Code equation:

For member meeting the local buckling requirements and having an axis of symmetry in, and loaded in the plane of their web:

a- when the compression flange is braced laterally at intervals not exceeding:

$$\frac{1380 \cdot A_f \cdot C_b}{d \cdot F_y}$$

b- When the above condition is not satisfied, the allowable compressive bending stress is governed by the lateral-torsional buckling stress f_{ltb} which is computed as follows:

I-For shallow thick flanged sections, the lateral torsional buckling stress is governed by the torsional strength given by

$$f_{ltb1} = \frac{800 \cdot A_f \cdot C_b}{d \cdot L_u} \leq 0.58 F_y$$

II-For deep thin flanged sections, the lateral torsional buckling stress is governed by the buckling strength given by:

$$f_{ltb2} = 0.58 F_y \qquad for \; L_u / r_t < 84 \sqrt{C_b / F_y}$$

$$f_{ltb2} = \left(0.64 - \frac{(L_u / r_t)^2 F_y}{1.176 \times 10^5 C_b} \right) F_y \leq 0.58 F_y \qquad for \, 84 \sqrt{C_b / F_y} \leq L_u / r_t \leq 188 \sqrt{C_b / F_y}$$

$$f_{ltb2} = \left(\frac{12000 \cdot C_b}{(L_u / r_t)^2} \right) \leq 0.58 F_y \qquad for \; L_u / r_t > 188 \sqrt{C_b / F_y}$$

The lateral torsional buckling stresses is to be taken as the greater of the two values obtained from equation of f_{ltb1} and f_{ltb2}.

Note:

1   $C_b = 1.13$ for simply supported beam carrying uniform load.

2. r_t is the radius of gyration about the minor axis of a section comprising the compression flange plus on sixth of the web area

Best Wishes

Required:

1. Draw with a suitable scale the general layout of the bridge including the required systems of bracing (elevation, plans, side view, … etc.). (12 %)

2. Calculate the max. B.M. and max. S.F. acting on an intermediate stringer due to dead load, live load and impact, then design a suitable section for the stringer as simply supported beam, use $f_{sr} = 1.68$ t/cm2. (14 %)

3. Calculate the max. B.M. and max. S.F. acting on an intermediate cross girder (X.G.) due to dead load, live load and impact. (12 %)

4. Using the influence line of the bending moment at mid-span, calculate the maximum bending moment on the main girder due to live load plus impact only. Use only one case of loading which you think is most critical. (12 %)

5. Design the welded main plate girder. Consider $f_{sr} = 1.26$ t/cm^2. (16 %)

6. Check the lateral torsional buckling stresses of the compression flange of the welded main plate girder. Consider the flexibility of the U frame $\delta = 0.06$ cm/ton and $E = 2100$ t/cm^2. (12 %)

7. Calculate the flange plate lengths of the welded main plate girder considering one step curtailment. (12 %)

8. Check the safety of the web buckling due to pure bending. Given the critical buckling stress $f_{cr} = k [1898(t/b)^2]$. (10 %)

Tanta University	Structral Engineering Departement	Faculty of Engineering

| Course Title: Design of Metallic Bridges	Code : CSE4217	Fourth Year Civil
Date: 6/2011	Time : 3 Hour	No. of pages: 3

Not allowed to use codes or tables. Assume any missing data.

A double track open timber floor railway plate girder pony bridge has a span of 24.0 m divided into 4 equal panels 6 m each. The main girders are welded plate girders having a depth of 240 cm and they are spaced 9 m apart. The main girders are provided with vertical stiffeners every 1.5 m as well as with horizontal stiffeners at 1/5 of the depth from the compression flange. The bridge is provided with wind bracing, stringer bracing. Material of construction is St. 44 with a yield stress Fy = 2.8 t/cm2 and. Live load is train type D.
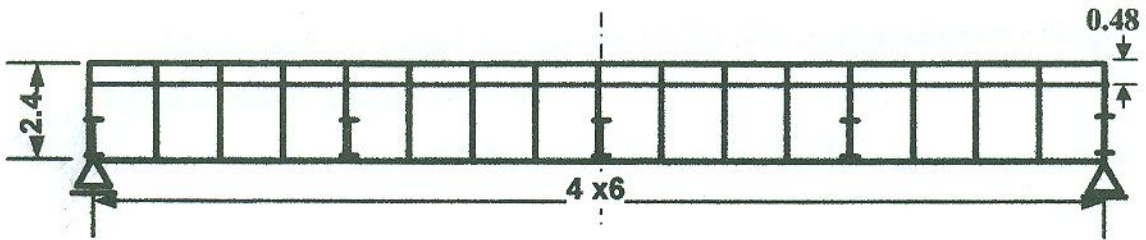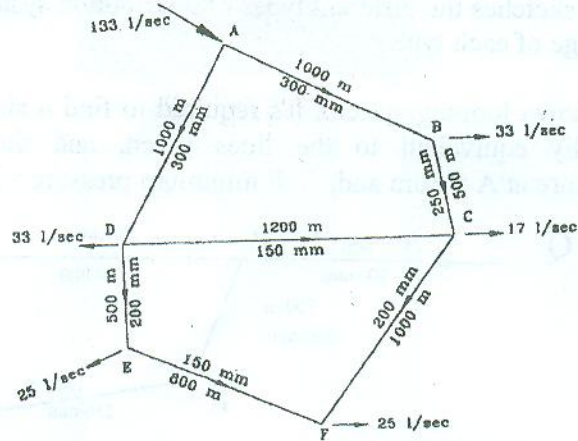

Elev. of Main Girder
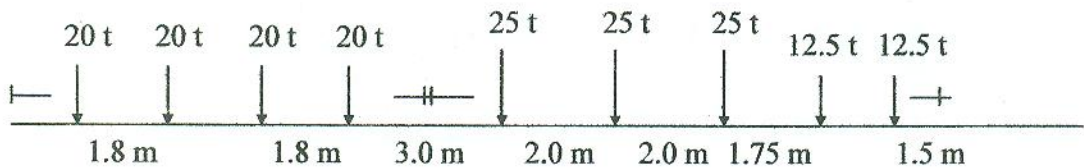
Train Type D: (Axle Loads)

4) By using Hardy-Cross method with Hazen's William formula. It's required to calculate the head losses and the corrected flows in the various pipes of the distribution network shown in the figure. Compute the corrected flows after two corrections.

5-a) What is your choice for pipe type in each case of the following with the reason:
- Rising main pipe to wastewater treatment plant.
- Main collector line of sewage of 1200 mm.

5-b) A main sewer collector 1500 mm in diameter and has a slope of0 .0009 carries at max. flow 800 l/s. this collector joints a branch sewer 500 mm in diameter that carries at max. flow 180 l/s, and 70 l/s at min. flow. At what height above the invert level of the main collector should the branch sewer enter. If the branch sewer has a slope of 2.5 ‰ .

5-c) For a city of population 160,000 capita and average sewage flow 160 l/c/d. It's required to design the main collector for this city if the sewer is following 2/3 full at maximum flow with peak factor 1.9, minimum factor 0.6 and minimum velocity 0.6 m/s.

6-a) Write brief notes about, the location of manholes in the sewerage system. Draw cross-section on one chosen manhole.

6-b) For the district shown in the given map it is required to plan the sewerage system showing the direction of flow, location of manholes and pumping station on it.
Note,(this map must be attached to your answer paper)

6-c) A circular sewer is to carry 0.75 m³/s when running 2/3 full at maximum flow and 0.20 m³/s at minimum flow. Determine the diameter and minimum slope of sewer. Then calculate the velocity and depth of sewage flow at maximum and minimum flow.
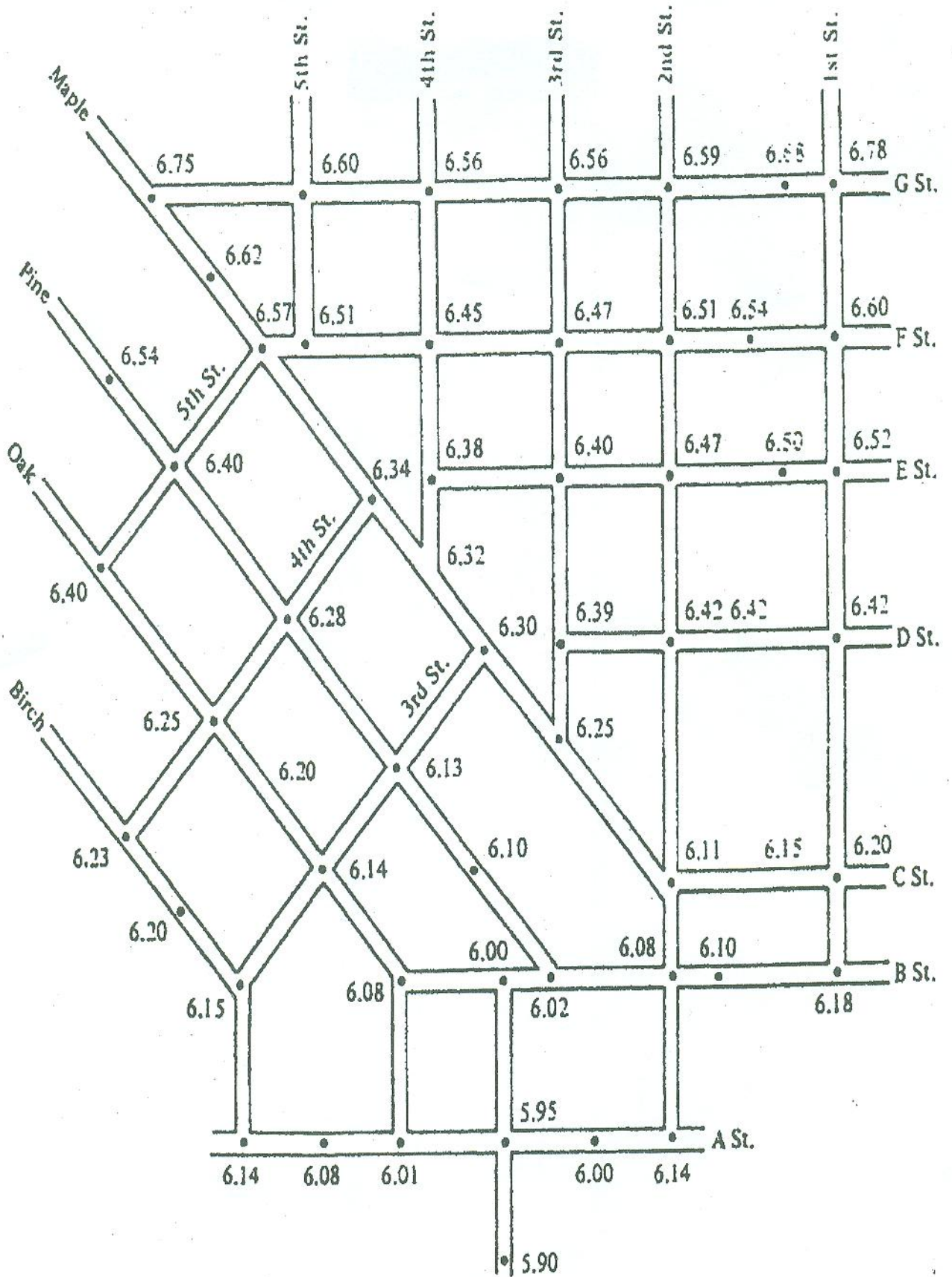
Hints :
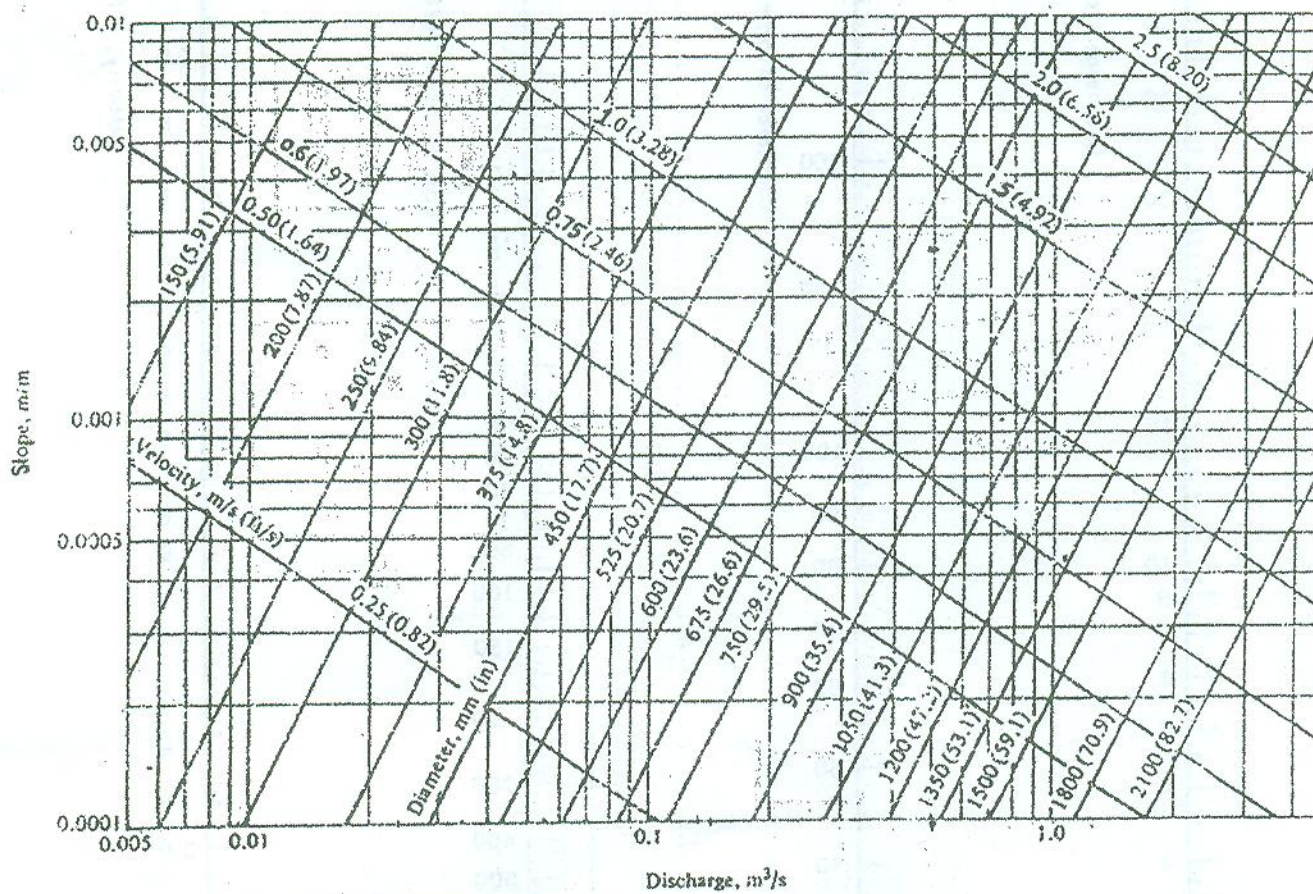$$V = 0.355 \, C \, D^{.63} \, S^{0.54}$$
$$HP = \gamma \, Q \, H_t / 75 \, \eta_1 \eta_2$$
$$\eta_1 \eta_2 = 0.8$$

Good luck
Dr. A. El-Morsy
Dr. Abdelaziz

5th St.

4th St.

3rd St.

2nd St.

1st St.

Maple

6.75　　　6.60　　　6.56　　　6.56　　　6.59　　6.58　　6.78

G St.

6.62

Pine

6.57　6.51　　6.45　　　6.47　　6.51　6.54　　6.60

F St.

6.54

5th St.

6.40　　　　6.34　6.38　　　6.40　　6.47　6.50　　6.52

E St.

Oak

4th St.

6.32

6.40

6.28　　　6.30　6.39　　6.42 6.42　　6.42

D St.

3rd St.

6.25

6.25

6.20　6.13

6.25

Birch

6.23

6.10

6.11　6.15　　6.20

C St.

6.14

6.20

6.00

6.08　6.10

B St.

6.15

6.08

6.08

6.02

6.18

5.95

A St.

6.14　6.08　6.01

6.00　6.14

5.90

3
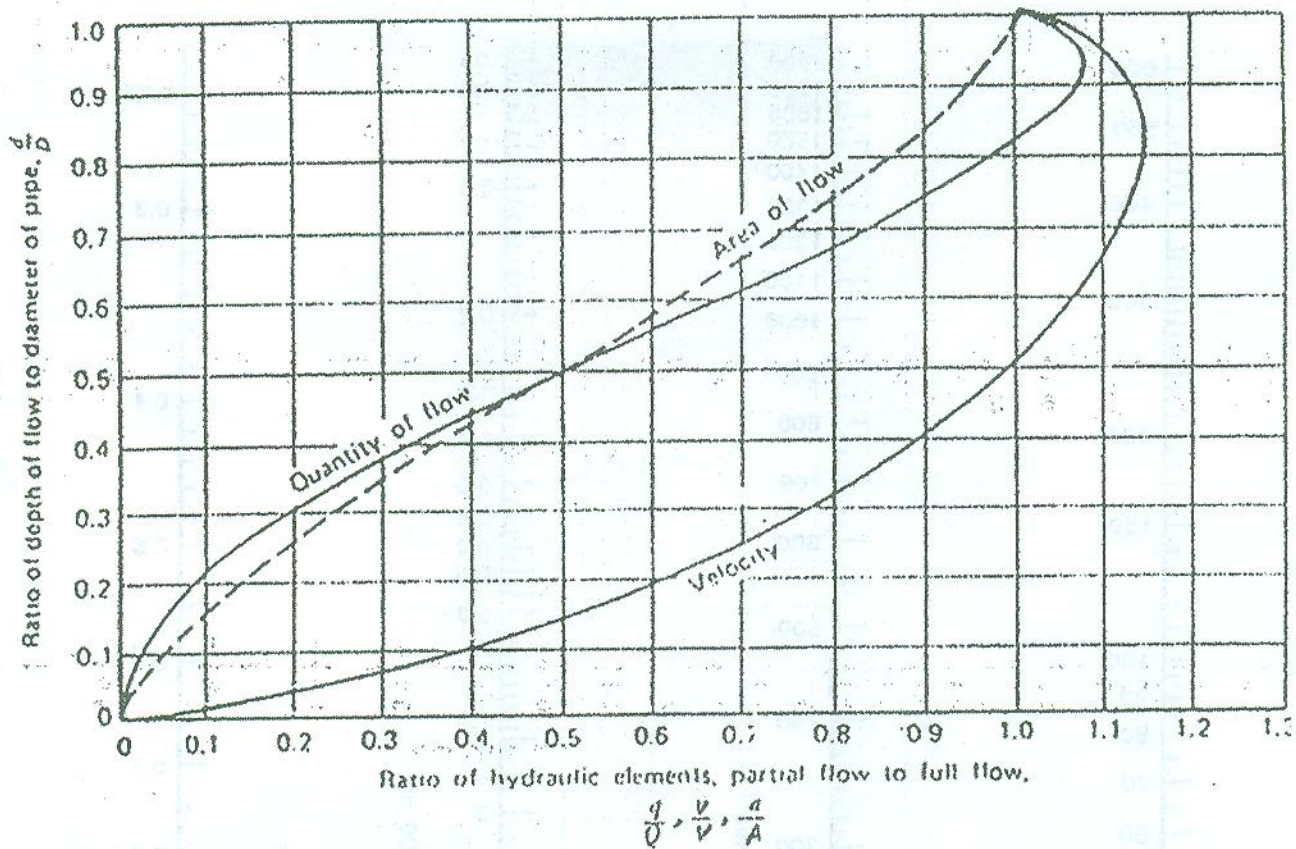
Nomograph for solution of Manning's equation for $n = 0.013$.

Nomograph of Hazen - Wiliams equation.

Tanta University
Faculty of Eng.
Public Works Eng. Dept.

Water & Wastewater Networks
Jun 2011

4th Year Civil Eng.
مقرر اختياري (٢)
Time: 3 hrs
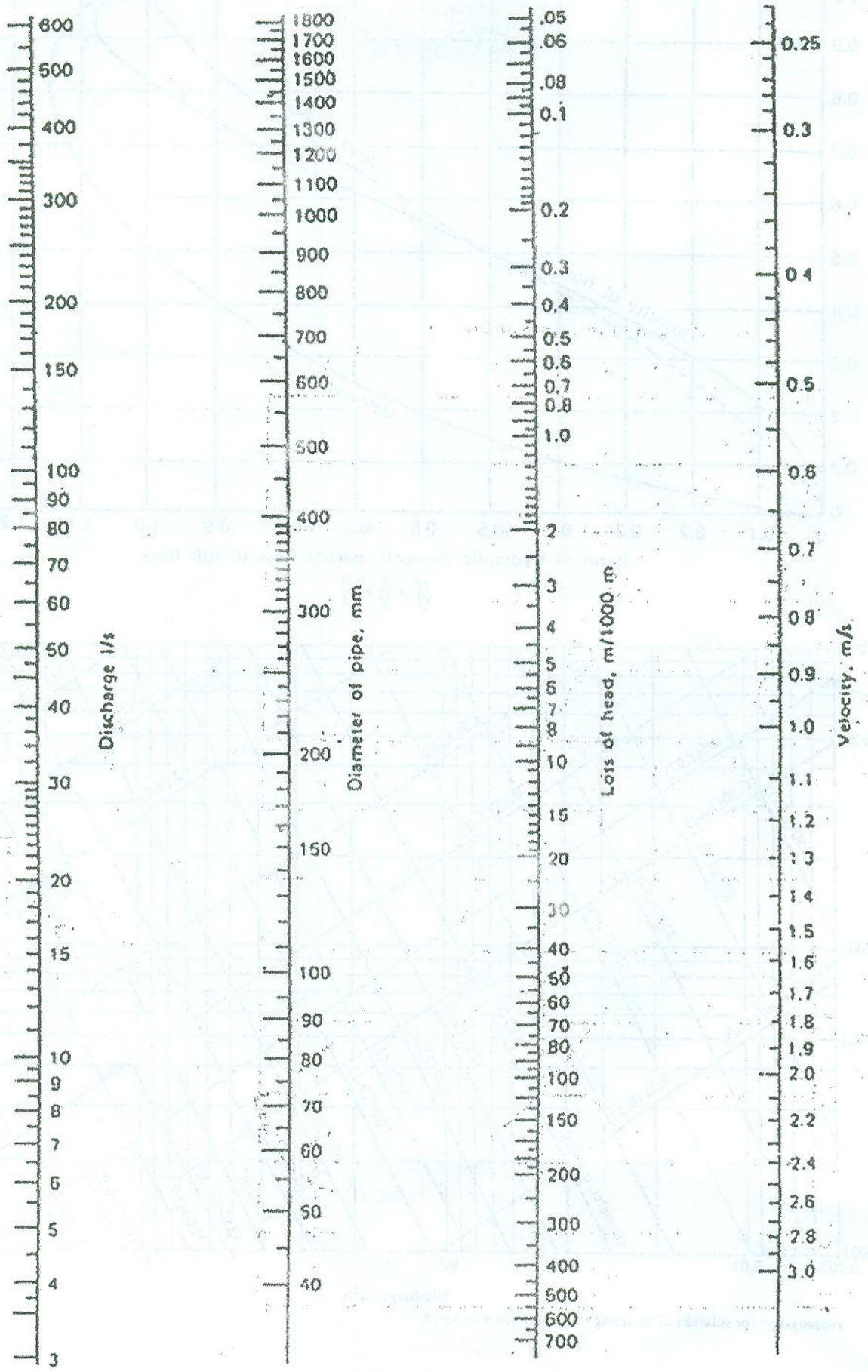
1-a) State using sketches the different types of distribution systems ? Discuss the advantage and disadvantage of each type ?

1-b) For the shown looping system, it's required to find a single pipe 3000 m long, which is hydraulically equivalent to the lines given, and the discharge (Q) in this pipe, if the pressure at A = 50m and,   F minimum pressure =25m.
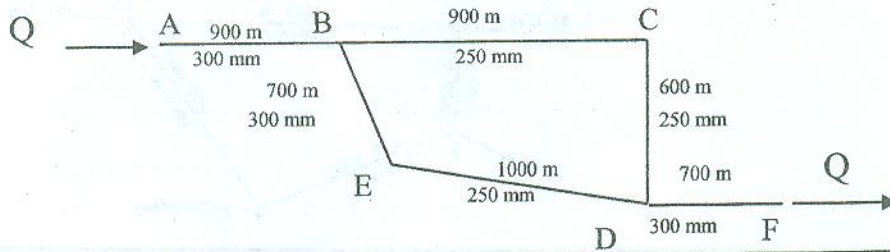
2) Investigate the network shown in figure at section A-A and B-B, given the following data:
- population of city   = 150,000 capita
- pop. after section A-A = 100000 capita
- Rate of water consum. = 180 l/c/d
- fire demand   = 130 l/s
- pop. after section B-B = 50000 capita
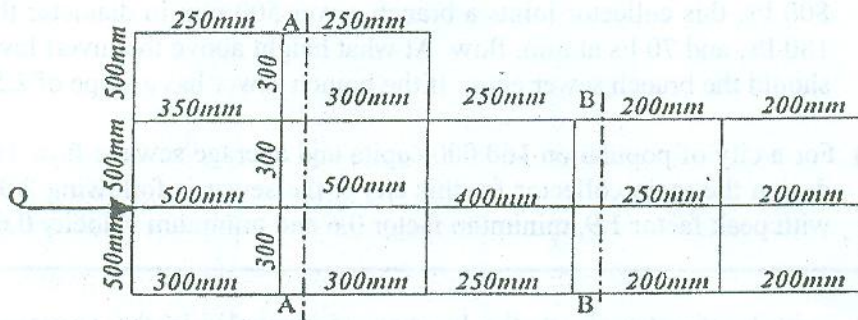

3-a) State the main different between :-
    1- high lift pumps and low lift pumps
    2- centrifugal pumps and displacement pumps

3-b) What are the main factors that affecting the selection of a suitable site of pumping stations.

3-c) A city has population of 120,000 and 98,000 for the years 2006 and 1996 respectively. The water source to the city is a navigable canal with width about   65 m , H.W.L. at (8.50), L.W.L. at (7.00), Bed level at (3.00), G.L. at (9.50), Road level at (10.50), The canal about 4500 meters away from the city, and water level in the rapid mixing tank at (23.00). The water treatment plant collection works for the city is designed to serve the year 2060 considering geometrical growth rate of increase and water consumption of 220 L/cap./day. It is required to :

    a- Determine the future population and average discharge at year 2060.
    b- Choose and design a suitable type of intake and delivery pipes taking into consideration :
        - Pumps works 18 hrs at a day
        - Number of delivery pipes = 1 , with velocity 1.57 m/s
    c - Draw a neat sketch (not to scale) showing the main elements of the intake and pumps arrangement and valves.

iii. Design a runway section for design gross weight of 90000 kg. Tests were conducted on pavement and CBR values obtained are as follows:

The runway pavement is expected to sustain 20000 coverages. Draw a sketch of the designed pavement section

Subgrade Soil	5%
Sub Base	20%
Base Course	44%

Figure 1   Flexible Airport Pavement Design Curve
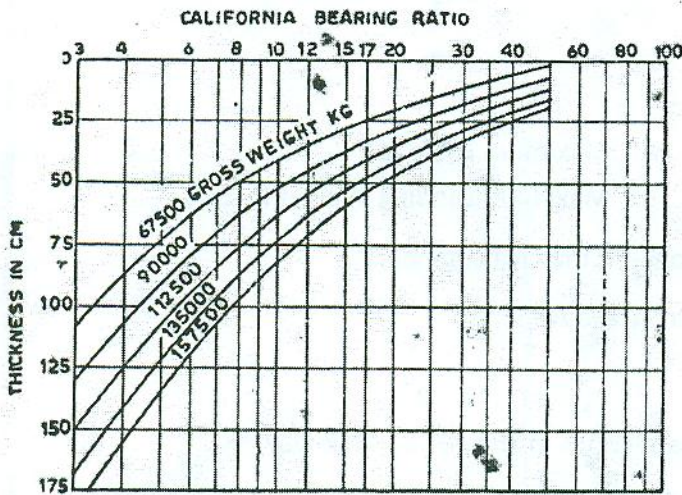
Coverages	Percent increase in design thickness
10000	7 percent
15000	11 percent
20000	14 percent

Questions No. 5 (16 Degrees):

i. Where and why the use of concrete rigid pavements is a must in airport?

ii. What are the main factors that affect the selection of airport site?

i. In the wind rose shown in figure 2, determine the total wind coverage on the specified runway and mention if this runway is sufficient or there is a need for another, and if so suggest the ideal direction of the second runway
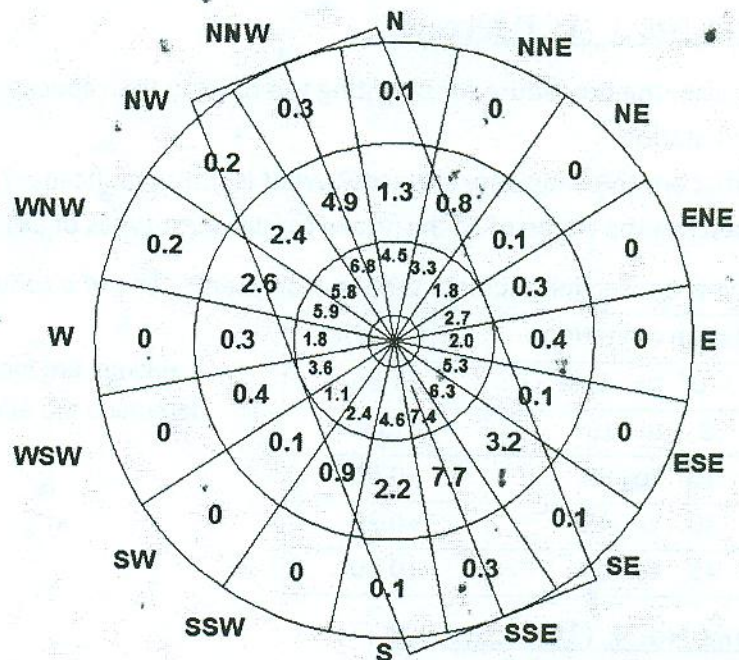

Figure 2

With Best of luck: Dr Ragaa Abd El-Hakim

Try All Questions

Questions No. 1 (16 Degrees):

i. Differentiate between the followings:
   a. Operating Empty Weight (OEW)   b. Maximum Payload
   c. Maximum Take-off Weight (MTOW)   d. Maximum Landing Weight (MLW)

ii. What are the aircraft characteristics which concern the civil engineer?

iii. Discuss briefly the Relationship between Aircraft and Airports.

Questions No. 2 (16 Degrees):

i. Draw typical runway configurations and cross sections of runway and taxiway

ii. Mention and draw a sketch of airplane wheel configuration.

iii. Determine the corrected length of runway, the following data are given:-
   - Basic runway length   =3200 m   Maximum ground level = 34 m
   - Minimum ground level = 30 m   Average ground level =   32 m
   - Mean of maximum daily temperature of hottest month = 38 ^{0}C
   - Mean of Average daily temperature of hottest month = 25 ^{0}C

Questions No. 3 (16 Degrees):

i. Explain the procedure for orienting the runway then specify the effect of wind on runway orientation.

ii. What are the imaginary surfaces? What is their significance? Explain with the aid of neat sketches the shape of each surface for different types of airports?

iii. The proposed longitudinal section along center line of a runway is as follows:

Station to station	Grade (%)
0 to 8	+1.25
8 to 15	-1.00
15 to 30	+0.50
30 to 45	+0.20
45 to 60	+0.40

If stations are located at a regular interval of 30 m, determine the effective gradient of the runway .

Questions No. 4 (16 Degrees):

i. What do you understand by the term visual aids in connection with airports? Name the different visual aids. What is the necessity of visual aids.

ii. Summarize briefly the various taxiway geometric design standards recommended by ICAO

جامعة طنطا – كلية الهندسة

الفرقة الرابعة (مدنى - لائحة جديدة)

النهاية العظمى: 70 درجة

إسم المقرر: مقرر اختيارى (١) تصميم محطات الطلمبات

العام الجامعى: ٢٠١٠/٢٠١١

زمن الإمتحان: ثلاث ساعات

الفصل الدراسى الثانى

الامتحان فى صفحة

(N.B.: Any missing data can be reasonably assumed.)

Question No 1: (30 degrees)

A. Define with drawing neat sketches the flow net exists below a pump station floor due to water head difference.

B. Explain using net sketches the different parts of pump station.

C. Show how to design retaining wall for pump station exceed than 8.0 ms height

D. Show how to design the house of pumps.

E. Why can the suction lift of a pump not exceed a certain limit.

F. Discusse with neat sketch the precautions of floor of the pump station.

G. Define
- Types of pumps
- Velocity triangles for an impeller vane
- Work done by the impeller
- Types of pump heads
- Types of efficiencies
- Specific speed
- N.P.S.H.

Question No 2: (40 degrees)

A. A centrifugal pump has an impeller 50 cm outer diameter and when running at 500 r.p.m. discharge water at the rate of 8000 litres / minute against head of 8.5 m. The water enters the impeller without whirle and shock. The inner diameter is 25 cm, and the vanes are set back at outlet at an angle of 45 $^{\circ}$ and the area of flow which is constant from inlet to outlet of the impeller is 0.05 m^2. Determine :
- The manometric efficiency of the pump
- The vane angle at outlet

B. Two centrifugal pumps have the head and discharge characteristics as follows:

Discharge Q (Litres / second)	0	5	10	15	20	25	30
Pump 1 (Head Hm1) (meters)	50.0	52.0	51.0	48.0	43.0	33.0	18.0
Pump 2 (Head Hm2) (meters)	47.0	46.0	44.0	40.0	34.0	26.0	17.0

Both pumps are installed together and are required to pump through a pipe15 cm diameter having f = 0.02. Calculate the heads under which pumps are working and discharges in liters per second pumped by them, if

1. The pumps are connected in series; static lift is 70 m and the suction and the delivery pipes are 900 m long.

2. The pumps are connected in parallel; static lift is 20 m and the suction and the delivery pipes are 400 m long.

(انتهت الأسئلة)

مع أطيب تمنياتنا بالتوفيق

Tanta University
Faculty of Eng.
Irri. & Hyd. Eng. Dept.

4th year structure & civil
2nd semester 2010-11
Dams & Reservoirs Engineering

Subject: Final Term Exam

26 June 2011

Third Question (50 marks)

For the given concrete gravity dam

Consider water height= 105 ms

Soil foundation is almost rock fractions

Static analysis (20 marks)

Use hand calculation to find

Find at height = 50 ms from the base

- The stress distribution
- The stability against overturning,
- Tthe stability against sliding
- The stability against overstresses
- The soil stability at dam foundation against overstresses
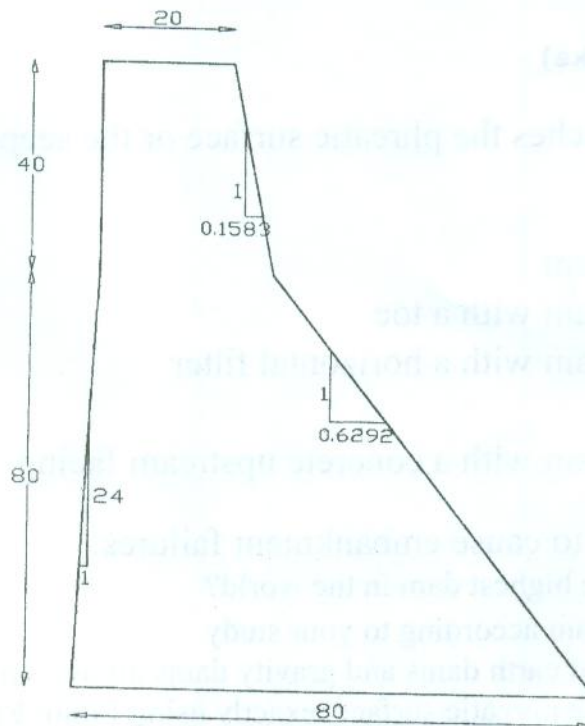
Dynamic analysis (25 marks)

The dam is subjected to El centro earthquake.

Use hand calculation to find at the base

1- the stability against overturning due to seismic loads.
2- the stability against sliding due to seismic loads.
3- the stability against overstresses due to seismic loads.
4- the soil stability at dam foundation against overstresses due to seismic loads.

SAP calculations (5 marks)

1- Discuss how to analyze the above cases using quasi-static procedure (simplified method)
2- Discuss how to analyze the above cases using response spectrum method (exact method)

Tanta University
Faculty of Eng.
Irri. & Hyd. Eng. Dept.

4th year structure & civil
2nd semester 2010-11
Dams & Reservoirs Engineering

Subject: Final Term Exam

26 June 2011

Time allowed 3 hours
Assume any missing data

First Question: (15 marks)

A: What is a reservoir? What is a dam? What is the main differences between a gravity dam and an embankment dam?

B: Define for Reservoirs
- Purpose
- Site selection
- Sedimentation
- Effect of raised Water Table

C: Discuss the following:

- Discuss the methods of rock grouting for a gravity dam.
- Discuss the temperature control of mass concrete for dams.
- Discuss concreting procedure for gravity dams.
- State instrumentations in concrete gravity dams.

D: Using empirical dimensions, draw to scale 1:100 a cross section of a gravity dam if the height of the dam 50 ms with a vertical upstream and downstream side slope is 2hz:3vl.

Second Question: (10 marks)

A- Locate with neat sketches the phreatic surface or the seepage surface in the following cases:

- Homogenous dam
- Homogenous dam with a toe
- Homogenous dam with a horizontal filter
- Zoned dam
- Homogenous dam with a concrete upstream facing

B- Discuss main factors to cause embankment failures.
C- What is the height of the highest dam in the world?
D- Describe High Aswan dam according to your study
E- What is the percentage of earth dams and gravity dams all over the world?
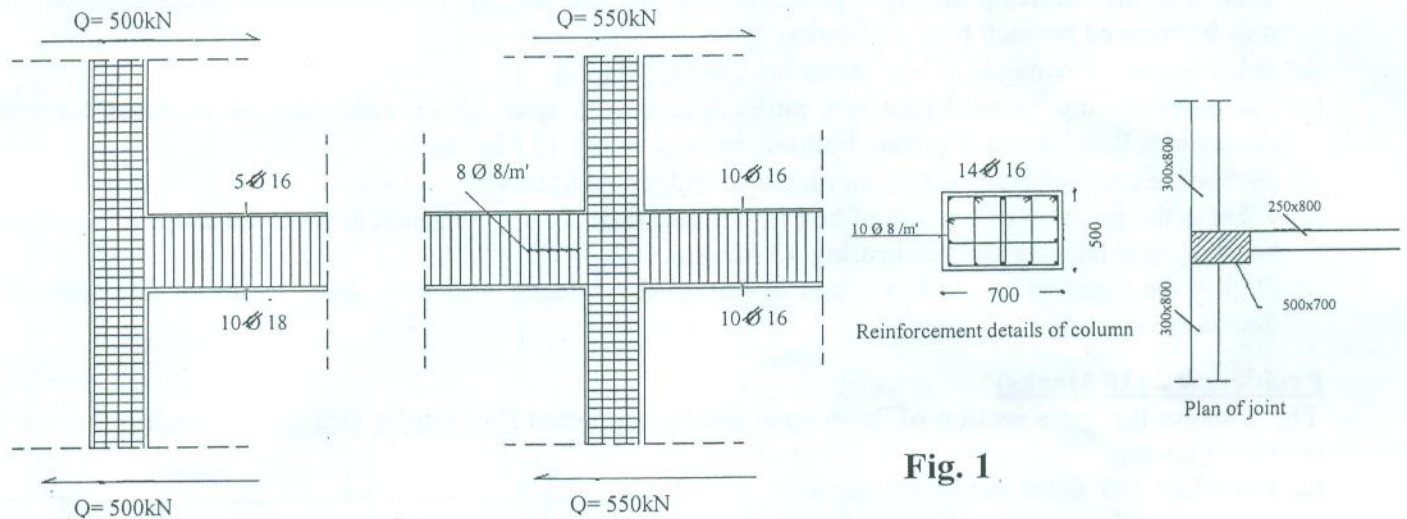F- Discuss how to locate the phreatic surface exactly using Finite Element Method.

Dr. Bakenaz A. Zedan

(d) *Draw* the details of reinforcement of the core and the critical shear walls. (4 Marks)

(e) *Calculate* the maximum allowable drift of this building. (3 Marks)

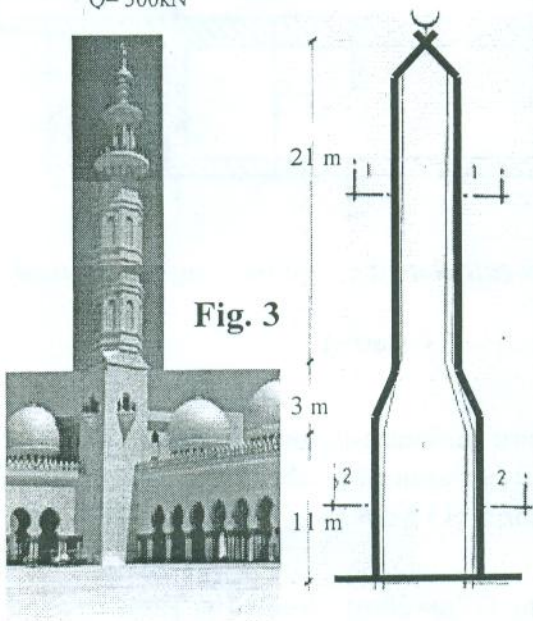(f) *Compare* briefly between enough and limited ductility frames. (3 Marks)

Data

- The base shear force due to earthquake loading is 650 kN.
- Number of floors = 13, (1 ground + 12typical)
- Clear height of ground story = 4 m and height of typical story = 3 m.
- The finishing level of the ground story is (+0.50) and the upper level of the raft is (-1.00).
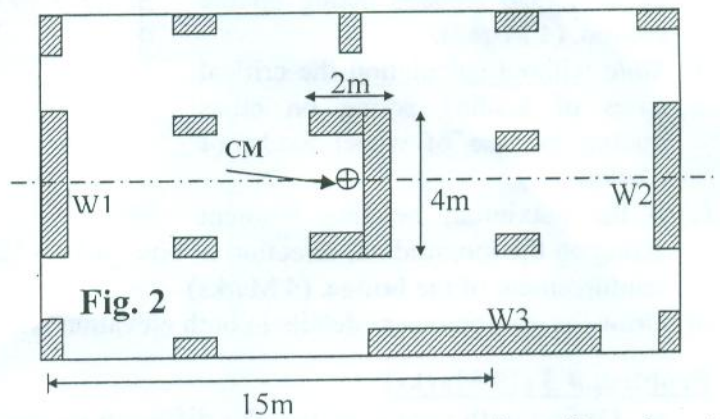
Problem # 5 (5 Marks)

It is required to *mention briefly* the steps of design for the shown composite minaret in Fig 3

Q= 500kN

Q= 550kN

5 Ø 16

8 Ø 8/m'

10 Ø 16

14 Ø 16

300x800

250x800

10 Ø 8 /m'

500

10 Ø 18

10 Ø 16

10 Ø 16

700

300x800

500x700

Reinforcement details of column

Plan of joint

Fig. 1

Q= 500kN

Q= 550kN

Fig. 3

21 m

3 m

11 m

Fig. 2

2m

CM

4m

W1

W2

W3

15m

معامل درجة الإحاطة للوصلة

كيفية الإتصال مع العناصر الإنشائية المحيطة	نوع الوصلة	
	II	I
١- وصلات محصورة من أربع جهات	1.6	2.0
٢- وصلات محصورة من ثلاث جهات	1.2	1.6
٣- جميع الوصلات الأخرى	0.9	1.2

Best Regards

Course Examination Committee

Prof. Dr. Tarek Fawzy
Dr. Ahmed Mohamed Atta

Prof. Dr. Abd-El hakeem Abd- El Khalek
Dr. Nesren Mohamed Qassem

Course Coordinator: Dr. Ahmed Mohamed Atta

2- كيف تحدد النتائج المقبولة للخلطة الخرسانية لضمان تحقيقها مقاومة مميزة (fcu) قدرها 350 كجم/سم 2 منذ تصميم الخلطة حتي إختبار المكعبات (أثناء الخلطة التجريبية بالمعمل و بالموقع ؟... مع العلم أن هامش الأمان قدره 50 كجم/سم2).

3- كيف تحدد مدي صلاحية ماء الخلط و الرمل للإستخدام في الخرسانة المسلحة (أذكر حدود قبول 2 من خواص الماء و 2 للرمل)؟

4- كيف تحدد مدي صلاحية صلب التسليح رتبة (600/400) مع توقع سلوك هذا النوع من الصلب في الشد (بالرسم)؟

5- كيف تحدد مدي صلاحية الخرسانة الطازجة و ما هو مقاس الركام المستخدم فيها لصب بلاطة خرسانية لسقف مبني السفر مساحتها 500 م2 بالنظام اللاكمري (Flat Slab) بسمك 25سم و بتسليح 7 أسياخ قطر 16مم سفلي و علوي في المتر و غطاء 1.5؟

السؤال الثالث (40 %)

أ – تعتبر الاختبارات الغير متلفة ذات أهمية كبيرة وسبيل من سبل ضبط الجودة لأعمال الخرسانة. في ضوء ذلك وضح ما يلي:

1- الخواص التي تكون محلا للاختبارات الغير متلفة بهدف تعينها؟

2- أهم الطرق الشائعة و أهم تطبيقاتها في مجال الخرسانة؟

ب- أجرى اختبار القلب الخرسانى على سقف خرسانى بعد 6 أسابيع من تاريخ الصب وكانت النتائج كما يلي:

ملاحظات	اتجاه القطع	حمل الانهيار (ك.ن.)	ارتفاع العينة (مم)	قطر العينة (مم)	رقم العينة
لا يوجد حديد تسليح	رأسي	149.5	95	99	1
لا يوجد حديد تسليح	أفقي	133.2	120	99	2
يوجد بالعينة عدد (2) سيخ عمودي على محور العينة - الأول بقطر 16مم وعلى بعد 45 مم من نهاية العينة - الثاني بقطر 8مم وعلى بعد 40مم من نهاية العينة.	أفقي	123.9	135	99	3

والمطلوب:

1- أذكر الحالات التى يطلب فيها إجراء اختبار القلب الخرسانى مع توضيح أسس تحديد عدد القلوب في الاختبار.

2- اشرح خطوات تجهيز عينات القلب الخرسانى و إعدادها للاختبار.

3- حلل النتائج السابقة محددا المقاومة التي يجب أن يتم تقييم المنشأ على أساسها.

4- إذا علمت أن المقاومة المطلوبة للمنشأ تبلغ 250 كجم /سم2 . وضح مدى مطابقة العينة طبقا لاشتراطات الكود المصري لتصميم وتنفيذ المنشات الخرسانية.

5- بفرض أن العينة لم تحقق الاشتراطات اللازمة طبقا للكود المصري. ما هي الإجراءات اللازم اتخاذها بعد هذا الاختبار؟.

6- وضح كيف يمكن معالجة أماكن قطع القلب الخرسانى؟.

ج –

1 – مستعينا بالرسومات. وضح الفروق بين الالتواء والتفلطح في منحنى التوزيع التكراري.

2- أجرى اختبار تعيين مقاومة الضغط (كجم /سم2) على مجموعة من مكعبات الخرسانة القياسية تتكون كل مجموعة من 6 مكعبات عند عمر 28 يوم من صبها فإذا علمت أن ثوابت لوحات ضبط الجودة كما يلي:

A= 0.48 , B = 2.0 , C = 0.0

والمطلوب

- رسم لوحة ضبط الجودة للمتوسط والتعليق عليها.

- حساب المقاومة المميزة للمجموعة الأولى مع تحديد مستوى ضبط الجودة لها.

الرابعة	الثالثة	الثانية	الأولى	رقم المجموعة
185	255	260	296	1
290	230	290	265	2
295	253	320	190	3
280	256	260	254	4
195	260	301	295	5
255	244	280	211	6

Tanta University	Department: Structural Engineering Total Marks: 70 Marks	Faculty of Engineering

احمد زيد – مفتي المباني (بث نفسي و طبة العربة

Course Title: Inspection and quality control of R.C	Course Code: CSE 4219	Year: 4th مدني
Date: June 2011 (Second term)	Allowed time: 3 hrs	No. of Pages: (2)

Remarks: (answer the following questions… assume any missing data… arrange your answer booklet

السؤال الأول (30%)

أ-بعض العبارات التالية صحيح و بعضها خطأ، أعد كتابة العبارات التالية بشكلها الصحيح (أي بعد تصحيحها اذا احتاجت لتصحيح):

1-يعتمد مهندس ضبط الجودة للمقاول المصادر المقترحة لمواد الخرسانة

2-في حال عدم مطابقة أحد نتائج إختبار مواد الخرسانة للحدود المسموحة في مواصفات المشروع يتم رفض المادة تماماً.

3- لا يمكن بأي من الاحوال إستخدام ماء البحر في صناعة الخرسانة أو معالجتها

4-تأكيد الجودة هي أداة أنتاج وهي مجموعة من الإختبارات للتأكد من مطابقة خواص المواد المستخدمة لمواصفات المشروع

5-الحد الأقصى المسموح به لأيونات الكلوريدات بالخرسانة المسلحة المعرضة للكلوريدات = 0.15% من وزن الأسمنت .

ب– تمثل ظاهرة صدأ صلب التسليح في الخرسانة المسلحة أحد أهم أسباب تدهور حالة المنشأت الخرسانية بالمناطق الساحلية. فـي إطار ذلك أجب عما يلي .. مستعيناً بالرسم كلما أمكن ذلك :

1- بوجه عام تعتبر عملية صدأ الحديد دورة كهروكيميائية. أشرح هذه العبارة موضحاً أهم الظروف الواجب توفرها لحدوث الصدأ .

2- أشرح كيف يكون للخرسانة جيدة الصناعة دور في حماية صلب التسليح من الصدأ ؟ ولماذا تزداد فرصة حدوث صدأ صلب التسليح للمنشأت الصناعية بوجه عام ؟

3- لإهمال ضبط جودة مكونات الخرسانة دور في زيادة فرصة حدوث صدأ صلب التسليح. فسر هذه العبارة موضحاً حدود قبول خاصيتين من خواص مكونات الخرسانة المؤثرة على فرصة حدوث الصدأ .

4- صدأ صلب التسليح بالخرسانة المسلحة يؤثر بالسلب على كفاءة القطاع الخرساني. إشرح هذه العبارة .

5- لسقف خرساني تعرض صلب التسليح له للصدأ إشرح أهم الخطوات المطلوبة لترميم هذا السقف .

السؤال الثاني: (30%)

أ- وضح العيوب المحتملة للخرسانة في الحالات التالية مع إستخدام الرسم كلما امكن ذلك :-

1- استخدام ركام سيليسي نشط في الخرسانة .

2- إستخدام هزاز لفترة طويلة أثناء صب خرسانة لها قابلية تشغيل عالية لقاعدة مسلحة بشبكة علوية لها غطاء خرساني> 2 سم.

3- تعرض الخرسانة لمياة الامطار أثناء الصب

4- عدم تجانس خلط إضافة تعجيل الشك في الخرسانة .

5- تعرض خرسانة قواعد خرسانية لتأثير مياة جوفية بها نسبة عالية من الكبريتات.

ب- مطار بمنطقة صحراوية نائية يتكون من مهبط خرساني للطائرات بالإضافة إلى صالة للإستقبال و السفر . للقيام بأعمال التفتيش الفني و ضبط الجودة وضح ما يلي:

1- كيف يمكن أخذ عينات ممثلة من الركام الخشن المستخدم في خرسانة مهبط الطائرات وكيف يمكن تقيم تحمل الركام لتأثير هبوط الطائرات؟

Course Title: Elective Course: Special Topics of R.C. Structures	Course Code: CSE4218	Year: 4th Civil.
Date: June. 2011 (Second term)	Allowed time: 3 hrs	No. of Pages: (2)

- Systematic arrangement of calculations and neat drawing are essential.
- Any missing data should be reasonably assumed.
- Concrete characteristic strength f_{cu}= 25 N/mm^2 & Grade of reinforcing steel is (360/520).

Problem # 1 (15 Marks)

(a) *State* with neat drawing the types of reinforced concrete bridges, then, define the maximum span that may be covered by each type. (2 Marks)
(b) *What* are the advantages of box girder bridges? (2 Marks).
(c) For a simply supported 2-lane box girder bridge with span 25 m. *calculate* the required concrete dimensions (total depth, top slab, bottom slab and webs). (3 Marks).
(d) *Define* the types of loads acting on roadway bridges. (2 Marks).
(e) *What* is the function of bearing of box girder, and then draw to reasonable scale the shape of neoprene bearing, steel bearing and pot bearing. (3 Marks).
(f) *Define* the types of expansion joints in box girder bridges, and then *draw* to reasonable scale the details of each type. (3 Marks).

Problem # 2 (16 Marks)

Fig. 1 shows the cross section of 29 m span simply supported <u>Box Girder Bridge</u>. It is required to carry out the following:

(a) *Calculate* and draw the distribution of dead load stresses acting on the section. (4 Marks).
(b) *State* <u>without calculation</u> the critical cases of loading acting on cross section in case of wheel loads. (4 Marks)
(c) If the maximum bending moment acting on the longitudinal direction of box girder= 3200m.kN *calculate* the required longitudinal main reinforcement of the bridge. (4 Marks)
(d) *Draw* the reinforcement details in both elevation and cross section. (4 Marks).
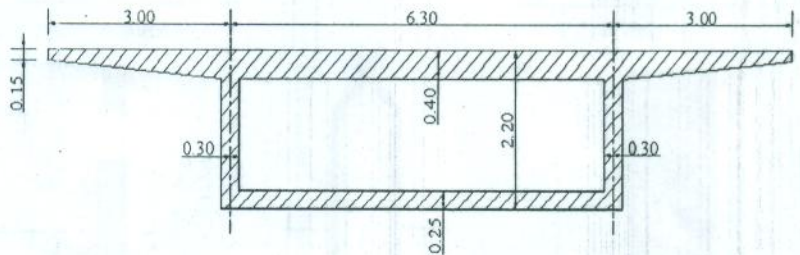
Problem # 3 (19 Marks)

a- Define with neat sketches the different modes of failure for beam-column joints. (4 Marks)
b- For the Type I beam column joint shown in figure1, it is required to check the joint capacity to resist the forces shown in the figure in both directions. (15 Marks)

Problem # 4 (25 Marks)

Fig. 2 shows the structural plan of multi-story residential building (12m×20m) located at Tanta city and constructed on raft. The center of the core locates at the center of the building. Widths of all walls are 0.3m. The lengths of the walls (W1), (W2), and (W3) are 4m, 4m, and 3m.
It is required to carry out the following:-

(a) *Allocate* the center of rigidity, neglecting the effect of columns. (5 Marks)
(b) Calculate the normal forces and the bending moments that can be carried by the shear walls due to earthquake loading taking into account the torsional moment effect. (5 Marks)
(c) *Make* complete design for the core and the critical shear walls. (5 Marks)

Question 4

a) Using neat sketch explain in details the type of berths.

b) Calculate the ship berthing force in t/m, if the vessel is passenger, GRT is 60000 ton, contact length is 25 m, the approach velocity is 0.2 m/sec., and the fenders are cylindrical type ϕ 1750x1000 and L is 2000 mm.

c) Determine the minimum cross section of a canal for single moving way for a ship $\dfrac{60 X 8.25}{1.95}$ with rated speed of 9.0 km/hr and side slope of 2:1. Find also the return flow and the squat.

Good Luck

Assoc. Prof. Yehia Barakat

Ministry of Higher Education
Tanta University
Faculty of Engineering

Final Exam
June, 2011
Time Allowed: 3.00 Hours

Harbor Eng. – Fourth year Civil Eng.

Answer the following questions, Note : the exam is two pages and any missing data can be assumed

Question 1

a) Explain how to use wind speed in harbor Engineering.

b) The following table indicates the number of hours of occurrence for several wind ranges for a specific year, it is required to plot the wind rose and determine the prevailing wind direction. Considering that the number of calm wind hours is 125, number of unrecorded wind hours is 320 and number of variable wind hours is 30.

U (knots)	345° 014°	015° 044°	045° 074°	075° 104°	105° 134°	135° 164°	165° 194°	195° 224°	225° 254°	255° 284°	285° 314°	315° 344°
1-10	895	364	160	140	125	225	350	960	440	320	210	450
11-27	150	65	43	80	59	49	197	1304	292	218	223	516
28-47	98	50	--	--	--	--	10	39	21	--	--	30
48-77	115	--	--	--	--	--	--	--	--	--	87	--

Question 2

a) Using neat sketch explain the wave characteristics.

b) Using the SMB , Darbyshire and Nomogram methods find the wave height and wave period comparing the obtained result, if the storm have the following characteristics, The wind speed is 25 knots, the fetch is 125 N.M., and wind duration is 4 hrs.

c) A Waves train of 10 s wave period and 4.50 m wave height at breakwater tip strikes along breakwater at 45° what will be the wave height at a point 40.0 m along breakwater and 60.0 m into harbor, if the gap width is 45.0 m and depth of harbor basin is 16.0 m.

Question 3

a) What are the main factors that affecting the selection of the type of breakwater.

b) Design the rubble mound breakwater head section and draw with neat sketch a detailed cross section showing its different elements. Knowing that; the wave height in deep water is 4.0 m, the wave period is 12 second, the design water depth is 14 m, the road width is 6.0 m with overtopping condition, where the overtopping discharge is 0.08 m^3 /s/m. Note that A=0.016, B=35, r=0.85, the tidal range is 2.0 m and the maximum available units is 2.5 tons and side slope is 3:1 (Use Rough angular blocks and Tribar both in random).