Ministry of Higher Education
Giza Higher Institute of Engineering & Technology
Civil Engineering Department
Course Name: **Theory of Structures (1)A**
Course Code : **CIV 111**   Date : **11 / 11 / 2017**

Academic Year : **2017/2018**
Semester : **First**
Level : **1ˢᵗ Civil**
Time : **1¼ Hours**
Examiner: **Dr. M. Abdel-Kader**

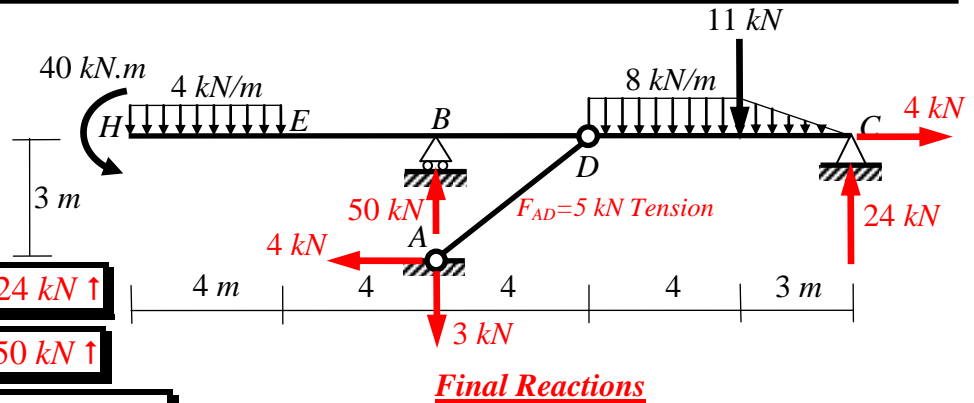# Answer of Mid-Term Exam

Total Marks: **30**   No. of Questions: **3** (Attempt all questions)

Question (1): (12 Marks)

For the shown structure, determine the reactions at the supports **A**, **B** and **C** and the force in the link member **AD**.

Note:
In your answer sheet, draw the final reactions (direction and magnitude) on the structure.

Final Reactions

Part DC: $+\circlearrowleft \sum M_D = 0 \;\rightarrow\;$ $C_y = 24\ kN \uparrow$

Part HD: $+\circlearrowleft \sum M_D = 0 \;\rightarrow\;$ $B_y = 50\ kN \uparrow$
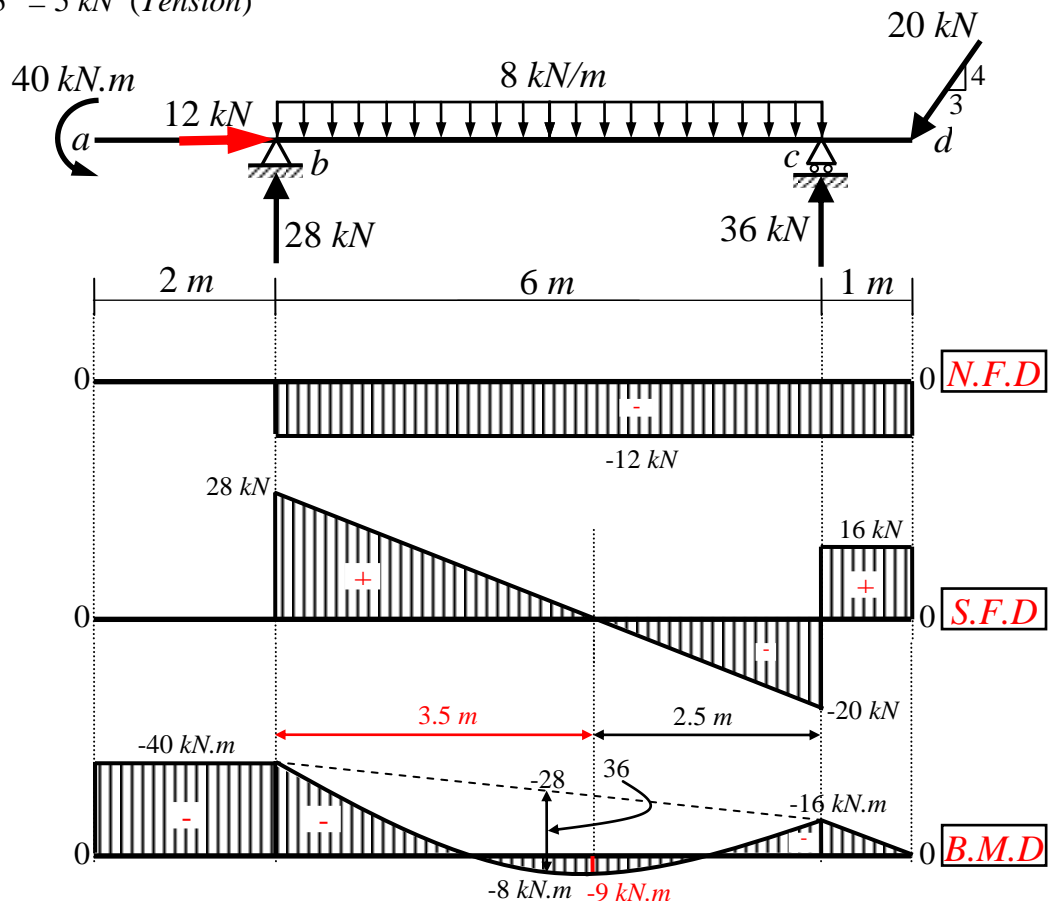
Entire structure: $+\uparrow \sum F_y = 0 \;\rightarrow\;$ $A_y = 3\ kN \downarrow$

Part AD: $+\circlearrowleft \sum M_D = 0 \;\rightarrow\;$ $A_x = 4\ kN \leftarrow$

Entire structure: $+\rightarrow \sum F_x = 0 \;\rightarrow\;$ $C_x = 4\ kN \rightarrow$
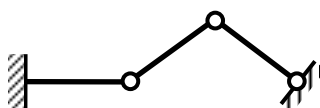
Force in link member $= \sqrt{4^2 + 3^2} = 5\ kN$ (*Tension*)
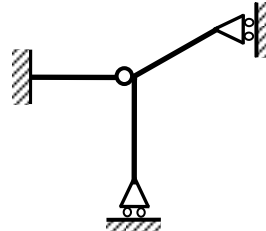
Question (2): (12 Marks)

b) Maximum positive moment is at (zero shear) a distance of 3.5 *m* from support **b**.
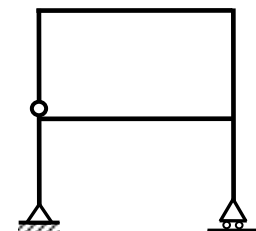Its magnitude of 9 *kN.m*

Question (3): (6 Marks)

(**a**) **Stable + Det.**   (**b**) **Stable + Ind. 1ˢᵗ Degree**   (**c**) **Stable + Ind. 2ⁿᵈ Degree**

With my best wishes
Dr. M. Abdel-Kader