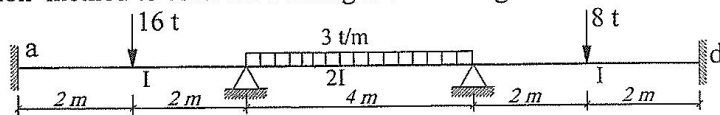




- اجب عن جميع الاسئلة التالية - تم بفرض اى قيم او معلومات قد تراها غير معطاة - دعم اجاباتك دائما بالرسومات التوضيحية
 - ان العناية بحسن تنظيم الحل و توضيحه لى محل تقدير

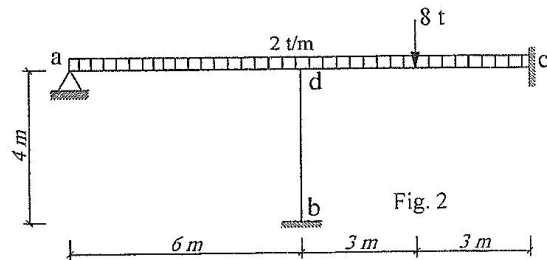
Question [1] (10 marks)

Use the moment distribution method to draw the bending moment diagram for the beam shown in Fig.1



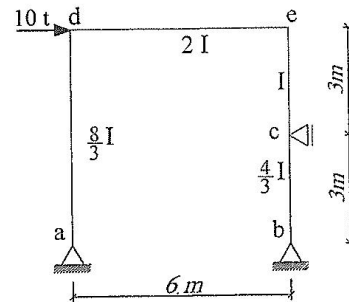
Question [2] (15 marks)

Use the slope deflection method to draw the bending moment diagram for the shown frame in Fig. 2
 EI is constant for all members



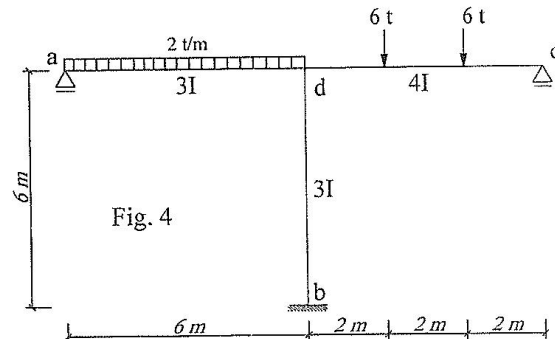
Question [3] (16 marks)

Use the moment distribution method to draw the bending moment diagram for the shown frame in Fig. 3



Question [4] (16 marks)

Use the slope deflection method to draw the bending moment diagram for the shown frame in Fig. 4



Question [5] (12 marks)

a- Using clear sketches, define the following:

- (i) Static and dynamic loading (ii) Free and forced vibration (iii) Resonance condition

b- What are the assumptions that are considered for shear building

c- Write the equations of motion and draw mathematical model for single degree of freedom:

- (i) Free damped system (ii) Forced undamping system

Question [6]

(18 marks)

A free vibration test is conducted on an empty elevated water tank as shown in Fig. 5. A cable attached to the tank applies a lateral horizontal force of 16 ton and pulls the tank horizontally by 2 cm. the cable is suddenly cut and the resulting free vibration is recorded at the end of four complete cycles, the time is 2 sec. and the amplitude is 1 cm.

From these data compute the following:

- a- the damping ratio b- the stiffness c- the weight
 d- the damping coefficient
 e- the number of cycling required for the displacement decrease to 0.2 cm

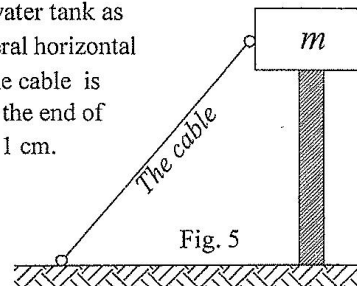


Fig. 5

Question [7]

(18 marks)

The shown frame is subject to horizontal force

at the girder level [$f(t) = 10 \sin 10t$] ton with damping ratio 5 %, if the column are 40 x 100 cm and $E = 200 \text{ t/cm}$ Determine :

- a- the steady state amplitude
 b- the maximum stresses in column AB and CD
 c- the maximum force transmitted to foundation

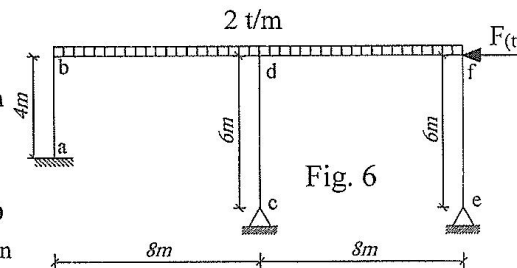


Fig. 6

Question [8]

(20 marks)

For the two story shear building shown in Fig. 7

$E = 2000 \text{ t/cm}$ and $I = 0.001 \text{ m}$, determine:

- a- The natural frequencies
 b- The mode shapes

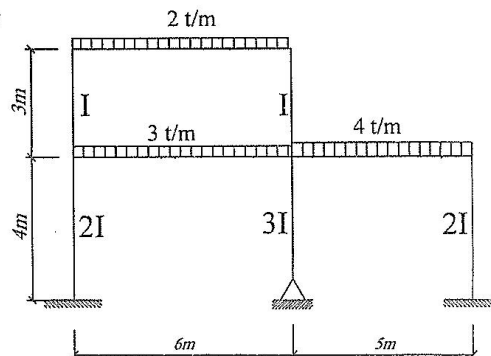


Fig. 7