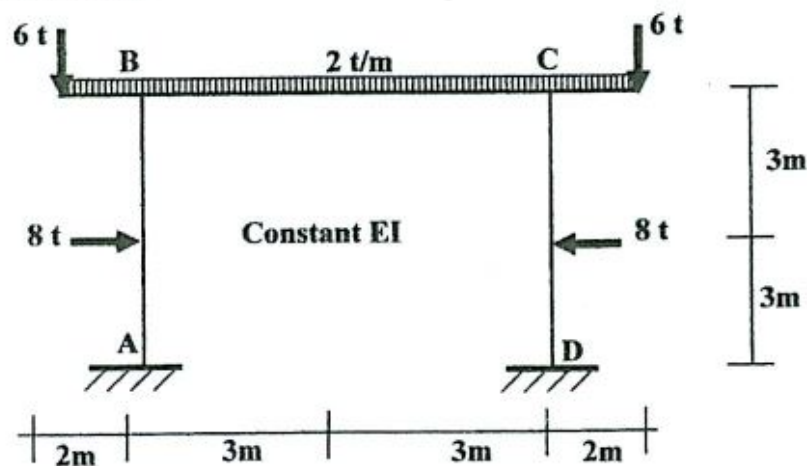
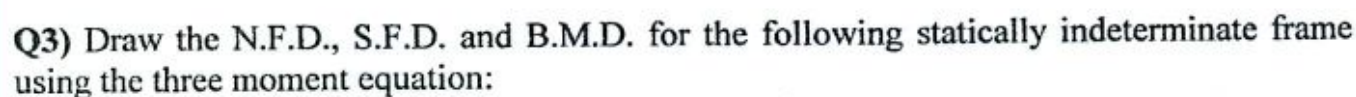
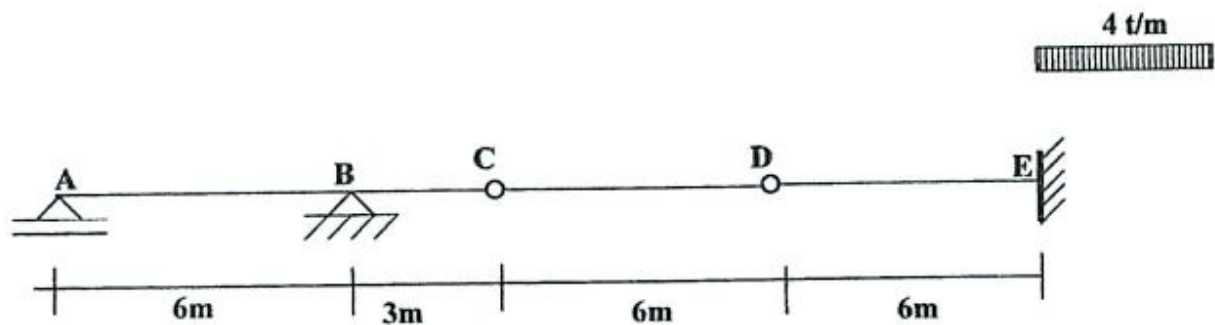


Q1) Draw the S.F.D. and B.M.D. for the following statically indeterminate beam using a suitable method:



**Q4)** Draw the maximum and minimum S.F.D. and B.M.D for the following statically determinate beam due to a uniformly distributed moving load of 4 t/m with sufficient length:



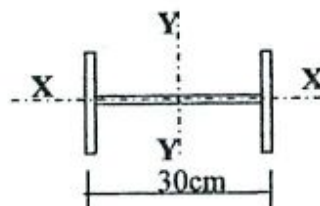
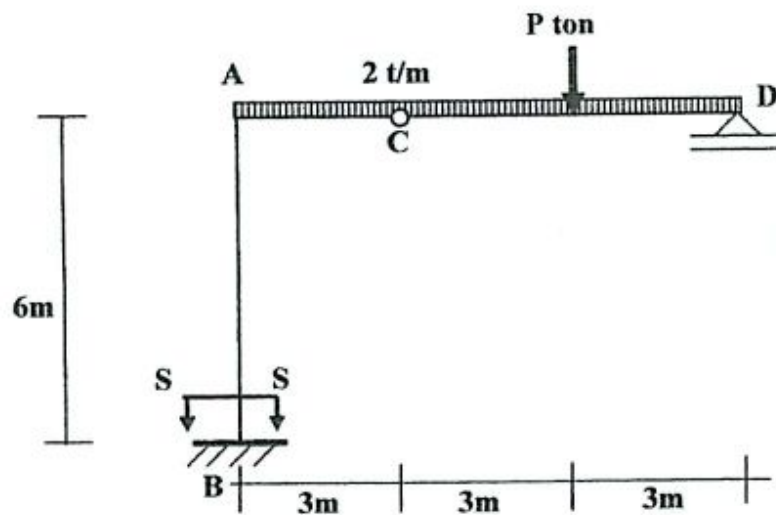
**Q5)** Find the force **P** such that maximum allowable stresses in column AB should not be exceeded considering the buckling effect for the following frame:

Given:

$$\sigma_w = 1.3 \text{ t/cm}^2$$

$$\sigma_{cr} = 1.3 - 0.00007 (\lambda)^2 \text{ t/cm}^2 \quad \text{for } \lambda \leq 100 \quad \text{where } \lambda = (L_b/i_{min})$$

$$\sigma = 6000/(\lambda)^2 \text{ t/cm}^2 \quad \text{for } \lambda \geq 100$$



Section S-S:  
 $A = 154 \text{ cm}^2$   
 $I_{x-x} = 9010 \text{ cm}^4$   
 $I_{y-y} = 25760 \text{ cm}^4$



**TANTA UNIVERSITY**  
**FACULTY OF ENGINEERING**  
**DEPARTEMENT OF STRUCTURAL ENGINEERING**



**EXAMINATION OF SECOND YEAR**

**STUDENTS OF CIVIL ENGINEERING**

**COURSE TITLE: STRUCTURAL ANALYSIS 2(b)**

**COURSE CODE: CSE2104**

**TERM: SECOND**

**DATE : 05/2013 TOTAL ASSESSMENT MARKS : 85**

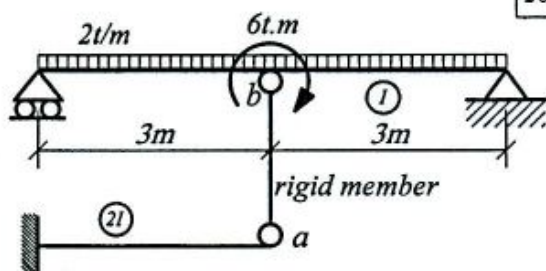
**الامتحان مكون من ٦ أسئلة**

**TIME ALLOWED: 3 HOURS**

**Systematic arrangement of calculations and clear drawing are essential. Any data not given is to be assumed**

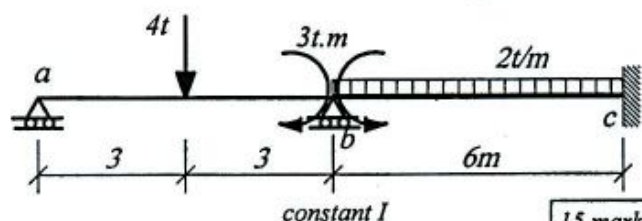
**Q1) For the given structure, draw the B.M. diagram**  
**Determine the deflection of point (a)**

**20 marks**

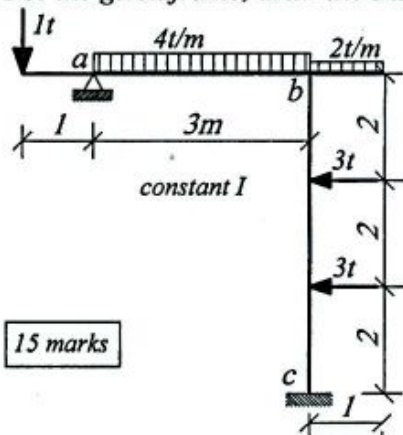


**Q2) For the given beam, draw the B.M. diagram**

**15 marks**



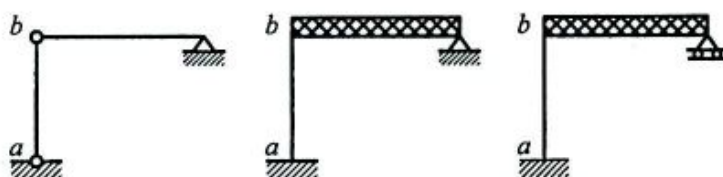
**Q3) For the given frame, draw the B.M. diagram**



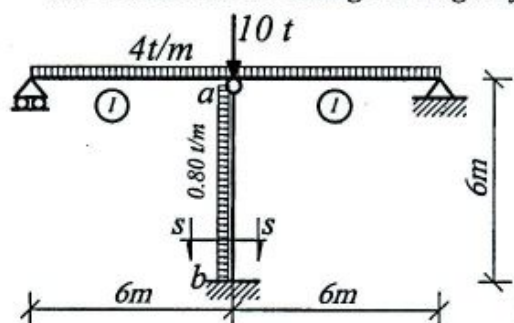
**15 marks**

**Q4) For the given frames, sketch and estimate the buckling length of column (ab)**

**5 marks**



**Q5) For the given structure, determine the Max. and Min. stresses at the section of Max. M in the column "ab". Take the effect of buckling into consideration. Change in length of column can be neglected.**

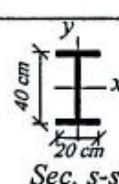


**15 marks**

$$I_x = 20720 \text{ cm}^4$$

$$I_y = 7320 \text{ cm}^4$$

$$A = 144 \text{ cm}^2$$



**Note**

$$M = \frac{wL^2}{8}$$

$$\sigma = 1.3 \text{ t/cm}^2$$

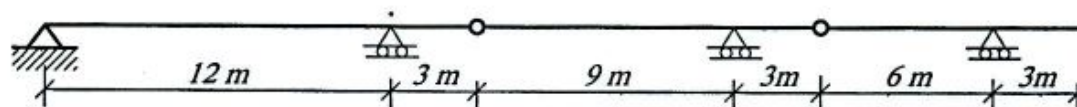
$$\sigma = 6000 / \lambda^2 \text{ t/cm}^2 \quad \lambda \geq 100$$

$$\sigma = 1.3 - 0.00007 \times \lambda^2 \text{ t/cm}^2 \quad \lambda < 100$$

$$\lambda = L / i$$

**Q6) For the given beam, draw the maximum and minimum curves of S.F., and B.M. Also, draw the absolute curves of S.F., and B.M. if the beam is subjected to D.L. = 2 t/m, and L.L. = 4 t/m**

**15 marks**







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EXAMINATION OF SECOND YEAR

STUDENTS OF CIVIL ENGINEERING

COURSE TITLE: STRUCTURAL ANALYSIS 2(b)

COURSE CODE: CSE2104

TERM: SECOND

DATE :06/2014 TOTAL ASSESSMENT MARKS :85

الامتحان مكون من ٦ أسئلة

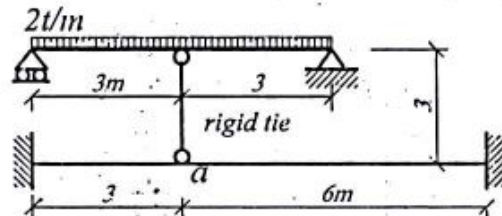
TIME ALLOWED: 3 HOURS

Systematic arrangement of calculations and clear drawing are essential. Any data not given is to be assumed

Q1) For the given beams, draw the B.M. diagram

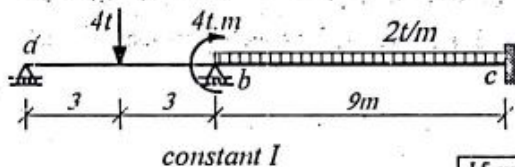
- determine the deflection of point (a)

20 marks

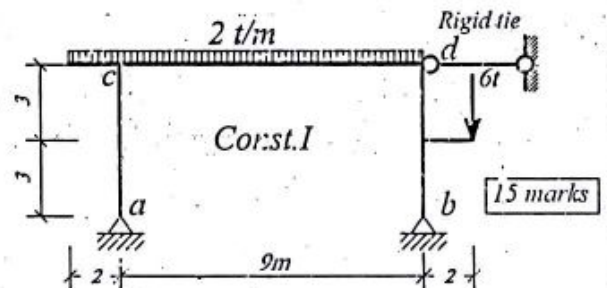


Q2) For the given beam, draw the B.M. diagram

Q3) For the given frame, draw the B.M. diagram



15 marks



15 marks

Q5) For the given structure,

determine the Max. and Min. stresses at the section of Max. M in the column "bc". Take the effect of buckling into consideration. Change in length of column can be neglected.

| Sec. s-s                   |
|----------------------------|
| $I_x = 20720 \text{ cm}^4$ |
| $I_y = 7320 \text{ cm}^4$  |
| $A = 144 \text{ cm}^2$     |

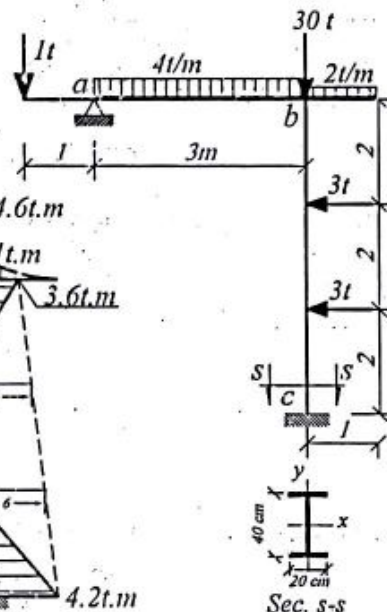
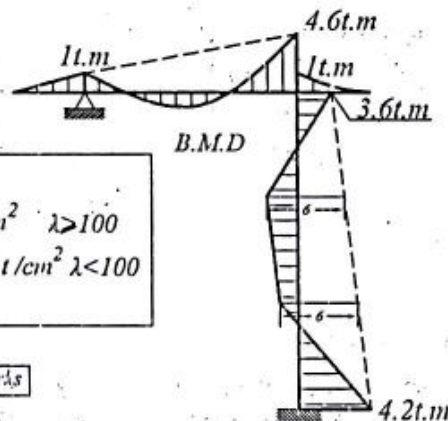
$$\sigma = 1.3 \text{ t/cm}^2$$

$$\sigma_a = 6000 / \lambda^2 \text{ t/cm}^2 \quad \lambda > 100$$

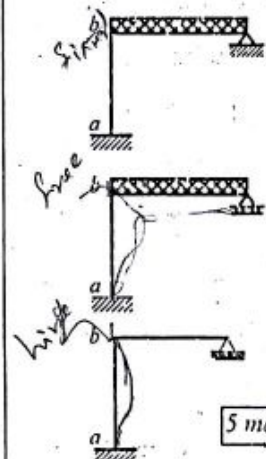
$$\sigma_a = 1.3 - 0.00007 \times \lambda^2 \text{ t/cm}^2 \quad \lambda < 100$$

$$\lambda = L / i$$

15 marks



Q4) For the given frames, sketch and estimate the buckling length of column (ab)



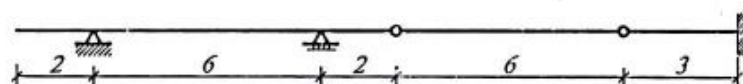
5 marks

Q6) For the given beam, draw:

-The max. and min. curves of B.M. and S.F. due to L.L = 2t/m

-The absolute diagram of S.F. due to L.L = 2t/m, and D.L = 1t/m

15 marks



With the best wishes

Dr. Fahmy A. Zaher



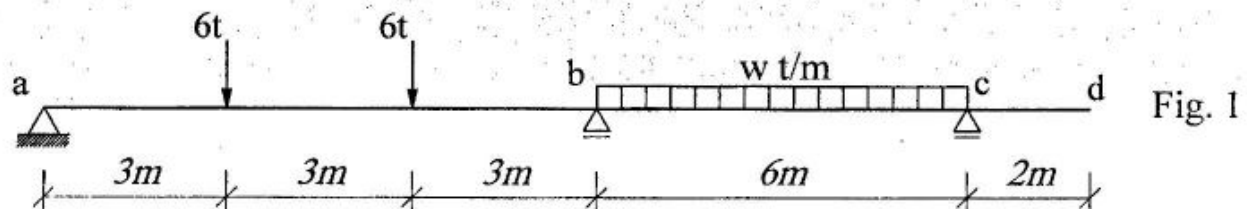
- اجب عن جميع الاسئلة التالية - قم بفرض اى قيم او معلومات قد تراها غير معطاة - دعم اجاباتك دائما بالرسومات التوضيحية  
- ان العناية بحسن تنظيم الحل و توضيحه لى محل تقدير

**Question [1]**

( 16 marks)

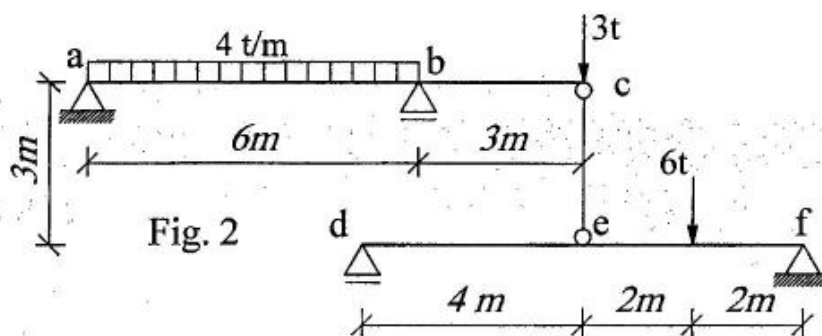
For the given continous beam shown in Fig. (1), it is required to:

- Find the value of the uniform load ( $w$ ) such that the max. positive moment in span (bc) equal ( $4 \text{ t.m}$ )
- Draw the the S.F and B.M. Diagrames.
- Calculate the vertical deflection at point (d) by using virtual work method ( $EI = 10000 \text{ t.m}^2$ )

**Question [2]**

( 15 marks)

The beams (a-b-c) and (d-e-f) with constant  $EI$  are connected to each other by the rigid pendulum (c-e) as shown in Fig. 2. Draw B.M. and S.F Diagrams for the tow beams

**Question [3]**

( 20 marks)

a- For the given continous beam of constant  $EI$  shown in Fig. (3), it is required to:

Draw the Max. and Min. curves of S.F and B.M. due to live load equal  $4 \text{ t/m}$

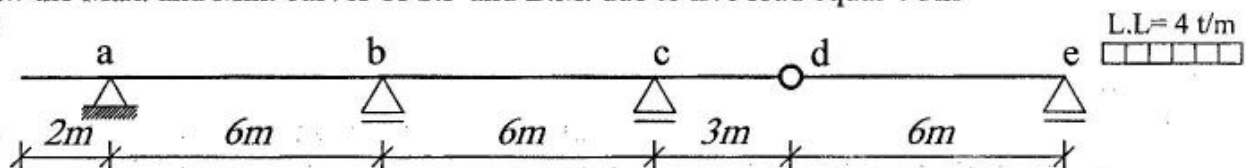
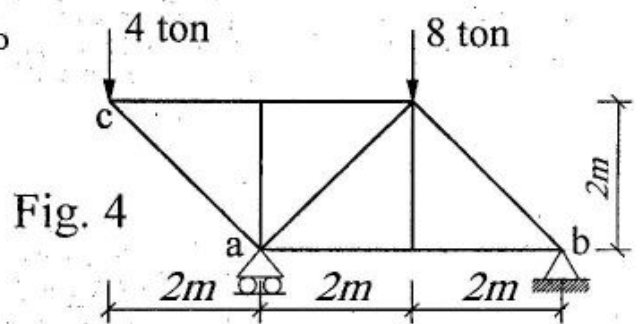


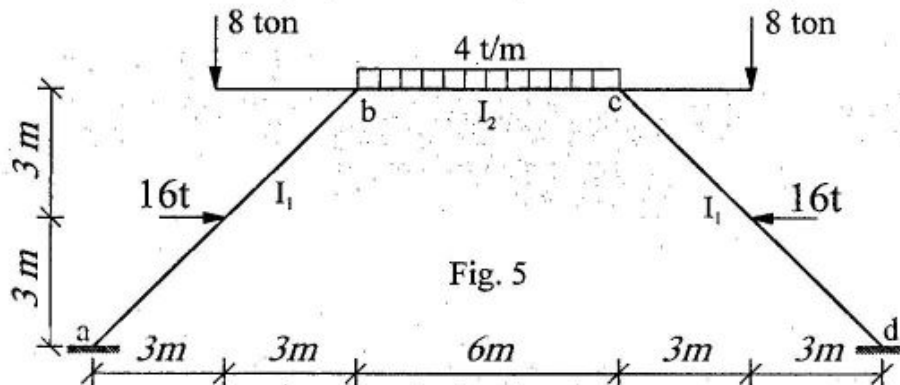
Fig. 3



For all members:  $\frac{EA}{L} = 200 \text{ t/cm}$



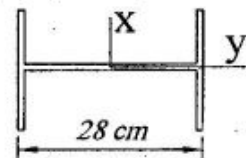
For the given frame shown in Fig. 5, draw the N.F, S.F and B.M. Diagrams. Take  $I_2 = 2 I_1$



( 18 marks)

$$\sigma_{\text{pc}} = 1.6 \text{ t/cm}^2$$

$$\sigma_{\text{Pb}} = \begin{cases} 1.6 - 0.000085\lambda^2 & \text{For } \lambda < 100 \\ \frac{7500}{\lambda^2} & \text{For } \lambda > 100 \end{cases}$$



$$\begin{aligned} A &= 118 \text{ cm}^2 \\ I_x &= 14920 \text{ cm}^4 \\ I_y &= 5130 \text{ cm}^4 \end{aligned}$$

Course Examination Committee :

Dr. Tamer M. El Korany