B. Drive the dynamic equation of G.V.F in terms of each of the section factor (Z) and the conveyance factor (K). *(6 marks)*

C. Choose one answer from the following: *(8 marks)*

1- The two alternate depths in a 4.0 m wide rectangular channel are 3.86 m and 1.0 m respectively. The discharge in channel in m^3/sec is;

a- 15 b- 7.76 c- 31 d- 51

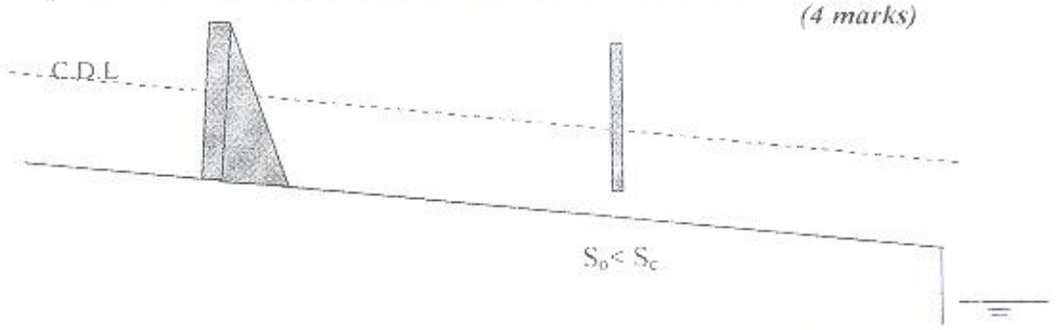
2- The Froude number of a flow in a rectangular channel is 0.73. if the depth of flow is 1.5 m, the specific energy in m is:

a-1.90 b- 1.55 c- 2.24 d- 3.22

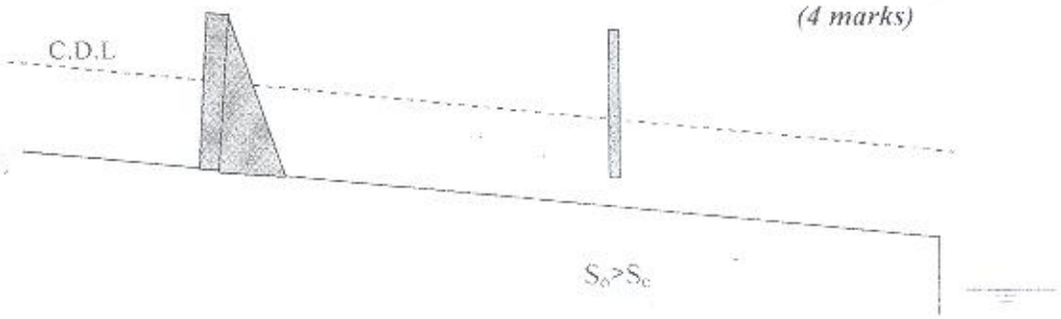
PROBLEM # 4 (15 marks)

A. Draw the possible water profiles for the following open channels:

1- *(4 marks)*



2- *(4 marks)*



B. A dicharge of 250 m^3 /sec flows over the spillway of a dam and then flows over a level reinforced concrete floor of width 50.0 m. The velocity of water at the bottom of the spillway is 14.0 m/sec and the water depth below the apron is 3.0m. if (n=0.016). Estimate:

a- How long should the apron be built? *(5 marks)*

b- The energy lost from the foot of the spillway to the downstream side of the jump *(2 marks)*

My Best Wishes

Dr. Shimaa Ghoraba and the committee

هندسة مدنية حديث + قديم
٢٠١١/١/٢٧

Tanta University Faculty of Engineering Public Works Dept.	Transport planning and Traffic Engineering Final Exam (طلاب حديث& قديم)	3rd Year Civil Time: 3 Hours 2010-2011

Try all questions & Max. Grade = 7 0 Marks

Problem (1): **(20 Marks)**

A)Define the following terms عرف الآتى مع ذكر العناصر الاساسيه

Transport system components & Net residential density & Employment& A.D.T& Home Interview & Traffic Density& Parking Index & Saturation Flow & Inter-green Time & P.H.F

Sketch Only ارسم فقط

Saturation flow –Green time relationship & Speed, Flow, density relationships & Desire Line Diagram, On street parking layouts

B) State whether these sentences is True or False and Correct the False Sentences:

i. The aim of Transport and traffic engineering discipline is to provide safe, economic, efficient and cheap movement of freights and people

ii. The urban transportation planning process consists of **Five** main models.

iii. Roadside interview O/D survey method measures the largest amount of movements within the urban areas, it is recommended for comprehensive transport study.

iv. Trip attraction model depends on employment and accessibility, and land use type

v. Cycle time is the time taken for complete sequence of signal indications for all served approaches

vi. . Modal split is used for distributing the inter-zonal trips between different transport modes

C)State the warrants for traffic signals installation

Problem (2): **(15 Marks)**

A user with annual income of 3000 Pounds is choosing between two modes; a taxi and a public bus for a specific journey of distance 7

miles, If the utility function of the model choice is on the following form: $U_m = k_m - 0.03\ tm - 0.34\ (X_m/d) - 50\ (Cm/y)$

Where: t_m = in vehicle time (minutes) , X_m = out vehicle time(minutes), d = distance (miles), Cm = Cost in piasters, y = annual income, km = mode specific constant

Considering the following situation:

Taxi: k_t=-0.11 t = 11 min. , X_m = 5 min , C_t = 150 Piasters Public

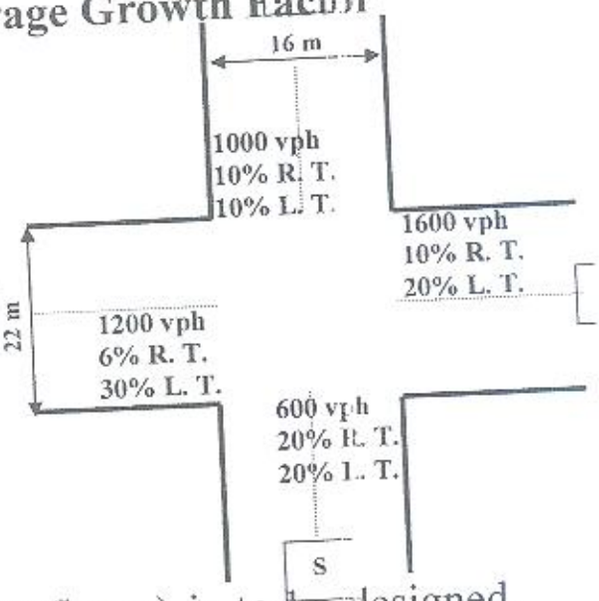
Bus: t_b = 14 min. , X_b = 8 min , C_b = 50 Piasters , k_b=0.0

Determine the probability of choosing each mode. [5 Marks]

Problem (3): (20 Marks)

An urban area is consisting of four zones 1,2,3,and 4, the existing (O/D) trip matrix is given as shown below. The future productions and attractions are calculated **from Trip Generation Model. It is required to:** Determine the future inter-zonal trips between the four zones for the design year 2020. **Average Growth Factor** method (**Two iterations only is enough**)

O\D	1	2	3	4	Future Prodns.
1		200	600	400	2400
2	200		400	200	4000
3	600	400		600	4800
4	400	200	600		4200
Future Attracts	1800	2400	5200	1800	



Problem (4): (15 Marks)

A two phase traffic signal (in the shown figure) is to be designed for peak hour condition. Design hourly volumes are given below. Assume starting delay of two second per phase. Also assume 10% truck (3.0 pcus) in each approach volume. It is required to make a full design for the traffic signal in this intersection.

With my best wishes

Dr: Sayed Shanaly

Dept.: Structural Engrg.	Faculty: Engineering	University : Tanta
Time allowed: ٣ hr. Date: January 201١	Course: Design of steel structures (a)	Course code: CSE3111

Note:

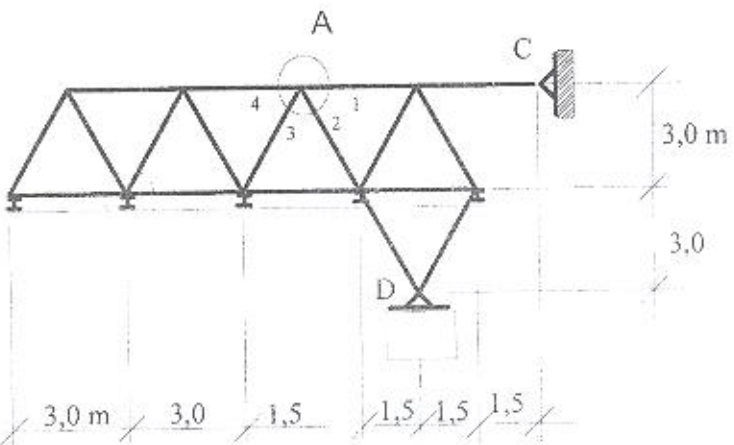
- It is allowed to use any tables or Egyptian Code of Practice books.
- Any missing data may be reasonably assumed.
- Attempt all questions. Max. Credit 100 % only.
- Number of examination pages: (4).

Question 1: (25 %)

The steel skeleton of a vehicles-shed is built up of trusses type shown below. The system shown is **two-hinged truss** at points C and D.
Given the following data, answer the required questions.

Data:

- Spacing between trusses = 4.0 m
- Own weight of steel structure = 30 kg/m^2 of covered area.
- Live load = 60 kg/m^2
- Weight of cover = 20 kg/m^2
- **Neglect the effect of wind pressure.**
- Use steel grade **St37**.



Note: The cover is fixed at the bottom chord

Required:

1) Draw to sketch different views showing the arrangements of bracing system. The length of the covered area is 20.0 m. (10%)
2) Calculate the design forces in marked members at joint A. (5%)
3) Design an intermediate purlin as rolled steel section. (10%)

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 - 2011	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.

TRY ALL PROBLEMS

Problem # One (23Marks)

a. Proof the code equation $q_{tu}= M_{tu}/2Ao\times te$ for the nominal ultimate torsional shear stress. What is the meaning of the terms "Equivalent thin-walled tube" in torsional analysis? (4Marks)
b. Compare between shear and torsion with regard to: stress distribution, mode of failure, code requirements. (4Marks)
c. Why the primary torsion is more dangerous than the secondary torsion? How the primary torsion generated in beams carried a pre-cast slabs. (4Marks)
d. Draw the B.M.D, S.F.D and T.M.D for the beams shown in Fig. (1-a) under the given loads. (4Marks)
e. Check design the section shown in Fig. (1-b) subjected to the following actions: $M_u= 400kN.m$, $Q_u= 400kN$, $M_{tu}= 150kN.m$.
Materials: $f_{cu}= 40MPa$, $f_y= 400MPa$. (7Marks)

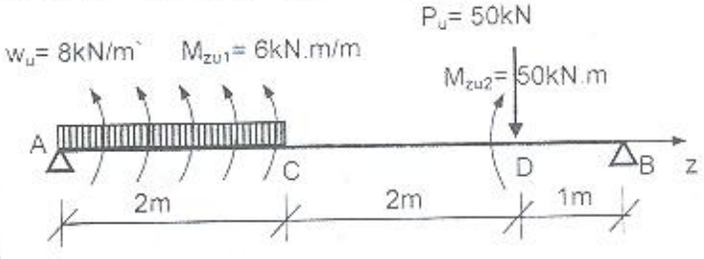


Fig. 1-a

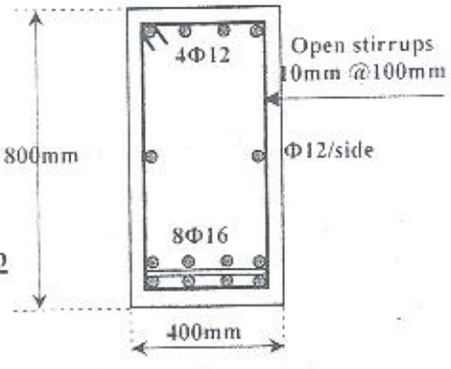


Fig. 1-b

Problem # Two (9Marks)

Fig. 2 shows layout of a first floor resting on eight columns with area of 8×9.6m. The panelled beams system is required to cover the 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 By1 only. Compute the load acting on the supporting beam B2.
Materials: $f_{cu}= 25MPa$, $f_y= 360MPa$

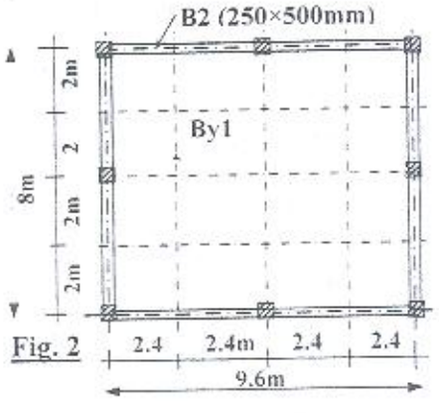


Fig. 2

Problem # Three (30Marks)

a. Explain the concept of using the hollow-block slab systems? (4Marks)
b. Compare between the solid slabs, hollow block slabs, waffle slabs and flat slabs, with regard to: load transfer, economy and advantages. (4Marks)
c. Fig. 3 shows a structural plan of roof ABCD. The roof is resting on the beams (AD and EF) and on the frames (EB and FC). The slab AEFD is dropped 100mm. The hollow-block slab system is required. The slabs is subjected to a live load = $6kN/m^2$ and a flooring cover= $1.8kN/m^2$. The cross section of all beams is 250×600mm. Materials: $f_{cu}= 40MPa$, $f_y= 400MPa$. It is required to carry out the following:
   i- Draw the B.M.D and S.F.D of critical strips. (5Marks)
   ii- Design the slabs at critical sections. Compute the width of the solid parts due to the S.F and B.M. (5Marks)

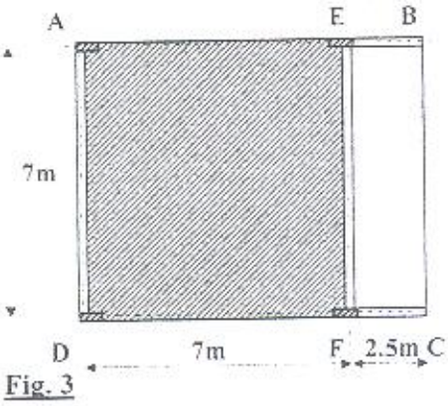


Fig. 3

P.T.O

iii- Draw on plan the reinforcement details and the arrangement of hollow blocks. (4Marks)

iv- Compute the load acting on the supporting beam EF. (3Marks)

v- Check design the slabs to carry a sand load in the form of the cone applied on panel AEFD without flooring cover. The height and diameter of the sand cone load are 1.5 and 5m, respectively. The sand density is 18kN/m^3. (5Marks)

Problem # Four (30Marks)

(A) Fig. (4-a) shows part of a plan of a typical floor of RC flat slab 36 × 40m consists of 25 panels each side 5 panels 7.2×8m each panel and slab thickness 0.25m (t_s= 250mm) without drop panel and with column head 1.50m×1.50m. 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. The flat slab is subjected to a uniformly ultimate (factorized) load, Wu= 20kN/m^2. Materials: f_{cu}= 25MPa, f_y= 360MPa

Using the empirical method of the Egyptian code of practice ECP203-2007 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 long direction only. (5Marks)

ii- Design the critical sections due to bending moment in column strip and field strips for the intermediate panel C1 C2 C3 C4 only. (6Marks)

iii- Check one-way and two-way shear stresses for the interior column C1 considering the case of the total load only. (5Marks)

iv- Draw on plan the reinforcement details of the column and field strips in the intermediate panel C1 C2 C3 C4 only. (5Marks)

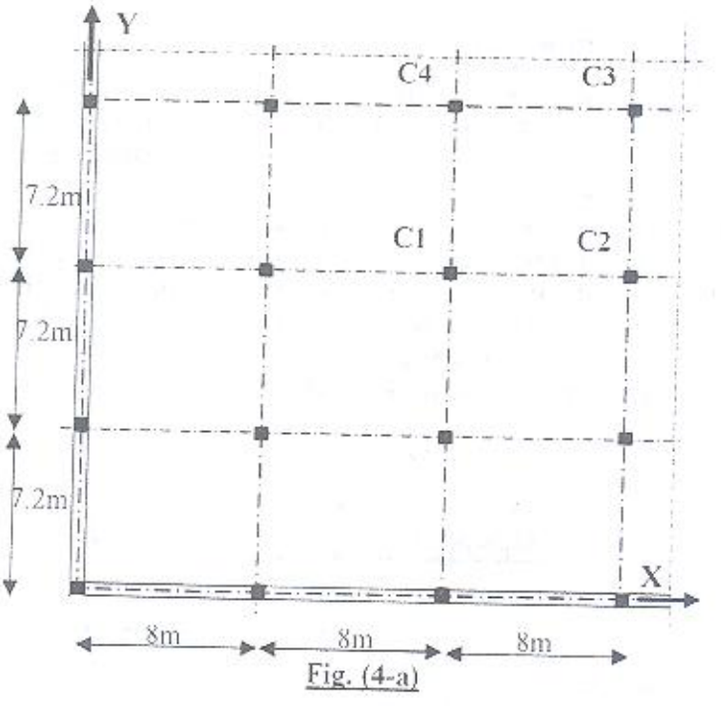


Fig. (4-a)

(B) What will be the punching shear stresses if a large opening exists at a distance 0.4m from the edge of column head of the interior column C1 in the previous problem, as shown in Fig. (4-b), and considering the case of total load only? And what will be the moment transfer from the flat slab to the internal column C1 in this case? (6Marks)

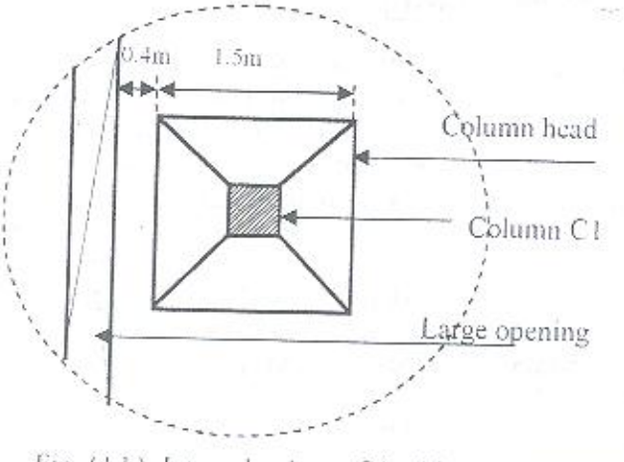


Fig. (4-b) Internal column C1 with large opening at 0.4m from the edge of the column head

(C) Compute the load acting on the marginal beam in y-direction and the straining actions at critical sections. (3Marks)

All the Best

Prof. Dr. Mohamed Kasem Prof. Dr. Tarek El-Shafiey

Tanta University

Department: Structural Engineering
Total Marks: 125 Marks

Faculty of Engineering

Course Title: Theory of structure
Date: January, 2011 (First term)

Course Code: CSE3109
Allowed time: 4 hrs

Year: Third Year (هندسة مدنية – لائحة جديدة)
No. of Pages: (2)

Remarks: (**a** .answer the following questions. - **b.** assume any missing data.)

1- Problem (1) 16 Marks:

Using the force method, draw the B.M.D. for the given frame of constant I shown in **Fig. (1)**.

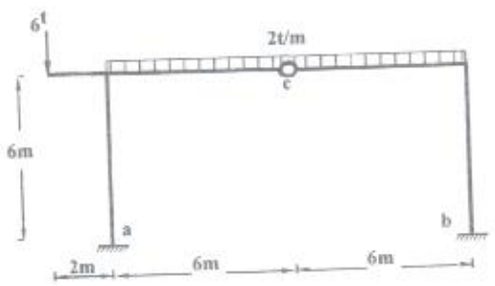


Fig. 1

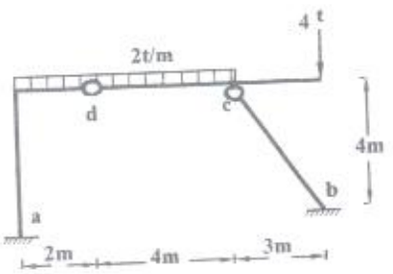


Fig. 2

2- Problem (2) 16 Marks:

Using the force method, draw the B.M.D. for the given frame of constant I shown in **Fig. (2)**.

3- Problem (3) 20 Marks:

Using the force method, draw the B.M.D. for the given frame of constant I which hinged at **a** and roller at **b** shown in **Fig. (3)**.

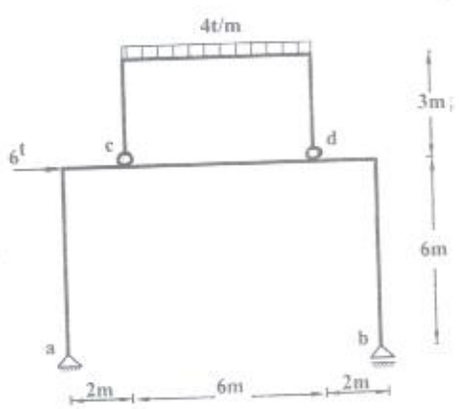


Fig. 3

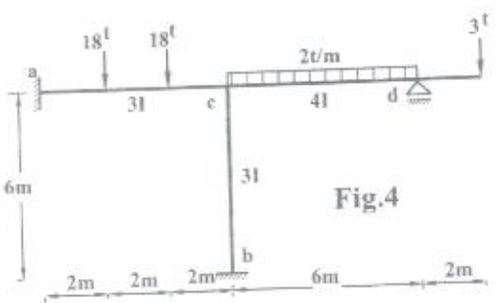


Fig.4

4- Problem (4) 16 Marks:

Using the slope-deflection method, draw the B.M.D. for the given frame of variable I shown in **Fig.(4)**.

P.T.O.

5- Problem (5) 16 Marks:

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

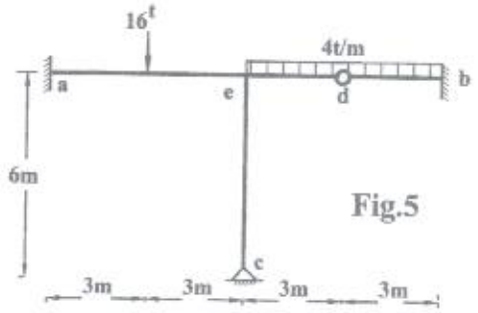


Fig.5

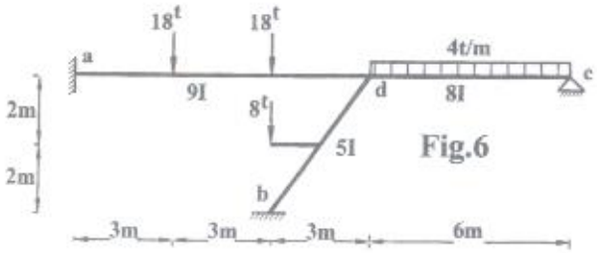


Fig.6

6- Problem (6) 16 Marks:

Using the moment distribution method, draw the B.M.D. for the given frame of variable I shown in **Fig. (6)**.

7- Problem (7) 25 Marks

a. Draw clear sketches for the mathematical models of forced damped and forced undamped one-degree of freedom system for dynamic analysis. **(5 Marks)**

b. Write the differential equation of undamped free body motion and solve this equation to find the undamped free vibration response (**u**) with initial displacement $\mathbf{u_0}$ and velocity $\mathbf{v_0}$. **(8 Marks)**

c. For the frame shown in **Fig. (7)**, **(12 Marks)**

i- Calculate the natural frequency considering the horizontal girder to be infinity rigid.

ii- If the initial displacement and the initial velocity are 2 cm and 40 cm/sec, respectively find displacement, velocity, and acceleration after 2 seconds. **($I= 0.04\ m^4$, $E=200 t/cm^2$)**.

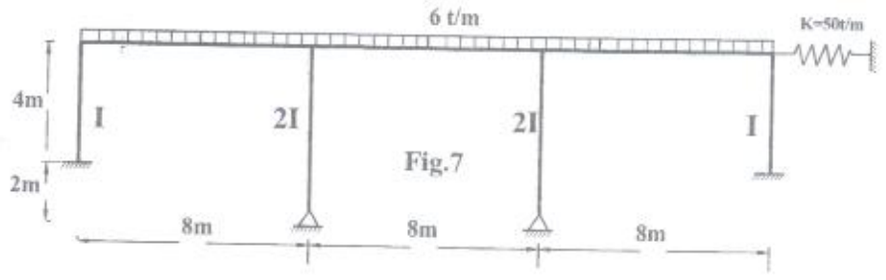


Fig.7

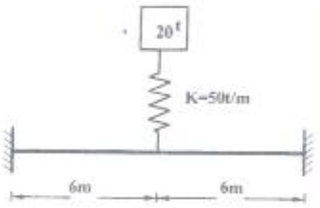


Fig.8

8- Problem (8) 10 Marks

For the structure shown in **Fig. (8)**, determine the equivalent stiffness Keq and the damping coefficient in the mathematical model. Assume the damping ratio = 10%, E = 200 t/cm^2, I= 0.06 m^4, and the stiffness of spring = 50 t/m.

With the best wishes

Course Examination Committee

Associate Prof. Mohamed Abd Elkhalek Sakr & Assist. Prof. Tarek Mohamady Khalifa

Question 2: (30 %)

Table (1) shows data given for truss members. By Using St. 52:

a- It is required to design these separate members (consider their connections as welded ones).

b- Calculate the required welded lengths.

Table (1)

Member	F_u [t]	L [m]	L_{bx} [m]	L_{by} [m]	Type
1	+20	5	-	-	Top chord
2	-15	5	5	2.5	Top chord, Unequal angles
3	+30	4	-	-	Bottom chord
4	0	6	-	-	Diagonal member
5	±12	4	4	4	Bottom chord

Question 3: (12 %)

Fig. (2) shows the statical system of a part of an industrial building. According to the Egyptian Code of Practice, compute the effective buckling lengths for columns 1-2, 2-3, 4-5, 6-7 and 7-8.

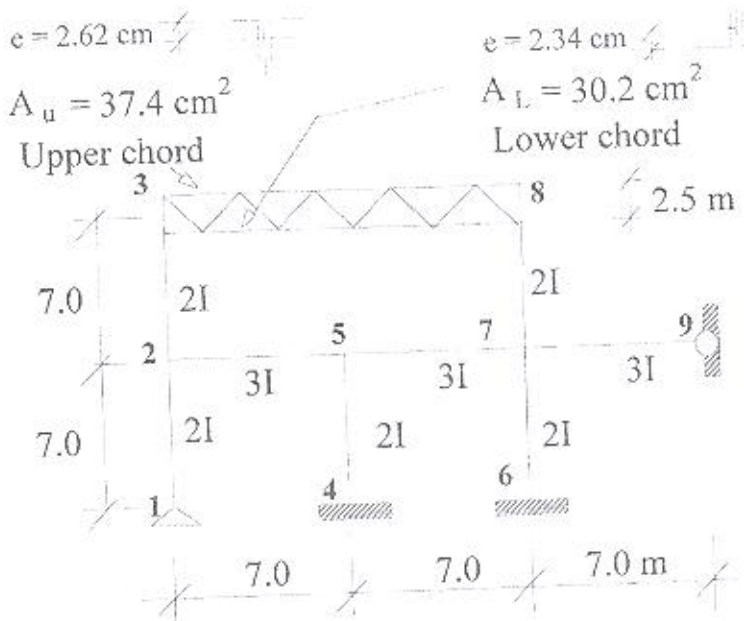


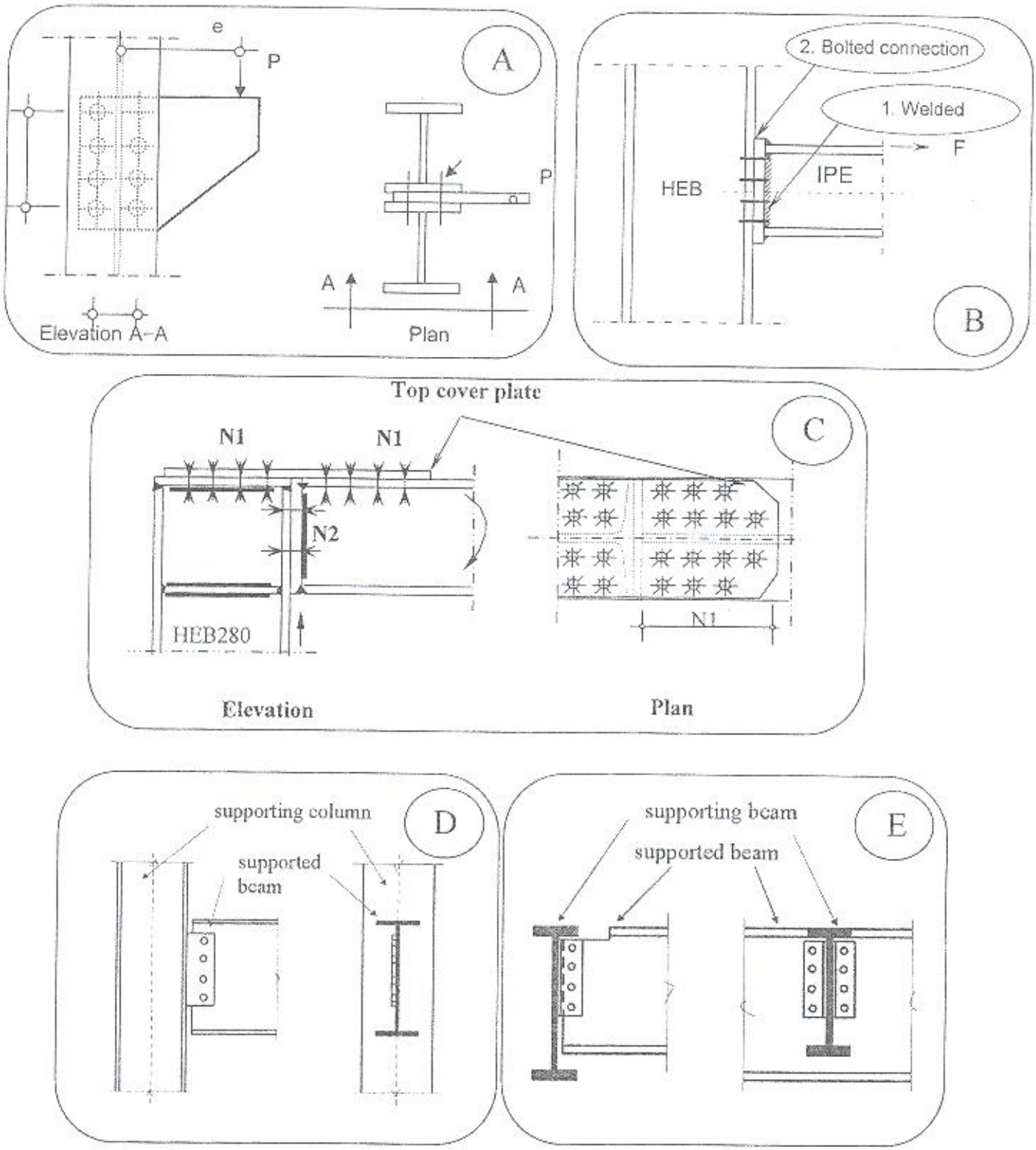
Fig. (٢)

$I = 4000\ cm^4$

Question 4:

(25 %)

Describe, **with net sketches and without any calculations**, the straining action of the following steel connections at Figures A, B, C, D and E:



Question 5:

(20 %)

It is required to examine the following statements by choosing (√) or (×), ***giving the reason for each choice***.

1. The theoretical value of the factor (G) for the *fixed support* is 0.0, while its practical value in design equals to 1.0.
2. The effective buckling length factor (K) for columns in *sidesway prevented* rigid frames is always greater than 1.0.
3. Among the SIB, IPE and HEB, the best suitable cross-section to be used with columns and as beams subjected to double bending moments is the *SIB*.
4. Using LRFD method, the strength is considered to equal the nominal or theoretical strength of the member multiplied by a resistance factor, which is nominally *less* than unity.
5. The vertical and horizontal loads in the plane of the main system are carried by the *bracing systems*, while the lateral loads are carried by the *main system*.
6. A tension member with holes can possibly fail by *yielding* at the net section through holes.
7. For a *diagonal* zero member with a length of 3ms with a bolted connection (ϕ=16mm), the best design cross-section is one angle $75\times75\times8$.
8. The *unfactored yielding* strength of the tension member which composed of two back-to-back angles $100\times100\times10$, given that the steel is St44, is 107.52t.
9. The *minimum angle leg* that can be connected using the bolt M24 is $60\times60\times6$.
10. The maximum slenderness ratio (λ_{max}) for a *long* compression member made of St 37 which has a critical buckling stress (F_{cr}) of 0.497t/cm2 is 143.95.

Best wishes, Prof. Dr. Mohamed Dabaon and Exam. Committee

Tanta University

Department: Structural Engineering
Total Marks: 75 Marks

Faculty of Engineering

Course Title: Soil Mechanics (2)	Course Code: CSE3112	Year: 3rd Civil Eng.
Date: 23 January 2011 (First term)	Allowed time: 3 hrs	No. of Pages: (4)

- Assume any missing data
- Answers should be supported by sketches

Question Number (1) ***(15 Marks)***

a) What is the main goal of soil exploration? (3 Marks)

b) What are the different steps of a soil exploration program. (3 Marks)

c) What are the methods adopted for measuring the field density of soil. (4 Marks)

d) Discuss with clear sketches the penetration testing of the soil in the field, what are the applications of such tests in engineering practice. (5 Marks)

Question Number (2) ***(15 Marks)***

a) What are the main differences between consolidation and compaction of soil? (1 Marks)

b) State the main differences between the standard and the modified proctor tests. (1 Marks)

c) Summarize with clear sketches some of the geotechnical applications in which the surface compaction can be used. (2 marks)

d) Describe briefly using clear sketches how to assess the maximum dry density of compacted sand in the field using the sand cone device. (2 Marks)

e) The following results were obtained from a Proctor test: (6 Marks)

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 behaviour using the interpretation of the compaction theory.
- On the same axes, plot the curves of 80% and 90% degrees of saturation.

f) 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%. (3 Marks)

Question Number (3) ***(15 Marks)***

a) The following Figure (1) shows two cases of retaining walls that are retaining approach fill of a bridge. The approach fill is sand with γ = 2.0 t/m^3 and ϕ' of 33°. Calculate the earth pressures distributions on vertical line AB in cases 1 and 2. (5 Marks)

P.T.O.

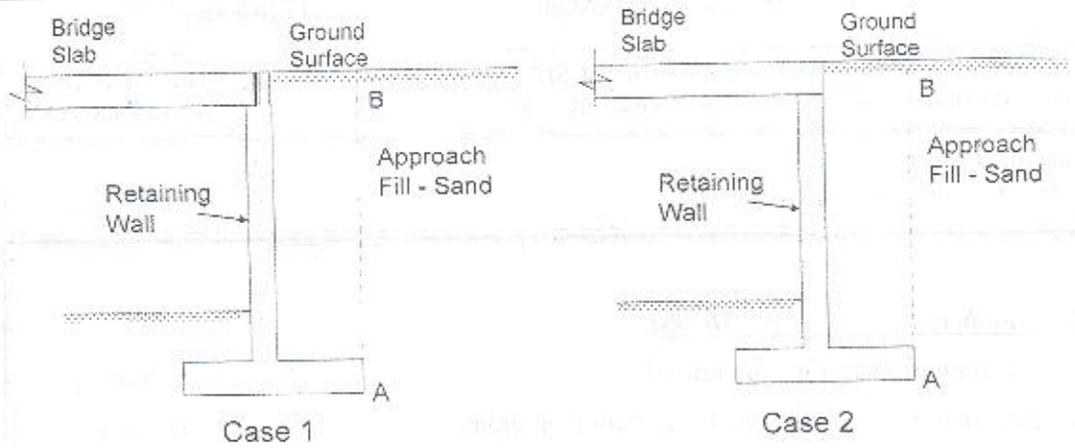


Figure (1)

b) For the given retaining wall channel (Figure 1), **calculate:** (10 Marks)

(I) Factor of Safety against sliding in case of the channel is empty (4 Marks)
(II) Factor of safety against overturning in case the channel is full of water (4 Marks)
(III) The stress under the base in case the channel is full of water. (2 Marks)

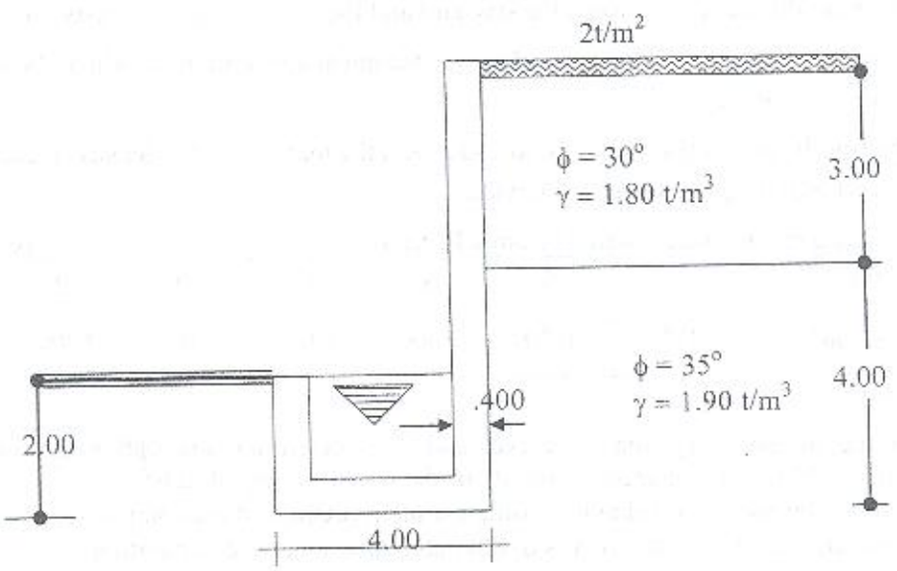


Figure (2)

Question Number (4) ***(15 Marks)***

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. (3 Marks)

b) Re-derive the previous expression for the case if a ground water surface exists at the slope surface. (3 Marks)

c) Use the expression derived in (a) to find the maximum stable slope where $c' = 0$, $\varphi' = 20°$ and $\gamma = 19$ kN/m^3. (2 Marks)

d) The factor of safety of the clay cutting shown in Figure (3) is considered inadequate. Hence, in order to increase it, the cross section is to be altered by removing part of the soil as shown. Determine the percentage increase in the factor of safety. (Neglect the tension crack zone). (5 Marks)

e) If the slope described in (d) is still unsafe, show, using clear sketches, how to protect this slope against failure. (2 Marks)

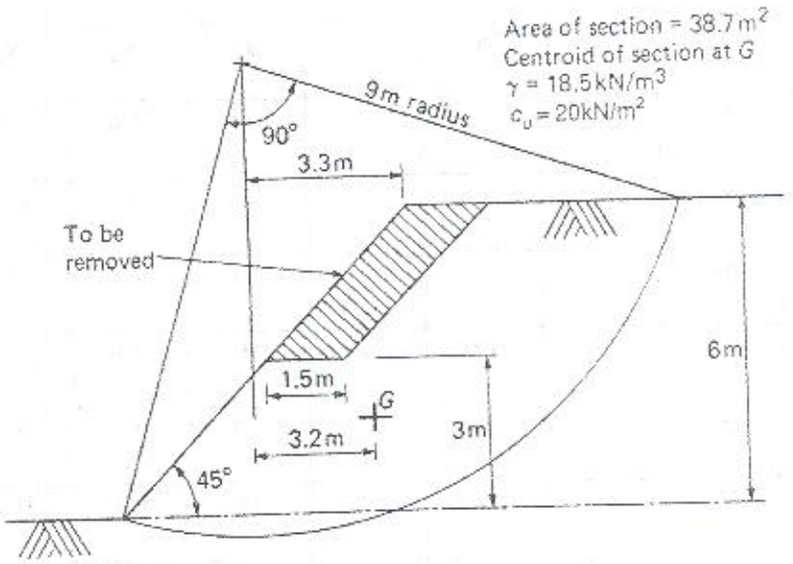


Figure (3)

Question Number (5) ***(15 Marks)***

a) Explain the effect of the ground water table on bearing capacity of soil in cases of (3 Marks)
(i) sand (ii) clay

b) Explain using sketches the concept of floating foundations (3 Marks)

c) Consider the site shown in Figure (4). The soil in the site is characterized as sand with unit weight of 18 kN/m^3. The groundwater level is at 1.5 m below ground surface. A footing load test is carried out on Footing A (1mx1m) at the ground surface. Based on the test, the ultimate load on Footing A is 290 kN. Calculate the maximum allowable load (P) in kN on Footing B (2.5mx2.5m) in the same site using factor of safety of 3. (9 Marks)

P.T.O.

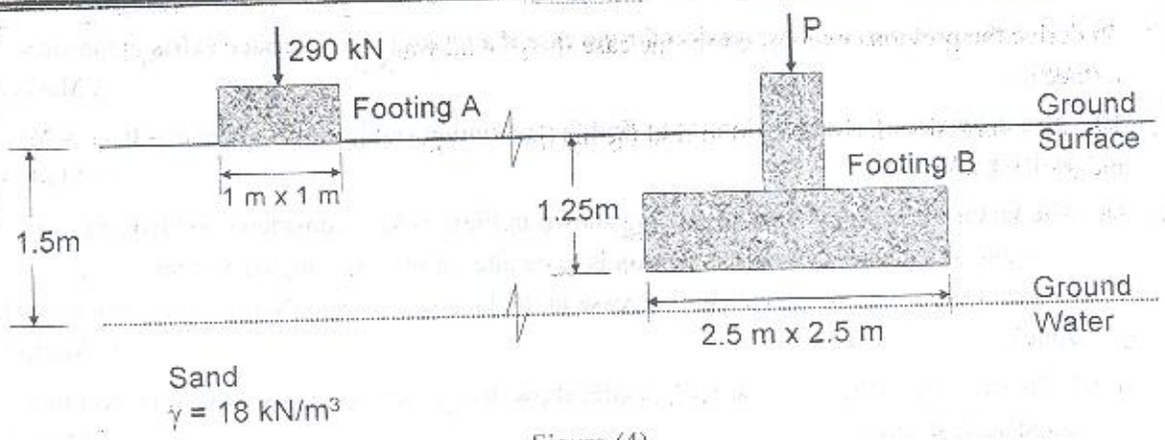


Figure (4)

ϕ°	N_c	N_q	N_γ		ϕ°	N_c	N_q	N_γ
0	5.0	1.0			27.5	25.0	14.0	7.0
5	6.5	1.5			30	30.0	18.0	10.0
10	8.5	2.5	0.5		32.5	37.0	25.0	15.0
15	11.0	4.0	1.0		35	46.0	33.0	23.0
20	15.0	6.5	2.0		37.5	58.0	46.0	34.0
22.5	17.5	8.0	3.0		40	75.0	64.0	53.0
25	20.5	10.5	4.5		42.5	99.0	92.0	83.0

Bearing Capacity Factors from the Egyptian Code of Practice – Shallow Foundations

Best Wishes.....

Course Examination Committee

Prof. Dr. Mohamed A. Sakr *Ass. Prof. Dr. Marawan M. Shahien*

Dr. Ahmed Farouk A. E. K.

٢٠١١/١/٢٥ مدنية

TANTA UNIVERSITY
FACULTY OF ENGINEERING
IRRIGATION AND HYDRAULICS DEPARTMENT
EXAMINATION (3rd YEAR) STUDENTS OF CIVIL ENGINEERING
COURSE TITLE: 0PENE CHANNEL HYDRAULICS

DATE: 25- 1- 2011	TERM: Final	TOTAL ASSESSMENT MARKS: 75	TIME ALLOWED: 3 HOURS

Notes:
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.
Answer as brief as possible. الإمتحان مكون من4 أسئلة فى ورقتين

PROBLEM # 1 (20marks)

A. Define the following very briefly, giving one practical open channel flow example for each: *(8 marks)*

- Kinetic flow factor: Froude number;
- two alternate depths, two conjugate depths;
- the best hydraulic section;
- the normal water depth and the critical water depth for nonrectangular open channel.

B. From the energy equation prove the following relation for the critical flow conditions.

$$Q^2T/gA^3=1 \qquad \textit{(4 marks)}$$

C. A discharge of 200 m^3/sec passes in a canal of 20m width and 2:1 side slope. The normal water depth is 4.0 m. The canal is lined with concrete for which 1/n = 80. Determine: *(8 marks)*

1. The grade of the canal in cm/km.
2. Calculate the discharge if S_o is doubled.
3. Calculate the discharge if n is doubled.
4. Comment on your results.

PROBLEM # 2 (20 marks)

A. Show that the best hydraulic section for trapezoidal section is half of hexagon. *(6 marks)*

B. Prove that the shear stress at open channel wetted perimeter can be expressed as:

$$\tau=\gamma RS_o \qquad \textit{(6 marks)}$$

C. A rectangular open channel of 5.0 m wide carries a discharge of 20 m^3/sec. A venturi-flume is installed in this channel having a stream lined hump 0.5 m high. Estimate the minimum throat width. Sketch both specific energy and specific discharge curves showing the main hydraulic characteristics through the flume.
The water depth upstream the flume is 2.5 m. *(8 marks)*

PROBLEM # 3 (20marks)

A. How can the open channel be classified? *(6 marks)*

Please Turn Over⟶