Banha University	Faculty of Engineering (Shoubra)
Civil Engineering Department	Fourth Year Civil – Public Works Div.
January 2008	January Examination

ELECTIVE COURSE - COMPUTER APPLICATIONS

Time all. = 3.00 Hrs. **Total Marks = 70%**

Systematic arrangement of calculations and clear neat drawings are essential. Any data not given can be reasonably assumed according to the Egyptian Code of Practice.

Question (1):

For the shown frames in figure (1), draw in clear sketches the local axes for each element of these frames.

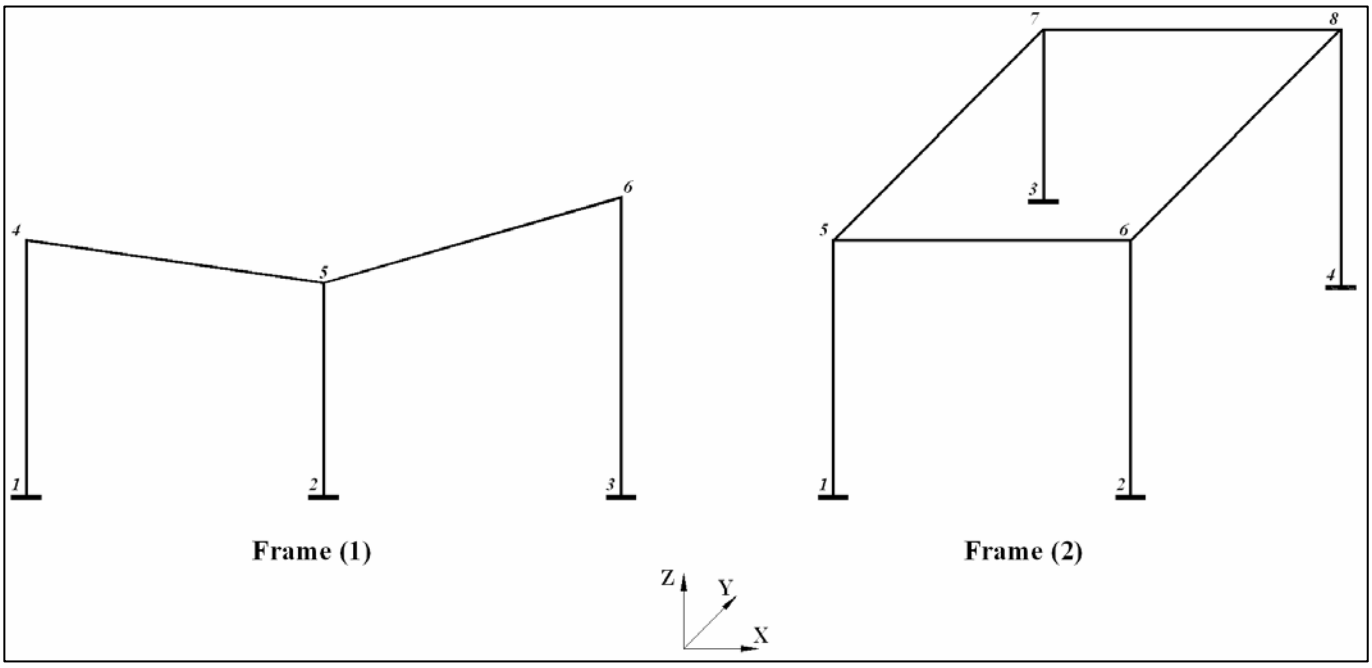

Figure (1)

Question (2):

(a) Draw a flow chart to demonstrate the sequence of operations to model a structure in a finite element program.

(b) Use clear sketch to show the use of end-offset and state its importance.

(c) How the frame element can be used to analyze the trusses in **SAP2000** program.

(d) Consider that the following types of problems are needed to model using **SAP2000** program:

(1) **Plane Frame** (2) **2D-Truss** (in one plane) (3) Raft on springs

For each of the above cases explain (using sketches when appropriate) the following:

- Default plane (or planes) of work and available degrees of freedom.
- Types of elements involved.
- Data blocks or items that have to be defined to complete the analysis.

Banha University	Faculty of Engineering (Shoubra)
Civil Engineering Department	Fourth Year Civil – Public Works Div.
January 2008	January Examination

ELECTIVE COURSE - COMPUTER APPLICATIONS

Time all. = 3.00 Hrs. **Total Marks = 70%**

Systematic arrangement of calculations and clear neat drawings are essential. Any data not given can be reasonably assumed according to the Egyptian Code of Practice.

Question (3):

It is required for the symmetrical overhanging beam (**abcde**) which supported on three link members (**A, B** & **C**) as shown in Figure (2):

(1) Draw a flow chart to explain the steps to complete the modelling of the structure using **SAP2000** program.

(2) Calculate the forces in the three link members **A, B** and **C**.

(3) Draw the Bending Moment, Shear Force and Normal Force diagrams for the symmetrical overhanging beam (**abcde**).

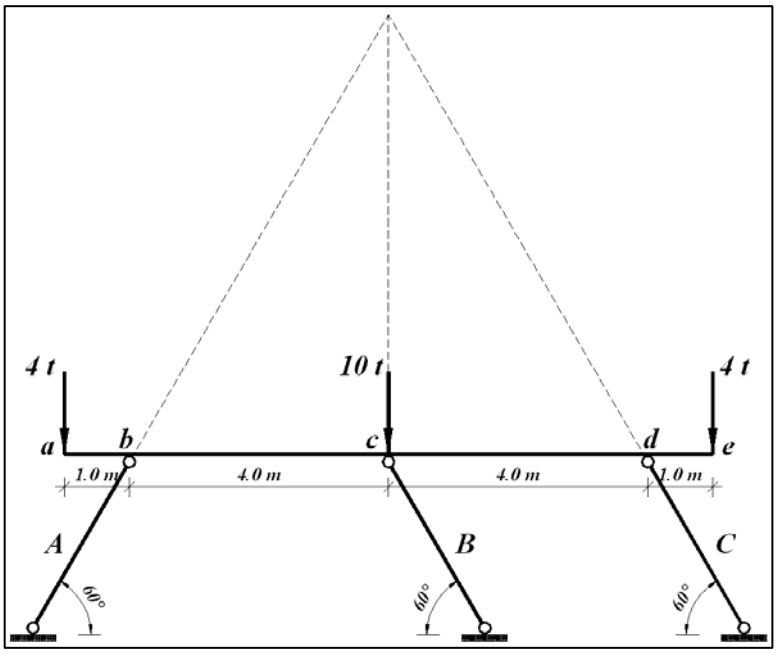

Figure (2)

Question (4):

It is required for the structure shown in Figure (3):

(a) Draw a flow chart to explain the steps to complete the modelling of the structure using **SAP2000** program.

(b) Draw the Bending Moment, Shear Force and Normal Force diagrams.

(c) Investigate whether the cross-section (**I - I**) is able to carry the external loads in bending and shear.

Note: The materials properties are, f_{cu} = 30 N/mm^2, f_y = 360 N/mm^2, f_y (stirrup) = 240 N/mm^2.

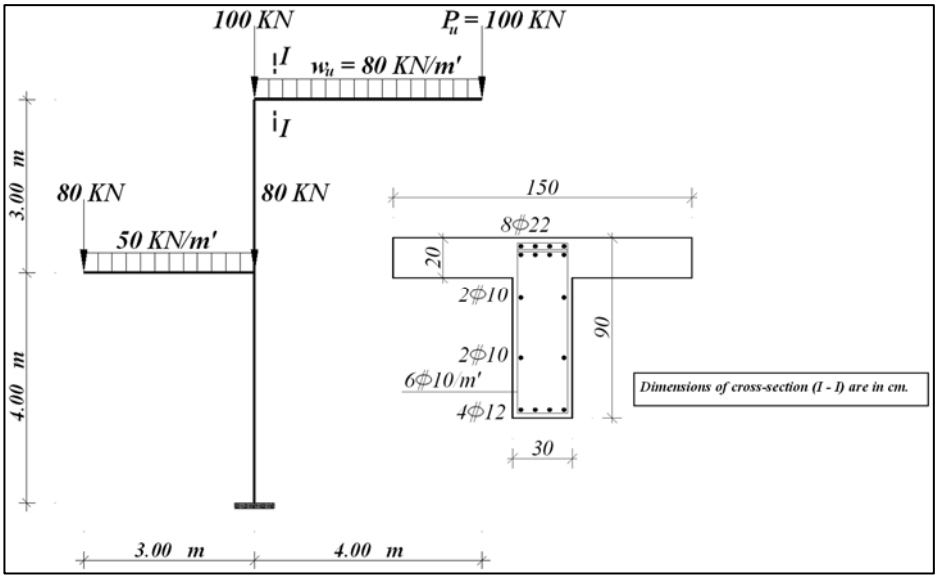

Figure (3)