

Student Name:

Code:

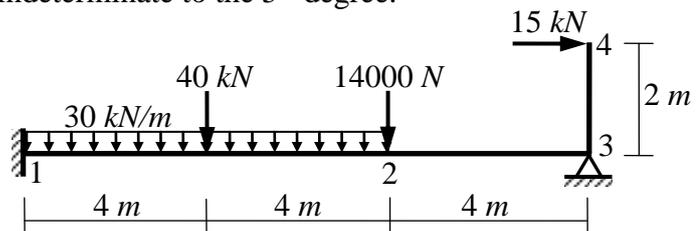
Mid-Term Exam

- The Exam consists of 2 questions in 2 pages.

Question (1): (7 Marks) wrong answer = -1 Mark

(a) TRUE or FALSE (Put ✓ or ✗ in front of the statement number in your answer sheet)

1. The abbreviation “CAD” means Computer-Aided Design and the abbreviation “SAP” means Statics And Problem.
2. The abbreviation “DOF” means Degree of Freedom.
3. In space frames, there are 6 DOF per free node, which are 3 translations and 3 rotations.
4. In plane frames, there are 3 DOF per free node, which are 1 translation and 2 rotations.
5. Bar element used in modeling trusses has two nodes at its ends, every node has 4 d.o.f.
6. The structure shown below has 7 non-zero DOF.
7. The structure shown below is statically indeterminate to the 5th degree.



(b) Choose the correct answer (Put a, b, c or d in front of the statement number in your answer sheet).

1. In SAP, properties of material and load combinations are considered as
 - a) Results of the analysis.
 - b) Input data.
 - c) Output data.
 - d) Always not required in the analysis.
2. The responsibility of the analytical model results lies on
 - a) The structural designer who used the software.
 - b) The company developed the software.
 - c) The input data.
 - d) The computer used.
3. Stiffness is the property of an element which is defined as
 - a) Displacement per unit area.
 - b) Force per unit displacement.
 - c) Force per unit mass.
 - d) Displacement per unit force.

Answer:

(a)

1.	
2.	
3.	
4.	
5.	
6.	
7.	

(b)

1.	
2.	
3.	

Please turn over

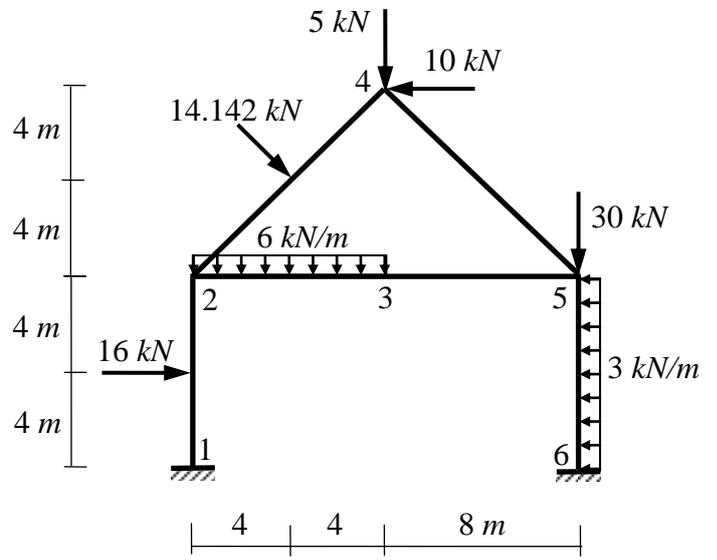
Question (2): (8 Marks)

The matrix equilibrium equation of the shown plane frame is:

$$\{F\} = [K] \{\Delta\} + \{F^f\}$$

Write:

- The nodal forces vector $\{F\}$
- The nodal displacements vector $\{\Delta\}$
- The fixed end solution $\{F^f\}$



Answer: