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

COURSE TITLE: DESIGN OF REINFORCED CONCRETE STRUCTURES (2)		*COURSE CODE*: CSE3210/3223
DATE: MAY -2015	*TERM*: SECOND	*TOTAL ASSESSMENT MARKS*: 100 — 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 ٣ أسئلة فى صفحتين

PROBLEM # ONE (35marks) TRY ALL PROBLEMS

Fig. (1) shows statical system of an intermediate frame ABCDEFG of a series frames spaced 5m. The frame is to be considered braced in two directions in-and-out of plane of the frame. The frame is hinged at A and link support DC. It is required to make a complete ultimate strength design one of the intermediate frame having breadth 400mm and the slab thickness 120mm and the depth of the main girder 1.2m and depth of the cantilevers (0.6/0.8m) for the given ultimate loads including own weights and the vertical reaction at A equals (**YA= 900kN**). Determining the following:

a) B.M., S.F. and N.F. diagrams. **(12marks)**

b) Design the critical sections and check shear stresses of the frame. **(13marks)**

c) Draw to convenient scale the intermediate frame showing clearly the concrete dimensions and the reinforcement details in elevation and in cross sections. **(10marks)**

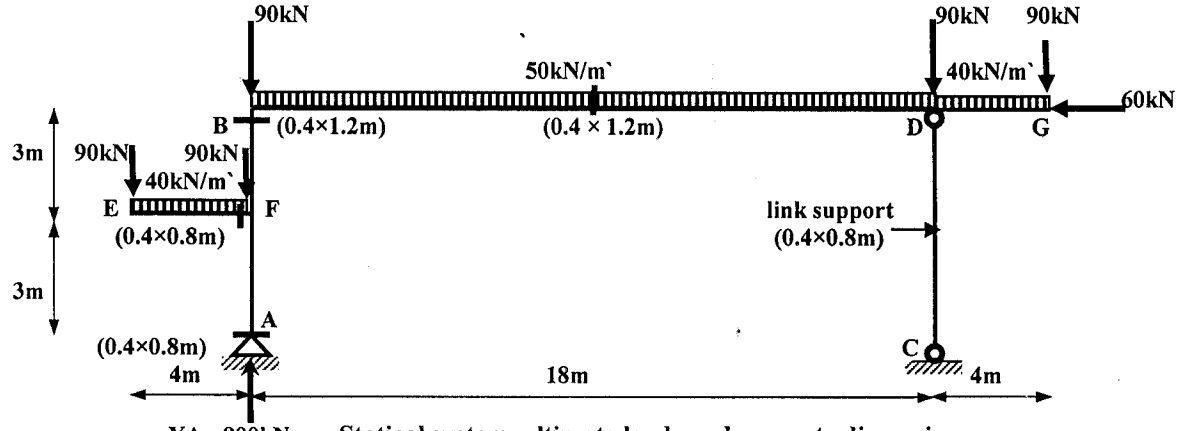


Fig. 1 **Statical system, ultimate loads and concrete dimensions**

PROBLEM # TWO (40marks)

I- Fig. 2 shows a sectional elevation of an arched slab of span 16m supported on columns spaced, S= 6m. The concrete dimensions of the arched slab elements are given in the figure. Consider the following loads of the slab: dead load, g= 6kN/m^2, live load, p= 2kN/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. **(9marks)**

b- Complete design (design + reinforcement details) of the tie. **(6marks)**

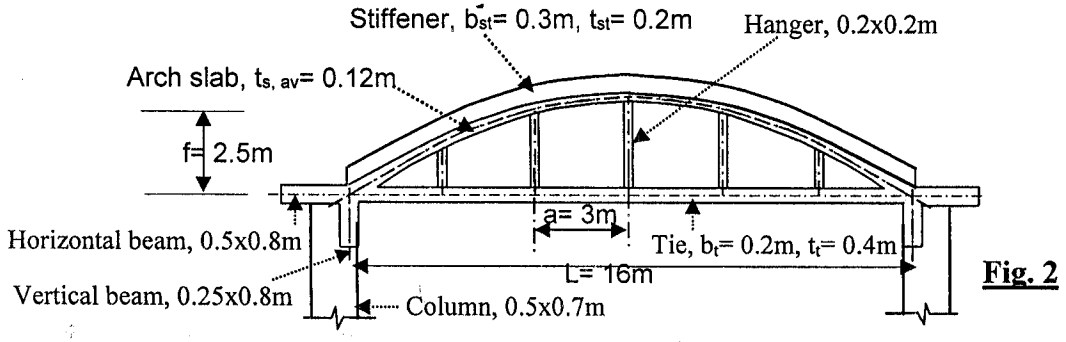


Fig. 2

II- 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). **(25marks)**

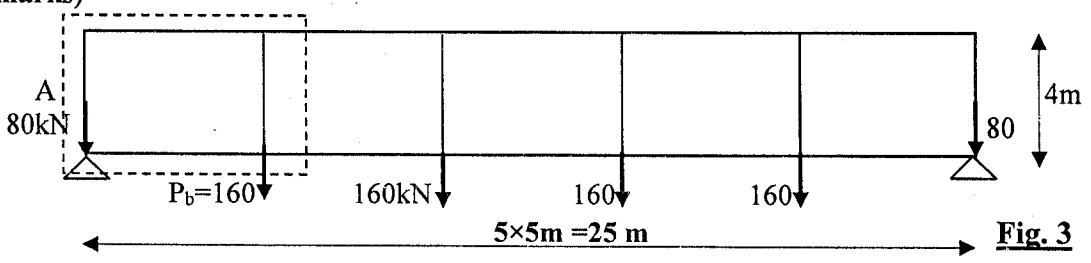


Fig. 3

Please Turn Over

PROBLEM # THREE (35marks)

I. Fig. 4 shows a saw – tooth roof structures. The al
under the footings is required. It is required to carry ou

a) Draw to convenient scale, sectional elevation shc
dimensions. **(8marks)**

b) Using diagrammatic sketches show the statical actio
uniform stress under footing is required, locate the fc
are the requirements for the north light roof structure

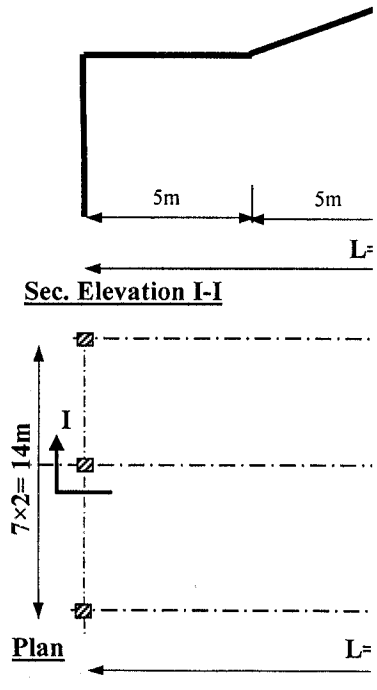


Fig. 4

Tanta University	**Design of Foundations (1); CSE3232**
Faculty of Engineering	**Second chance may. 2015**
Structural Engineering Department	**16 / 5 / 2015**
3rd year Civil Engineering	**Allowable time: 3 hours**

(هندسة انشائية – لائحة جديدة)

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

For all the problems; consider F_{cu} is 250 kg/cm^2 and H.T.S 36/52.

Question No. (1) (15 point)

(a) Differentiate between smell and strap beam showing the function and reinforcement details. **(3 point)**

(b) Draw section elevation of rectangular footing showing how to distribute reinforcement bars in the short direction. **(3 point)**

(c) Discuss how to check the punching stresses for raft foundation. **(3 point)**

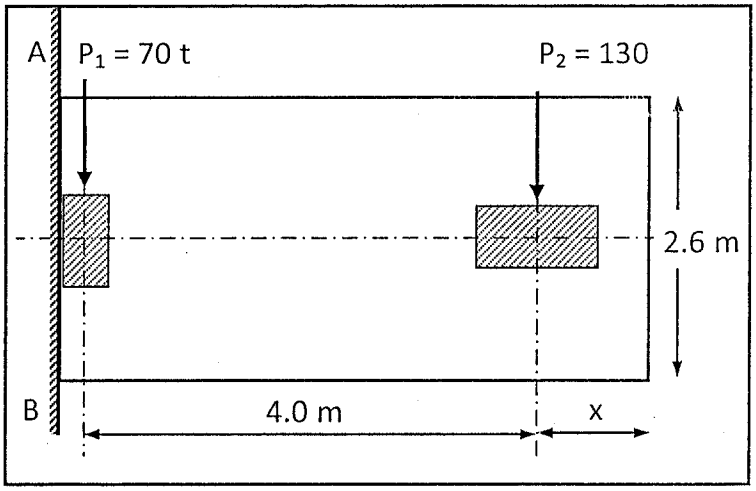
(e) Discuss the problems in footing adjacent to property line showing the different structural solutions. **(3 point)**

(d) Using clear sketch discuss how to determine the transfer steel reinforcement for

(I) a strip footing with inverted beam (II) a strip footing without inverted beam. **(3 point)**

Question No. (2) (15 point)

The figure shows the plan of two adjacent columns. The left column is (30 x 60) cm and carries 70.0 t and the right column is (40 x 80) cm and carries 130.0 t. The allowable net soil pressure is 1.50 kg/cm^2. Considering the thickness of plain concrete = 20 cm and the thickness of the R.C footing = 80 cm, you are required:



(i) Determine the distance (x) which give uniform stresses under the footing **(5point)**

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

(iii) Determine the maximum negative moment if the distance (x) = 0.5 m **(6point)**

Question No. (3) (15 point)

a) Write detailed notes on:

a-1) pile reinforcement **(2 Point)**

a-2) settlement of pile group for both friction and end bearing piles **(3 Point)**

b) For pile load test results tabulated below find

b-1) pile working load **(4 Point)**

b-2) pile settlement at working load **(3 Point)**

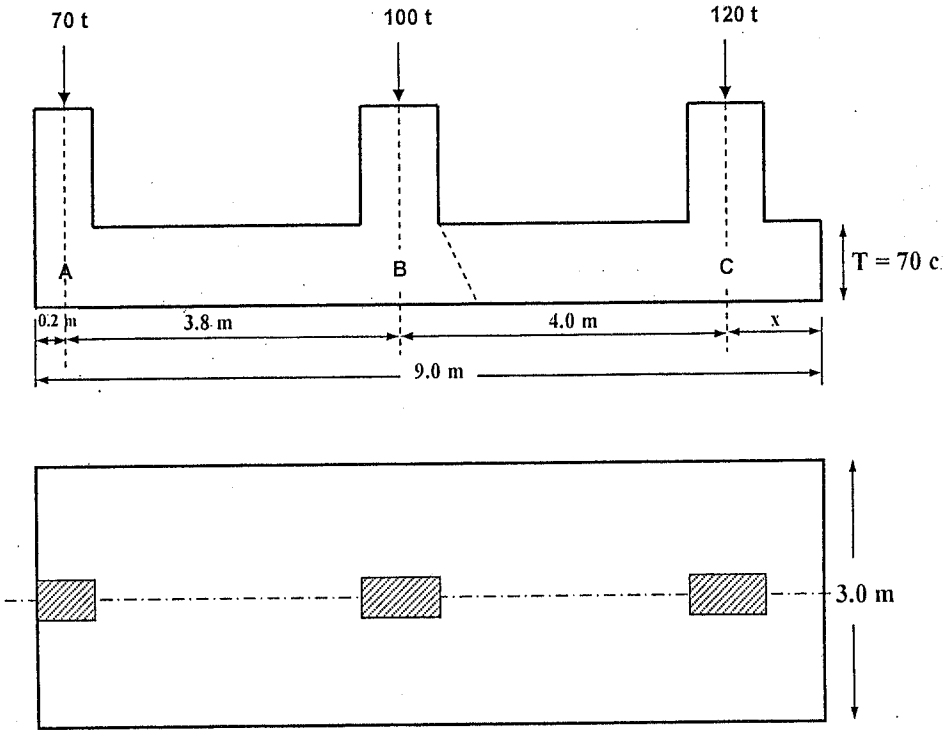
b-3) can we consider the test as successful ? **(3 Point)**

Load, (T)	0	20	40	60	80	100	120
Settlement , mm	0.0	0.26	0.75	1.46	2.98	4.54	9.31

The pile diameter is 50 cm, 20 m in length and modulus of elasticity for pile material = 140 t/cm^2.

Question No. (4) (16 point)

The figure shows the plan and section elevation for a strip footing without inverted beam. 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 distance (x) required to give uniform stress distribution under the footing **(4 point)**

(ii) Check the punching stress at the left column **(4 point)**

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

(iv) Check the stresses under the footing if the distances x is 1.0 m **(4 point)**

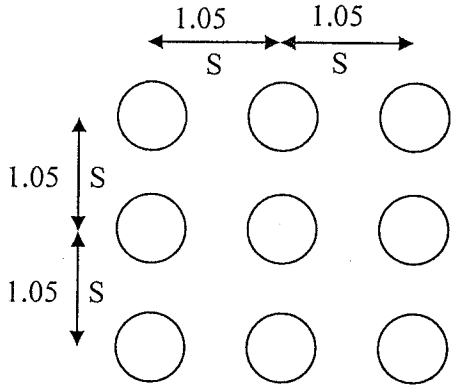
Question No. (5) (24 point)

(a) Discuss what is meant by group action and define the group efficiency illustrating how to estimate it **(4 point)**

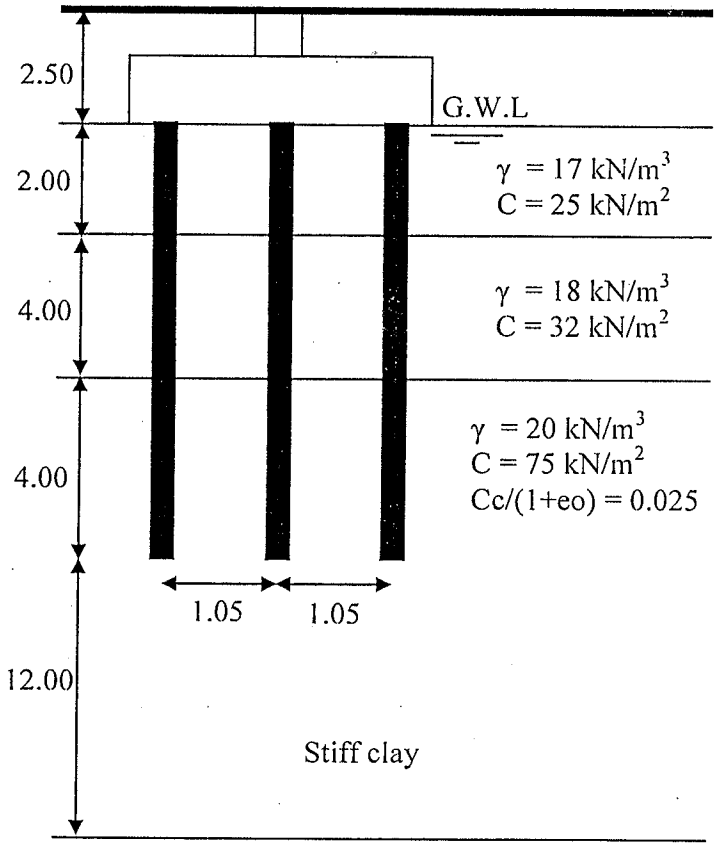
(b) The figure shows 9 piles group constructed in a clayey soil. The column load is 1000 kN and the pile diameter is 35 cm. You are required to:

(i) Estimate the expected settlement of this cap. **(4 point)**

(ii) Estimate the group efficiency. **(5 point)**



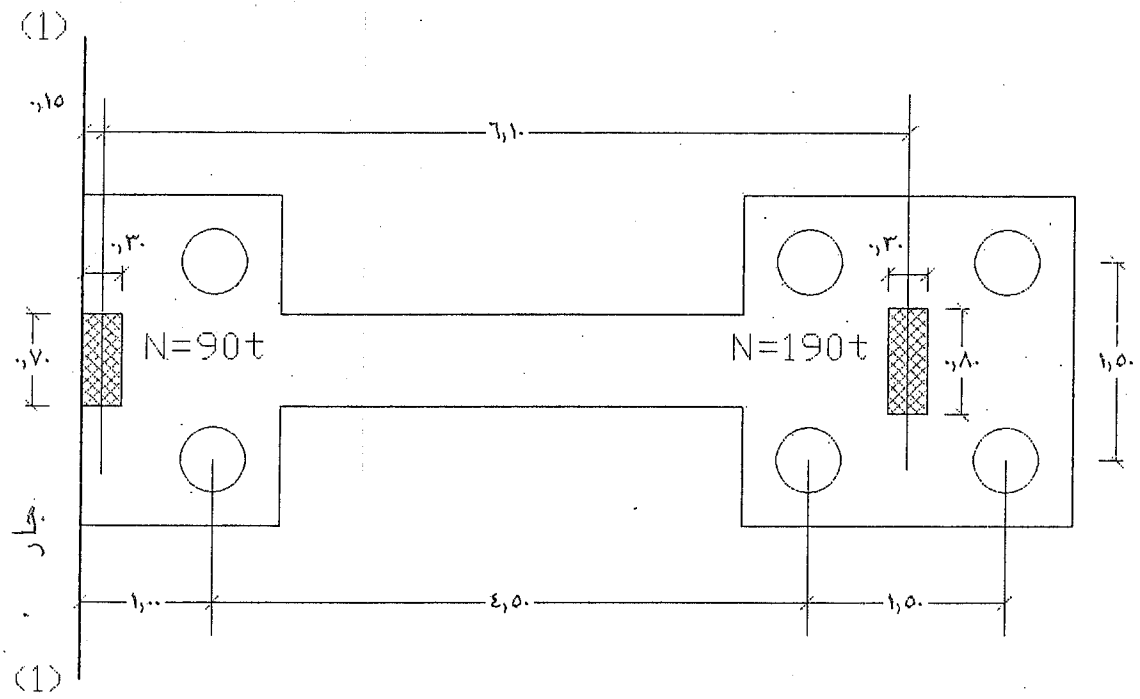
Plan of group



(c) The figure shows a strap beam connecting two columns. Column 1 is 30 x 70 cm and P_{c1} = 90 ton while column 2 is 30 x 80 cm and P_{c2} = 190 ton. The distance between columns centers is 6.10 m. The pile diameter = 50 cm and the safe pile load = 55 ton. You are required to:

(i) Design strape footing only **(7 point)**

(ii) Draw longitudinal section into the strap showing its reinforcement **(4 point)**


(1)
٠,١٥
٦,١٠
٠,٣٠
٠,٣٠
N=90t
N=190t
٠,٧٠
٠,٨٠
١,٥٠
١,٠٠
٤,٥٠
١,٥٠
(1)

Tanta University | Civil Engineering Department | Faculty of Engineering

Total Marks: 70 Marks

Course Title: Railway Engineering	Course Code: CPW3204	Year: 3rd
Date: May 2015	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)

اجب عن جميع الاسئلة مع العناية بالرسومات والنظام وفرض اي بيانات تجدها لازمة.... الاسئلة في ورقتين

السؤال الاول (20 درجة)

1. **أكمل الجمل التالية:**
2. تتساوي مقاومة الانحدار الحاكم مع مقاومة المنحني عند انحدار قدره.....
3. في سكك حديد مصر تحدث أقصي قيمة لمقاومة المنحنيات عند منحني نصف قطره .....
4. يتم تنفيذ 3/2 القيمة النظرية لارتفاع الظهر عن البطن بسبب.....
5. توقف قطار مترو علي منحني افقي وعندما بدأ يتحرك تعرض لـ.....
6. تتأثر القوة المستفاد بها من ألات الجر عند بدء الحركة بـ .....
7. تنقسم تفريعات السكك الي..... و.....و.....و.....

2. اذا كان الانحدار الحاكم لخط سكة حديد هو 5‰ فماهو عدد عربات الركاب التي يمكن جرها بسرعة100 كم/س اذا علم ان وزن العربة 45 طنا وان القاطرة ديزل طراز جـ - جـ ووزنها 132 طنا وقدرتها 2200 حصانا.

3. قطار مكون من 10 عربات مزودة جميعها بالفرامل وزن كل عربة 60 طنا وتسحبه قاطرة طراز جـ - جـ وزنها 120 طنا ويسير بسرعة 140 كم/س لمح سائق القطار قطار بضائع يسير علي نفس الخط وفي نفس الاتجاه نتيجة لخطأ ما. فاذا كانت سرعة قطار البضائع 40كم/س وكانت المسافة بين القطارين لحظة رؤية سائق قطار الركاب القطار الاخر 900 م فهل يحدث تصادم بين القطارين؟ واذا حدث تصادم احسب السرعة عند التصادم. علما بان عدد المحاور المزودة بفرامل للقاطرة 4 محاور.

استعمل معادلات ستراهل حيث (ك = 4000, Δس = 12كم/س) وكان الخط في هذا الجزء ينحدر الي اسفل بمقدار 2%, بالنسبة للقطارين ووزن عربة الركاب الفارغة 50 طنا ومعامل الاحتكاك =0,12.

السؤال الثاني (20 درجة):-

1. احسب الطول الوهمي لخط سكك حديدية طوله 20 كم والانحدار الصاعد عليه 5% بطول 2 كم و يقع علي هذا الخط منحني طوله 800 متر ونصف قطره 500 متر بفرض ان م س+هـ = 4 كجم / طن

2. ارسم كروكي متقن يوضح انواع البلنجات

3. اذكر مميزات وعيوب الفلنكات الخرسانية عند استخدامها في السكك الحديدية

4. اذا حدد الارتفاع الاقصي للظهر عن البطن في سكك حديد مصر 150 مم فكم تكون اقصي سرعة مصرح بها للمسير علي منحني نصف قطره 600 مترا وكم تكون العجلة المركزية الخارجية ودرجة المسير. كذلك ماهي السرعة الحرجة.

5. خط سكك حديدية مفرد السرعة القصوي عليه 105 كم/س يتكون من منحني عكسي انصاف اقطاره 700, 900 متر

علي التوالي فاذا علم ان ارتفاع الظهر عن البطن المسموح به هو 150 مم و أن المسافة التي تفصل المنحنيين قصيرة وطولها 110 متر. المطلوب حساب أطوال منحنيات الانتقال و ميل المنحدرات (بفرض ان المنحدر خط مستقيم)- أوجد كذلك احداثيات منحني الانتقال

السؤال الثالث (30 درجة):-

1. ارسم كروكي متقن لمفتاح شمال مقابل علي خط سكة حديد مفرد
2. اذكر اسباب الاجهادات في قضبان السكك الحديدية
3. سكة ذات اتساع واسع 1542 مم يسير عليها قطار ركاب سرعته 125 كم/س تجره قاطرة ديزل كهربائي طراز أ1أ-أ1أ وزنها 132 طنا وعدد من العربات وزن كل منها 50 طنا (4 محاور) والفلنكات خشبية مقاسها 265*25*15 سم وتقسيطها 63 سم. والمطلوب ايجاد:-

أ) أقصى اجهاد بالفلنكات الخشبية اسفل محور القضيب وفي منتصف الفلنكة بفرض ان توزيع الضغط منتظم

ب) الطول المناسب للفلنكات بحيث يتساوي الاجهاد اسفل محور القضيب وفي منتصف الفلنكة

ج) أقصى ضغط رأسي يمكن حدوثه اسفل محور الفلنكة وعلي عمق 40 سم

د) أقصى ضغط رأسي يمكن حدوثه اسفل في منتصف المسافة بين فلنكتين علي نفس العمق السابق- استعمل معادلة تالبوت المعدلة.

قوانين هامة

م س+هـ قاطرة = (250/و) * ((س+Δس)/100)^2

م س+هـ عربة= 2,5 + (س+Δس)^2/ ك

μ= ((9000/ (42+س)) +116)/1000

(ل ف) = (4,2 (و + ق)(س ق ^{2} - س ب ^{2})) / ق ف

ق ف = (و + ق)(م س+هـ متوسطة ± م ح + م م) + 1000 η (و ف + ق ف غ) e_f*

ن ف = (ن + 0,03 (و+ ق)*(س ق-س ب))/((و + ق)/1000*(م س+هـ متوسطة ± م ح + م م) + η (و ف + ق غ ف) ef*)

ض =((122- ص)/ 56)*(ض ا/ط)*(α+ جا α جتا β2)

ض = (52,8 ض ا/ ص ^{1,25})*(10) $^{-6,13 *(س/2ص)^{2,5}}$

س$_1$ =(4/ط)((μ)/(EI4))$^{4/1}$ سم

ع$^/$ = 0,318 و س$_1$ كجم. سم

ص$^/$ = (0,393 و)/ (μ س$_1$) سم

With best of luck: Dr. Ragaa and the Examining Committee

TANTA UNIVERSITY

FACULTY OF ENGINEERING

Department of Irrigation and Hydraulics Engineering

Examination 3RD Year Students of Civil Engineering (تخلفات)

Course Title: **Design of Irrigation Works (1)**		Course Code: **CIH3206**	
Date: **17 – 05 – 2015**	Term: **Second 2014/2015**	Total Assessment Marks: **150**	Time Allowed: **4 Hours**

Notes:

- *Systematic arrangement of calculations and clear neat drawings are essential.*
- *Any data not given is to be reasonably assumed.*
- الإمتحان مكون من ثلاثة أسئلة فى ثلاثة صفحات بالإضافة الى جداول تصميم قطاعات الخرسانة.
- غير مسموح باصطحاب أى جداول أو منحنيات.

Question No. 1 (70 Marks)

A. ***Distinguish*** *between the different* ***alternative works****, which can be used for the crossing of* ***Road – Canal.*** **(8** marks**)**

B. ***Give****, using neat sketches, the typical* ***reinforcement details*** *of a* ***RC slab bridge*** *in the* ***two directions****.* **(20** marks**)**

C. *A RC girder bridge is to be constructed across the shown main canal in Figure (1). The bridge consists of* ***two vents****, each is* ***6 m span****. The crossing road is a* ***10 m*** *width, its level is* ***(14.00)*** *and its side slopes are* ***2:1****.*

- *The bridge deck width is* ***7 m*** *and has 2 sidewalks of* ***1.5m*** *each.*
- *PC pier of* ***2m*** *width is used.*
- *The US and DS used wing walls are* ***RC box*** *and* ***RC broken****, respectively.*
- *The soil properties at the bridge site are:* $\varphi = 30^{o}$, $\gamma_{bulk} = 1.8\ t/m^3$, $\gamma_{sat} = 2\ t/m^3$ *and the soil bearing capacity is* ***1.8*** kg/cm^2.
- *For* ***RC*** *elements,* ***steel (36/52)*** *and* ***concrete*** (F_{cu} ***= 250 kg/cm²)*** *are used.*

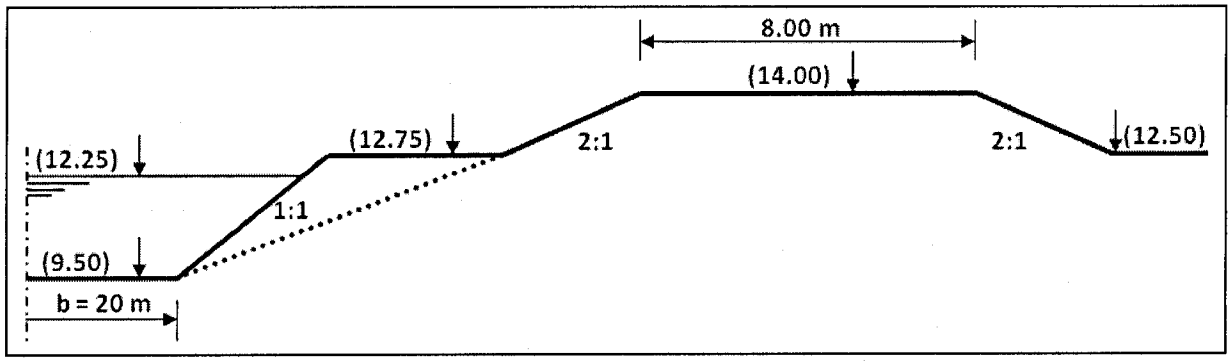


Figure 1

It is required to:

1. Find the **maximum passing discharge** under the bridge. **(5** marks)
2. **Give** the complete structural design of the bridge **girders and sidewalks.** **(10** marks)
3. **Check** the soil bearing capacity under the pier for the case of **maximum axial force**. **(7** marks)
4. **Draw,** into scale of **1:100, a plan (H.E.R.)** for the bridge layout. **(10** marks)
5. **Draw,** into scale of **1:50, the reinforcement** details of the **bridge girder (Long. Direction)**. **(5** marks)
6. **Draw,** into scale of **1:20, the reinforcement** details of the **bridge girder (Cross-section)** and the **sidewalk**. **(5** marks)

Question No. 2 (50 Marks)

A. Using neat sketches, if possible, **briefly explain** the different functions of culverts. **(12** marks)

B. *A **RC Box culvert (2 vents)** will be constructed to pass the discharge of the shown canal of **Figure (2)** under a high-way.*

- *The maximum passing discharge of the canal is **16 m^3/sec**.*
- *The **internal span** of the culvert vent equals to **its internal height** which is **2.30** m.*
- *The high-way is **20 m** width, side slopes are **1:1**, and its level is **(35.00)**.*
- *The US and DS used wing walls are **PC box and broken**, respectively.*
- *The soil properties at the culvert site are: $\varphi = 30^o$, $\gamma_{bulk} = 1.8$ t/m^3, $\gamma_{sat} = 2$ t/m^3 and the soil bearing capacity is **1.7** kg/cm^2.*

It is required to:

1. **Check** the culvert hydraulic design. (K_r =0.1 , **a**=0.003 & **b** = 0.03) **(8** marks)
2. **Give** the complete structural design of the culvert, considering the **external loads only** – use an equivalent live load of **2 t/m^2** as the **only live load on the high-way.** (design **only two** critical sections). **(15** marks)
3. **Draw,** into scale of **1:100, a longitudinal section** of the **culvert** showing all levels and dimensions. **(8** marks)
4. **Draw,** into scale of **1:20, the reinforcement** details of the **culvert cross-section**. **(7** marks)

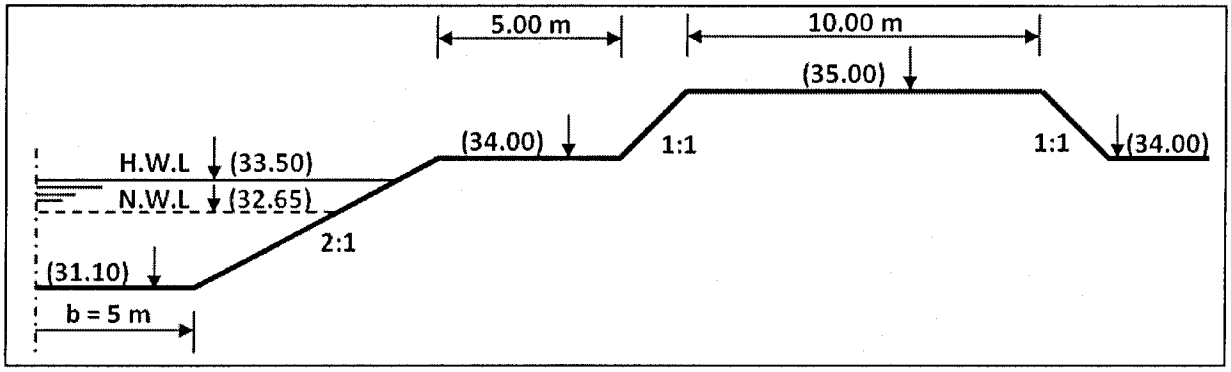


Figure 2

Question No. 3 (30 Marks)

*It is required to construct a **steel pipe aqueduct** to pass a discharge equals **3 m^3/sec** of the branch canal across the main canal as shown in **Figure (3)**.*

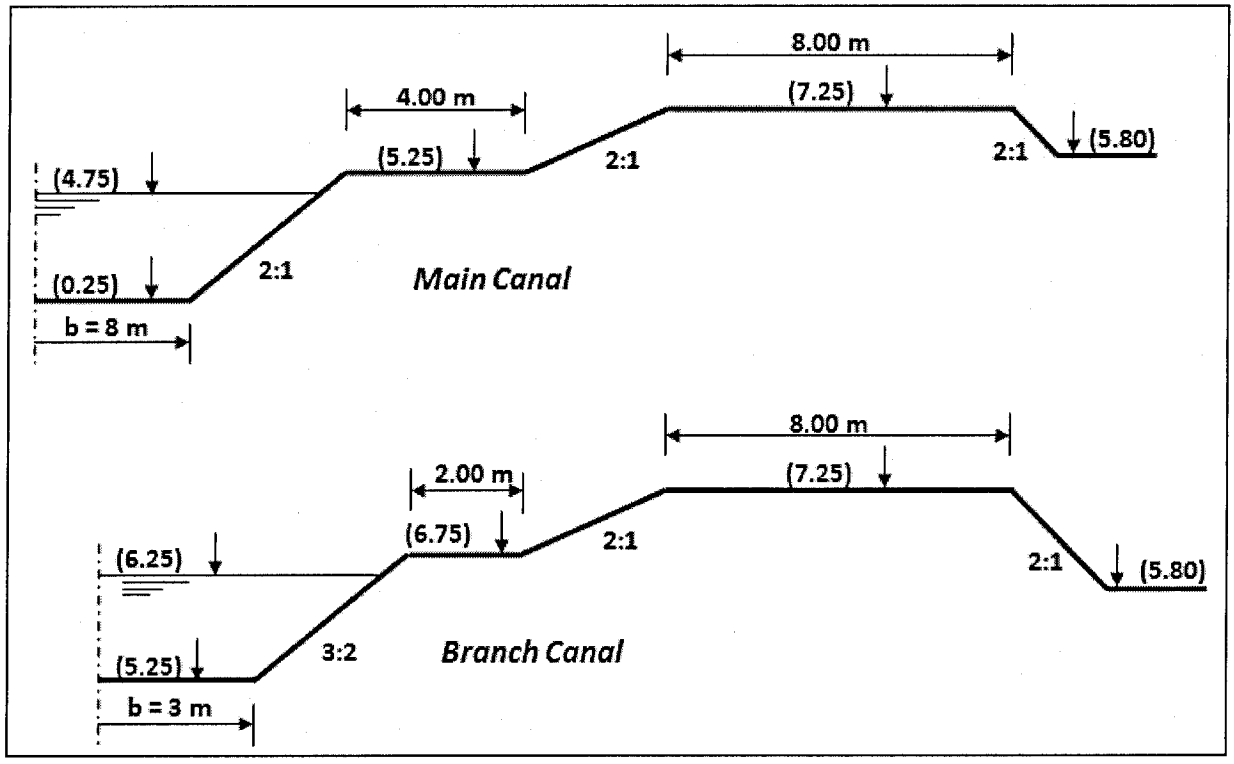


Figure 3

إنتهت الأسئلة

مع أطيب الأمنيات بالتوفيق

د / محمد الشيمى – د / مسعد خضر

Useful information: