevation by rotation about the inner

Examiners: *Prof.Dr.Ing. M. Hafez Fahmy Aly and Committee*

Tanta University

Department: Civil Engineering
Total Marks: 70 Marks

Faculty of Engineering

Course Title: Geodesy and Satellite Surveying	Course Code:	Year: 4th
Date: January 15, 2011 (First term)	Allowed time: 3 hrs	No. of Pages: (2)

Remarks: (answer all the following questions, and assume any missing data)
(answers should be supported by sketches)

السؤال الأول (٢٥ درجة)

أ- أذكر مع التوضيح بالرسومات الدقيقة ماذا يحدث نتيجة للآتي:

١- عدم تزامن الساعة الموجودة بجهاز الاستقبال مع الساعات الذرية بالقمر الصناعي

٢- إختيار زاوية القطع (Elevation musk) صغيرة

٣- حالة وجود توزيع هندسي سئ للاقمار الصناعية

٤- خبود القمر الصناعي في مساره عند المدار المحدد له **(١٠ درجات)**

ب- أشرح مع **التوضيح بالرسم الدقيق** طرق قياس المسافة بين القمر الصناعي والنقطة المحتلة بالمستقبل الأرضي لنظام الرصد العالمي GPS. **(٥ درجات)**

ج ـ تكلم عن الأساليب المختلفة للرصد في نظام تحديد المواقع بالرصد على الأقمار الصناعية (GPS) **موضحاً الإجابة بالرسم الدقيق** ثم قارن بين الطرق المختلفة للرصد من حيث زمن الرصد لكل نقطة والدقة المحتمل الحصول عليها. **(٥ درجات)**

د - أذكر مع الشرح الأخطاء التي تتعرض لها الموجات الصادرة من الأقمار الصناعية لنظام GPS نتيجة مرورها في الطبقات المختلفة من الغلاف الجوي ثم بين كيف يمكن التغلب على هذه الأخطاء أثناء الرصد. **(٥ درجات)**

السؤال الثاني (١٥ درجة)

أ- إذا كان لديك نوعان من أجهزة الاستقبال الأول بدقة محتملة (٦,٠ سم + ٢ جزء في المليون) والثاني بدقة محتملة (٠,٥ سم + ٥ جزء في المليون) واريد قياس خطي قاعدة بطول ٢٠كم ، ٥٠ كم ـ حدد أنسب جهاز تستخدمه لقياس كل من خطي القاعدة. **(٥ درجات)**

ب- إذا علمت الاحداثيات الكرتيزية (X,Y,Z) للنقطة (م) بالأمتار وأن الأليبسويد المرجعي هو WGS 84 (نصف قطر المحور الأكبر = ٦٣٧٨,١٣٧ كم، نسبة الأبعاج = ١/ ٢٩٨,٢٥٧)

الاحداثي (X) = ٣٧٧٨١٥١,٦ متر

الاحداثي (Y) = ٤٠١٤٥٦٦,٨ متر

الاحداثي (Z) = ٣٩٨٤٦٥٦,٢ متر

أوجد الاحداثيات الجغرافية لها. **(١٠ درجات)**

(الدور الثاني) تصميم منشآت خرسانية مسلحة (٣)

TANTA UNIVERSITY

FACULTY OF ENGINEERING

DEPARTMENT OF STRUCTURAL ENGINEERING

EXAMINATION (4th YEAR) STUDENTS OF CIVIL ENGINEERING

COURSE TITLE: Reinforced Concrete Design III			COURSE CODE: CSE 4115
DATE: 12-1-2011	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 4 HOURS

Notes:
Systematic arrangement of calculations and neat drawings are essential, any missing data should be reasonably assumed, concrete characteristic strength f_{cu} = 25 MPa, and grade of reinforcing steel is 36/52

الإمتحان مكون من 6 أسئلة في ورقتين

PROBLEM # ONE (10 Marks)

I. For a half spherical R.C dome with 15.0 m diameter and 7.50m rise,
- ***Suggest*** the most adequate structural shape of the supporting ring beam.
- ***Indicate*** the most critical design internal force components (meridian force or ring force) and the effect on reinforcement detailing. **(5 Marks)**

III- ***State*** which statement is right and which one is wrong , then ***correct*** the wrong one:
- Prestressing technique can be applied to all RC elements to enhance their structural performance.
- Economically, it is recommended to use post-tensioning technique rather than pre-tensioning. **(5 Marks)**

PROBLEM # TWO (20 Marks)

Shown in **Fig. 1** is a sectional elevation of RC folded plates covering an exhibition hall has dimensions of 40x15m. The hall has a clear height of 6.0 m and columns are allowed only on the outer perimeter of the hall.

It is required to carry out the followings:

i. ***Calculate*** the internal forces and ***design*** the critical sections of the folded plates. **(10 Marks)**

ii. ***Draw*** to a convenient scale sectional elevation and plan showing the details of reinforcement of the folded plates. **(10 Marks)**

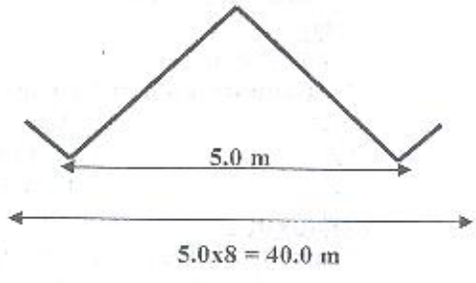


Fig. 1

PROBLEM # THREE (20 Marks)

For the elevated water tank supported on four columns as shown in **Fig. 2**, it is required to:

i. *Carry out* complete design of the tank elements(walls and floor) **(10 Marks)**

ii. *Give* full reinforcement details for the tank in plan and cross sections. **(10 Marks)**

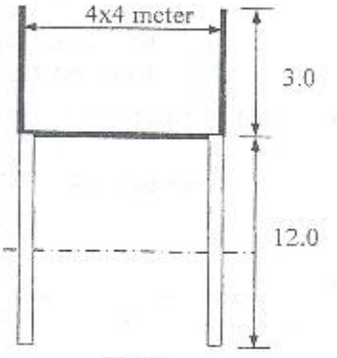
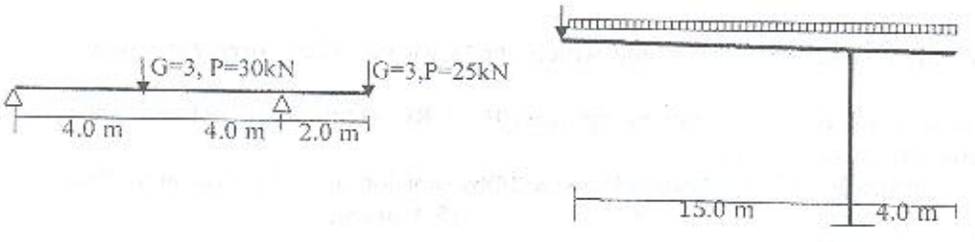


Fig. 2

PROBLEM # FOUR (20 Marks)

I For each of the given cases, indicate wherever pre-tensioning or post-tensioning may be applicable than, draw the proposed cable profile in each case. **(5 Marks)**



II For the shown cross section **(Fig. 3)** of simply supported pre-tensioned pre-stressed concrete beam of 20 m span assuming 12% losses.

Data:

f_{cu} = 45 MPa.

D.L (without o.w) = 7 kN/m'

L.L = 2 kN/m'

Z_T = $92.16*10^6$ mm^3

Z_B = $37.94*10^6$ mm^3

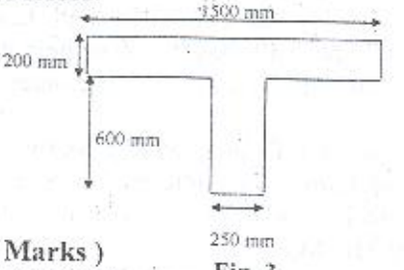


Fig. 3

Required:

- Suggest suitable cable profile. **(4 Marks)**
- Calculate the initial prestressing force P_o (P_i) **(7 Marks)**
- Check stresses at service stage **(4 Marks)**

Please Turn Over ⟶

PROBLEM # FIVE (20 Marks)

The shown plan in Fig.4 is for a 12 story residential building in Tanta of area 15×25m in plan with typical story height of 3.0m and foundation level of -2.25m, the total depth of plain concrete and RC foundations is 1.5m. It is required to carry out the following:

1- Sketch the details of reinforcement for the given shear walls.
2- Calculate both the earthquake and wind loads for the critical direction.
3- Choose the critical horizontal load for this building.
4- Mention briefly how to increase the ductility of RC structure.

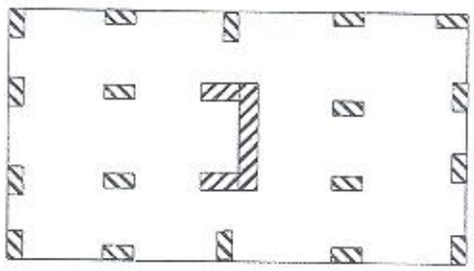


Fig. 4

PROBLEM # SIX (15Marks)

Shown in **Fig. 5** is a sectional elevation of RC dome with 24 m diameter covering an exhibition hall. The hall has a clear height of 10.0 m and columns are allowed only on the outer perimeter of the hall.

It is required to carry out the followings:

I. *Calculate* the internal forces and design the critical sections of the dome. **(8 Marks)**

II. *Draw* to a convenient scale a half elevation and a half plan showing the details of reinforcement of the hall. **(7 Marks)**

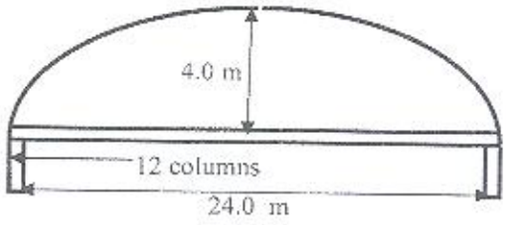


Fig. 5

With best wishes انتهت الاسئلة

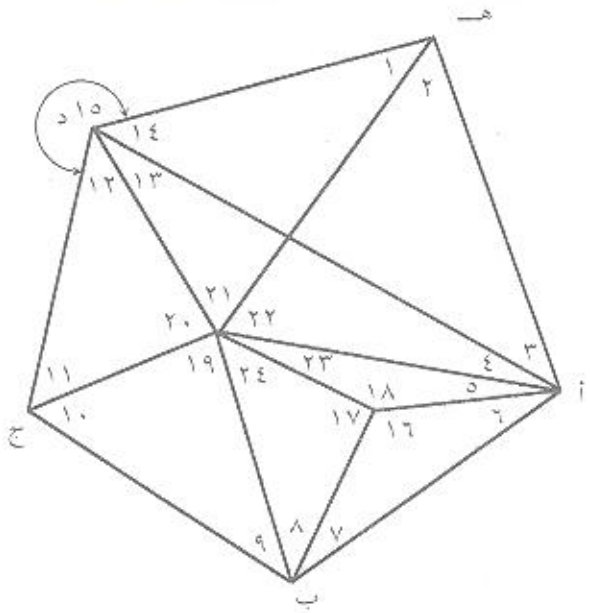
Course Examination Committee:

Prof. Abdel Hakeem Khalil

Assoc. Prof. Dr. Mohamed Hussein **Dr. Nesreen Kassem**

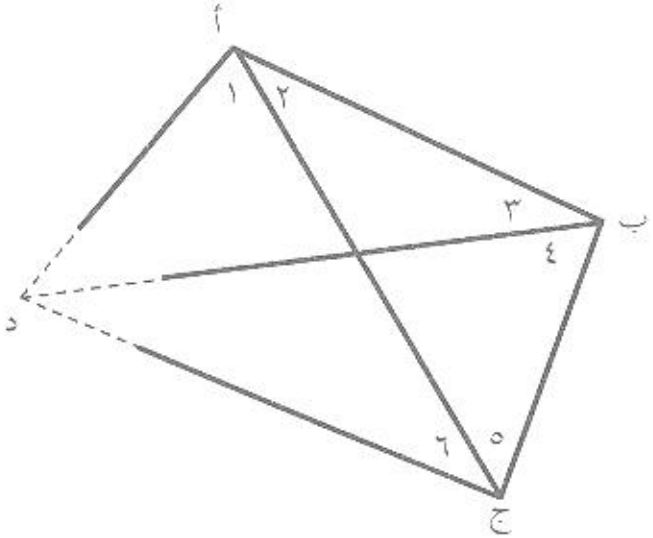
السؤال الثالث (١٠ درجات)

عين عدد ونوع الاشتراطات الهندسية الداخلية لشبكة المثلثات الجيوديسية الموضحة بالشكل مع كتابة معادلة شرطاً واحداً من كل نوع.



السؤال الرابع (٢٠ درجة)

يوضح الشكل جزء من شبكة مثلثات جيوديسية عبارة عن مضلع رباعي (أ ب ج د) مرصود القطرين علماً بأن النقطة (د) غير محتلة والمطلوب ضبط الزوايا المرصودة بالشكل وإيجاد قيمها المصححة بطريقة المعادلات الشرطية إذا علمت أن الزوايا المرصودة كالآتي:



الزاوية ١ = ٣٩° ٤٤′ ٦٨″

الزاوية ٢ = ٤١° ٠١′ ٣٩″

الزاوية ٣ = ٤١° ٥٣′ ٣٠″

الزاوية ٤ = ٣١° ٠٢′ ٦٨″

الزاوية ٥ = ٢٧° ٠٢′ ٤٢″

الزاوية ٦ = ٥٦° ١٥′ ٣١″

مع تمنياتي بالتوفيق

أ.م.د. حافظ عباس عفيفي

Tanta University

Structural Engineering Department
Total Marks: 75 Marks

Faculty of Engineering

Course Title: Foundations Engineering (2)	Course Code: CSE4116	Year: 4th
Date: January 17th 2011 (First term)	Allowed time: 3 hrs (Term Exam)	No. of Pages: (3)

Answer the following questions … answers should be supported by clear sketches

Problem number (1) **(12 Marks)**

(a) Explain the different types of sheet pile walls according to its structure system. **(2.0 Marks)**

(b) Show the main information required to design the sheet piling retaining walls. **(2.0 Marks)**

(c) For the anchored sheet pile wall shown in Figure (1), the allowable stress of steel is 2000 kg/cm^2. You are required to calculate the followings:-

1) The minimum depth of embedment, d, to provide stability. **(4.0 Marks)**
2) The required section modulus of the steel sheet pile. **(4.0 Marks)**

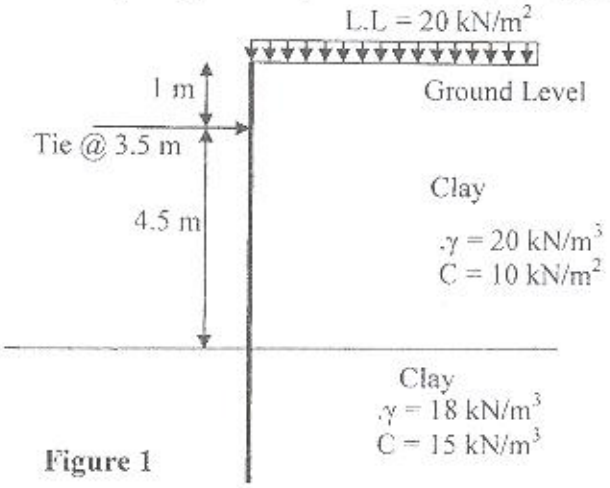


Figure 1

Problem number (2) **(12 Marks)**

(a) Show the different types of braced cuts **(3.0 Marks)**

(b) For the braced excavation shown in the figure design the whole structural elements. **(9.0 Marks)**

For sandy layer
Unit weight = 17.00 kN/m³
angle of internal friction, ø = 40°
For clayey layer
Unit weight = 20.0 kN/m³
Colesion, C = 150 kN/m2
Live load of surface = 10 kN/m2

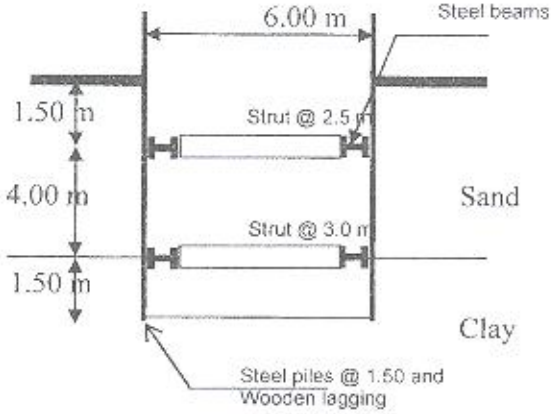


Figure (2)

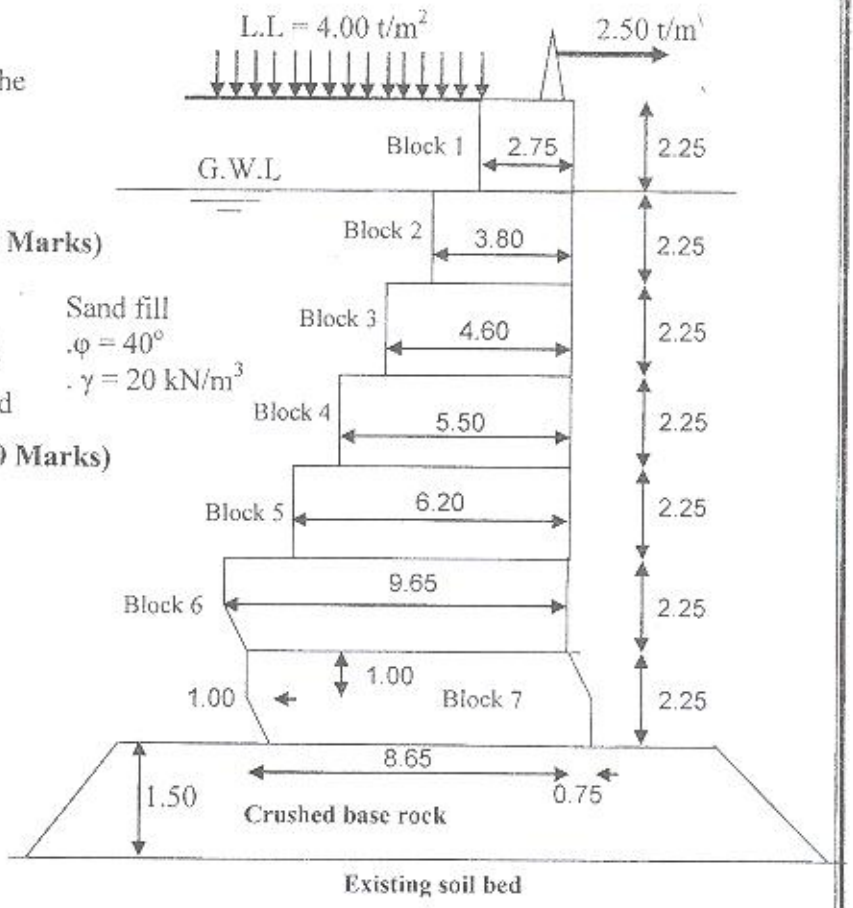
Section of steel sheet pile

Problem number (3) **(13.5 Marks)**

(a) State the different types of gravity retaining walls. **(2.5 Marks)**

(b) For the shown gravity wall in the figure, you are required to:

- Check the stability of block # 6 **(6.0 Marks)**
- Calculate the stress underneath Block # 7 and stress transmitted to the existing soil bed **(5.0 Marks)**



Problem number (4) **(13 Marks)**

a) Illustrate the difference between the sectional and plan flow nets. **(1.5 Marks)**

b) Using clear sketches, discuss the factors affecting the discharge capacity of both well point and deep well. **(1.5 Marks)**

c) Explain how to warranty the safety of old building adjacent to excavation site with foundation level is much deeper than that of the old building **(1.5 Marks)**

d) The section of an excavation is rectangular (20 x 30) m in plan and 7.0 m in depth. The site profile consists of 8.0 m medium to stiff clay overlying 4.0 m medium to coarse sand on intact granite bedrock. The initial ground water table is (-2.0 m). The nearest waterway is far away 150 m. The coefficient of permeability for sand layer = 0.002 m/sec. The available wells are 25 cm in diameter and 12.0 m in length with discharge capacity = 0.014 m^3/sec

(i) Design the pressure relief system. **(4.5 Marks)**

(ii) Estimate the drawdown of water at well and midpoint between wells. **(4.0 Marks)**

Problem number (5) **(12 Marks)**

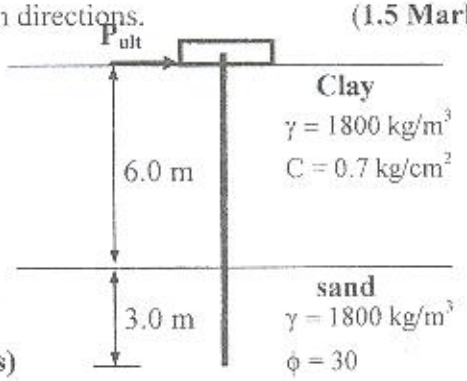
a) Explain how to determine the dynamic load acting on the footing due to the machine vibration. **(1.5 Marks)**

b) Discuss in details how to design the machine foundation illustrating the main points which should be considered in the design . **(1.5 Marks)**

c) Illustrate how to measure the shear modulus in the field. **(1.5 Marks)**

d) Illustrate how to determine the maximum and minimum loads in unsymmetrical pile group subjected to vertical load and moments in both directions. **(1.5 Marks)**

e) For the steel circular pile shown in the next figure
If the yield stress of pile material = 360000 kN/m^2
and the outer and inner diameters of pile are 45 and 43 cm respectively.
Find out the maximum horizontal load can be resisted by this pile. **(6.0 Marks)**



Problem number (6) **(12.5 Marks)**

A structural graduate engineer married a pretty civil graduate engineer in 1990. They built their own house which consists of four typical floors hoping that they will have three children in the future. Unfortunately, they have 7 kids and all of them are boys. So, they need four additional typical floors. The husband has collected all the required date to check the stresses under the raft as follow:

- The plane concrete thickness = 0.30 m
- The thickness of reinforced concrete = 0. 90 m
- The unit weight of soil = 1700 kg/m^3
- The raft is 12 x 15 m with the long side in X direction
- The foundation level = 2.0 m
- The allowable net stress at foundation level=1.0 kg/cm^2
- The load of one floor = 250 t acting in the right bottom quarter with e_x=0.15 m and e_y=0.25 m
- The acting moment on the raft due to considering the lateral loads in Y direction = 300 tm.

Using detailed calculations you are asked to tell the husband:

(a) The maximum stress under the raft under vertical loads only of four floors **(4.0 Marks)**

(b) The maximum number of typical floors that the soil can support safely for the case of both vertical and lateral loads **(4.0 Marks)**

(c) If the wife is blaming her husband as he refused to construct basement floor. She thinks if they constructed a basement floor, she may have more trials to have a beautiful baby girl. If the foundation level in this case would be 4.5 m and the allowable net stress at foundation level =1.10 kg/cm^2 , you are asked to tell the wife the maximum number of typical floors that the soil can support safely for the case of vertical loads only **(4.5 Marks)**

أطيب الأمنيات بالتوفيق

Course Examination Committee

Dr. Mostafa El Sawwaf **Dr. Ashrf Kamal Nazir**

رابعة مدنى لائحة جديدة
هندسة صحية

Tanta Univ.
Faculty of Eng.
Public works Eng.Dep.

First term Exam
Jan.2011

Sanitary Eng.
4th year Civil Eng.
Time : 3.0 hrs

Question 1

(a) A water source has a maximum water level at (10,00) m and the distance to water treatment plant is 2000 m. It is required to transport 0,35 m^3/sec of water from the source to the rapid mixing tank with the water level(20,00)m. by using the low lift pumps with total horse power (216Hp) and $\zeta_1\ \zeta_2 = 0{,}65$. Determine the diameter of the main pipe connecting between the source and R,M,T, (C=100,secondary losses =20% friction losses).

(b)- For water purification plant of discharge 75700 m^3/d, Pilot plant analysis on mixed media indicates that filtration rate of 5 m/h will be acceptable, Assuming a surface configuration of approximately 6.25 * 8 m. How many filter units will be required?

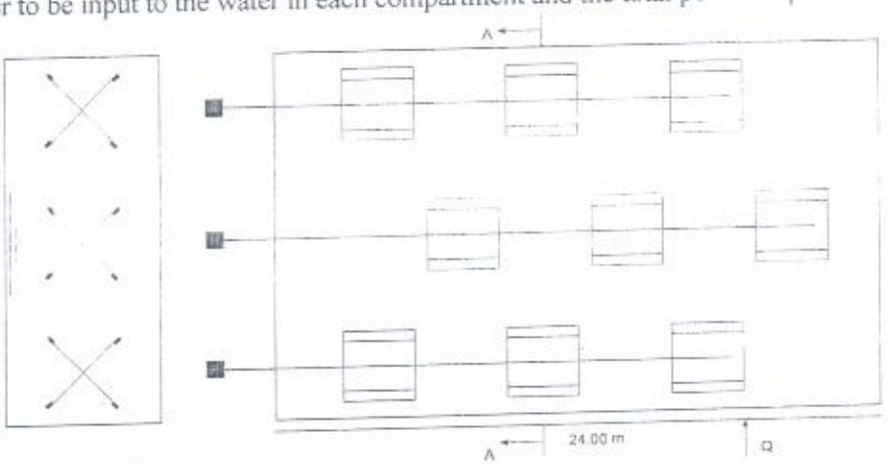
- Allow two units of service for back washing, Determine the net water production of each filter if backwash period requires 15 min, and the ripening period is 10 min.

Question 2

A flocculator basin is to be designed for a water purification plant with a design flow of 50,000 m^3 /day. The basin is to be a cross-flow horizontal-shaft, paddle with a mean velocity gradient of 30 sec^{-1} and a detention time of 30 minutes, Tapered flocculation is to be provided and three compartments of equal depth in series are to be used as shown in the figure, The G values are 40, 30 and 20 sec^{-1}. The outside blades should clear the floor by 0,3 m and be 0,3 m below the water surface, There are to be four blades per paddle, Adjacent paddles should have a clear spacing of 0,5 m together with the wall clearance (V_{act} for the first compartment is 0,65 m/sec)
(at 10°C, $\mu = 1{,}3 * 10^{-3}$ Ns/m^2, and $\rho_w = 999{,}3$ kg/m^3).

Determine:

1- The basin dimensions.
2- The paddle design and rotational speed.
3- The power to be input to the water in each compartment and the total power required for basin.



Sec A - A

Question 3

For a city of population 80000 capita and water per capita consumption 300 L/c/d. There are two available cases of working.

- In case 1 working period 6 A.M - 10 P.M
- In case 2 working period 6 A.M - 8 P.M

* Which case 1 or 2 will be economic to be applied?

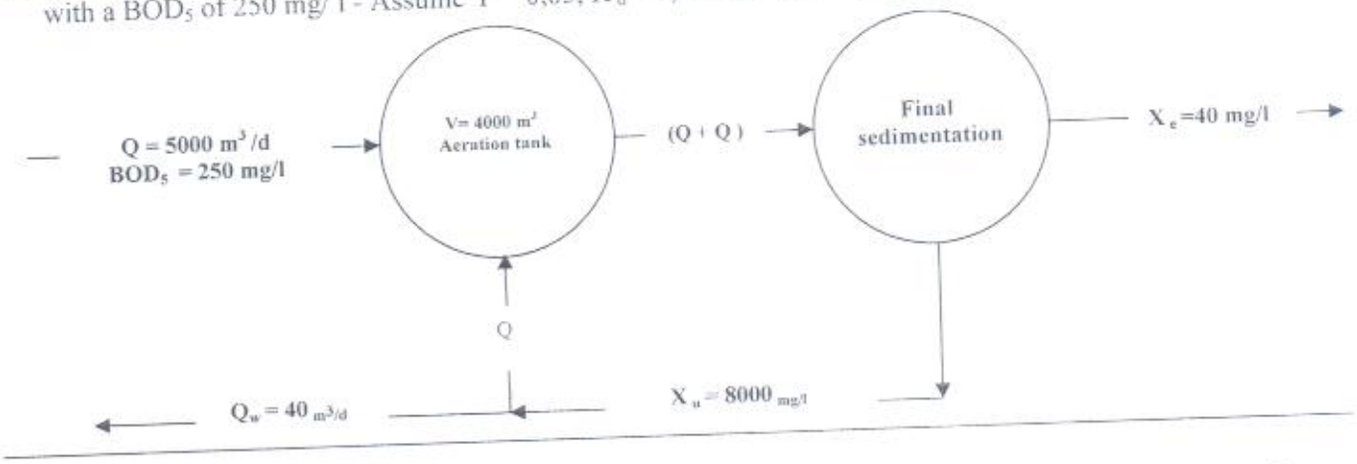
If the cost of increasing 1 m^3/hr = 500 LE & of saving 1 m^3 storage = 50 LE

Time	*Rate, Lit/hr*	*Time*	*Rate, Lit/hr*
12M,N -2	2	12N -2	23
2 -4	2	2 -4	18
4 -6	3	4 -6	23
6 - 8	8	6 -8	8
8 - 10	27	8 - 10	4
10 - 12 N	29	10 -12M.N	3

Question 4

(a) - A grit chamber is designed to remove particles with diameter of 0,2 mm, specific gravity 2,65, settling velocity for these particles has been found (0,02) m/sec depending on their shape factor.
A flow through velocity of 0,3 m/sec will be maintained by the proportional weir, determine the channel Dimensions for maximum wastewater flow of 8,000 m^3/sec.

(b)- Determine an effluent BOD5 and the recirculation flow to be expected from an aeration tank treating sewage with a BOD_5 of 250 mg/ l - Assume Y = 0,65, K_d = 0,05 and Θ_c = 30 days.



Question 5

The following data were collected during field evaluation of an existing conventional activated sludge secondary treatment plant treating municipal wastewater:

Number of aeration tanks	= 10
Dimensions on aeration tank	= 40 ms length 6 ms width 4 ms liquid depth
Influent wastewater	= 18800 m^3/day
Recirculated sludge	= 4000 m^3/day
Wasting sludge	= 16500 m^3/ day
BOD_5 of primary treated waste	= 450 mg /lit
BOD_5 of final clarifier effluent	= 50mg /lit
Under flow concentration (Xu)	= 10,000 mg/lit

a) use the above data to calculate the following :-

- Retention period.
- Mixed liquor suspended solids.
- F/M ratio, volumetric loading.
- Mean cell residence time

b) Is the volume of aeration basins sufficient. If not , estimate the number and dimensions of the required additional tanks. (If the maximum allowable F/M is 0,25 kg BOD5 /kg MLSS).

Question 6

- A city having a present population of 90,000 capita and an average water consumption of 300 l/c/d. It is required to determine the number and dimensions of rapid sand filters if the treatment plant is working 16 hours daily, (rate of filtration l20m^3 /m^2/d)
- If the population of such city will be increased to 170,000 capita after 40 years, and the plant will work 24 hours daily, would the previously designed units be suitable to meet the filter requirements? Determine how many additional units, if any, of the same designed dimensions will be needed if the maximum filtration rate is l60 m^3 / m^2/d.

Notes : $v = 0{,}355\ Cd^{0,63}\ 5^{0,54}$

volume of aeration tank = $\frac{Q\, y\, \Theta_c\, (S-S_e)}{X(1+ k_d \Theta_c)}$

Power = $P = C_d \rho_w A_p \frac{V_p^3}{2}$ P watt ,(Nm/S) $G = \sqrt{\frac{P}{\forall \mu}}$

Good luck
Dr. A . El morsy

هندسة مدنية
تصميم أعمال الري (٢)

TANTA University
Faculty of Engineering
Dept.of Irrigation Engineering & hydraulics

Frist Term Exam-Jan 2011
Forth Year Civil
Time 3hr.

Irrigation design II

افرض اي معلومات قد تحتاجها في التصميم

Question No 1

A Head regulator is required across brarch canal whose cross section is as shown in figure (2), two vent with 4.0ms are used. . It is required to carry out the following :
A – Design plain concrete pier , consider case of double moment .
B – Skatch out a dimensional plan (H.E.R) and longitudinal section througth one of the vents .

Question No 2

Figure (2) shows the cross section of an unsymmetrical lock chamber. Floor, land wall and guide pier are of plain concrete($\phi = 30^\circ$, $\phi^1 = 23^\circ$ and $\gamma_{sat} = 2t/m^3$)
Considering the case of maximum internal forces it is required to carry out the following:
(a) - Check the soil reaction ($f_{all} = 1.2$ kg /cm^2) .
(b) - Find the soil friction diagram ($\mu = \tan \phi^1$).
(c) - Compute the magnitude of the maximum moment.
(d) - Considering an opened miter gale design the tie rods .

Question No 3

A – Explain brifly the different acting forces on gravity dams.
B – Draw a schamatic sketch of cross section for Aswan High Dam , showing the used different methods to minimize the seepage through and beneath the dam.
C – A plain concrete gravity dam was designed according to the middle third only the maximum vertical normal stress, f, was assumed 40kg/cm^2 a result there appeared crushing and vertical cracks near the toe of the dam , fig . (4). Using prismatical elements at the D . S . Side of the dam , explain the reasons of these failures .

مع تمنياتى بالتوفيق

دكتور/ زكريا شلومه

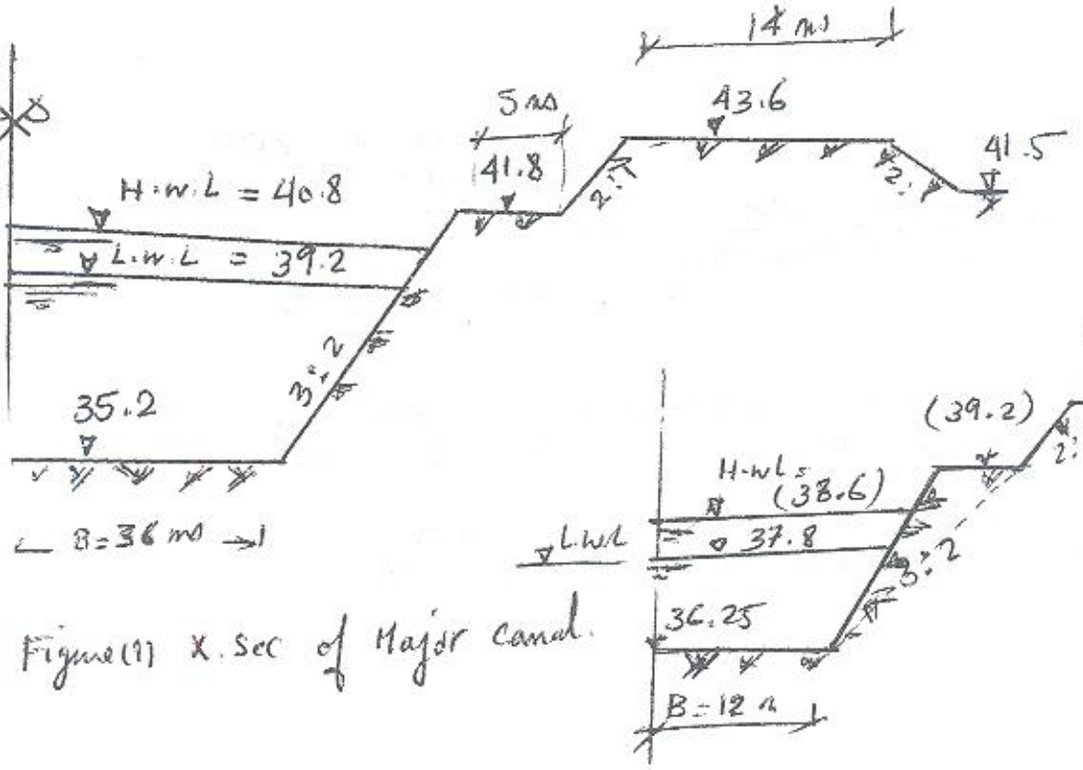


Figure (1) X. Sec of Major canal.

Figure (2) X. Sec of branch canal

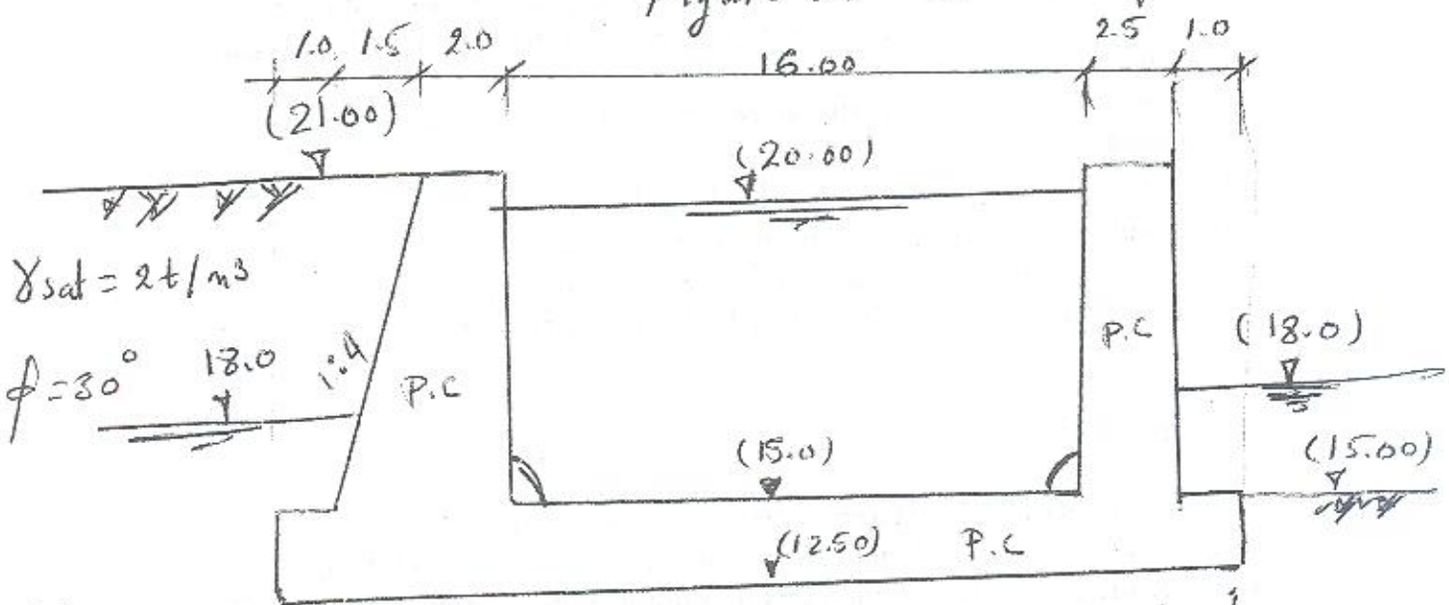


Figure (3) X. section of lock chamber.

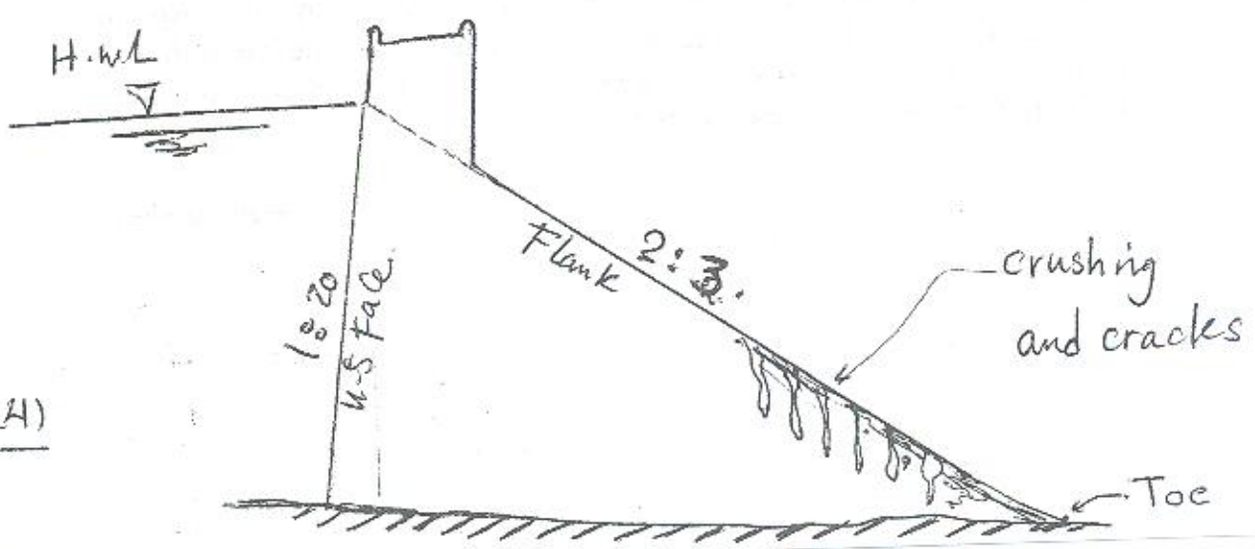


Figure (4)