



**King Saud University  
College of Engineering  
Department of Civil Engineering**

**FINAL EXAM**

**GE201 Statics - Second Semester 1427 - 28 H**

**Wednesday, 20<sup>th</sup> Jumada-I 1428  
Time allowed: 3 hrs (8.00 – 11.00 AM)**

<b>Student name (in Arabic)</b>	
<b>Student number</b>	
<b>Section</b>	

*Total number of Questions: 5*

**Answer all questions**

<b>Questions</b>	<b>Maximum Marks</b>	<b>Marks Obtained</b>
<b>Q # 1</b>	10	
<b>Q # 2a</b>	6	
<b>Q # 2b</b>	6	
<b>Q # 3</b>	12	
<b>Q # 4</b>	8	
<b>Q # 5</b>	8	
<b>Total marks</b>		<b>50</b>

Total marks obtained (in words): \_\_\_\_\_

*Instructor*



Student name

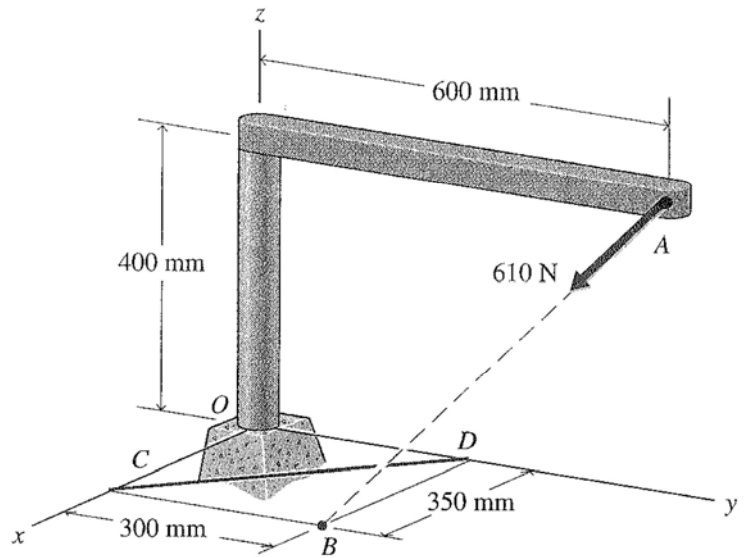
Student number

Marks obtained for Q1

**Question # 1 (10 points)**

The cable **AB** exerts a force ( $T = 610 \text{ N}$ ) as shown in the figure:

- a) Find the moment about the **point O**.
- b) Find the moment about the **line CD**.



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**Solution:**



Student name

Student number

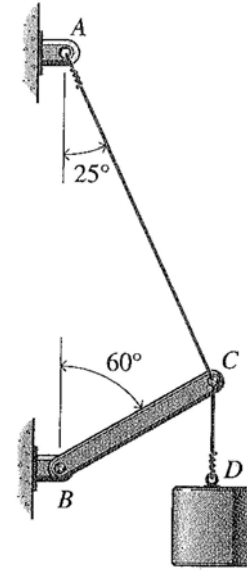
Marks obtained for Q2a

**Question # 2a (6 points)**

A **100 kg** block is supported by a member BC and two cables CD and AC as shown in the figure.

Determine the force in the **member BC**

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**Solution:**





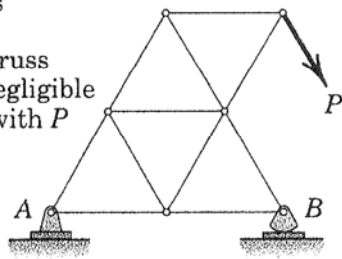
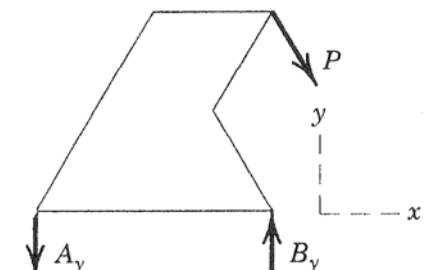
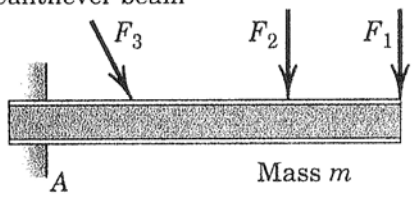
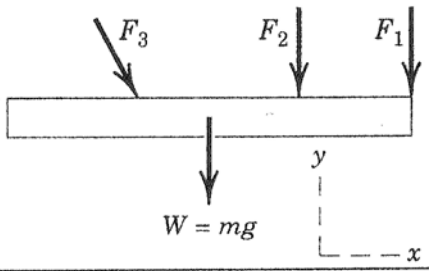
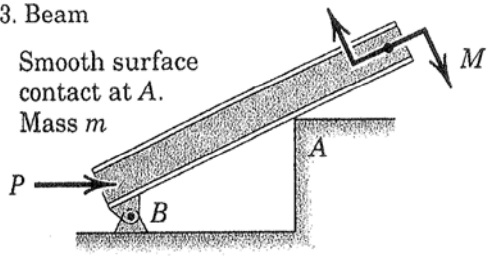
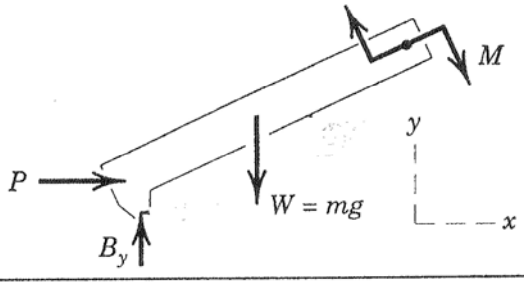
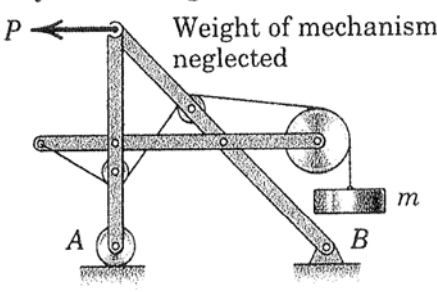
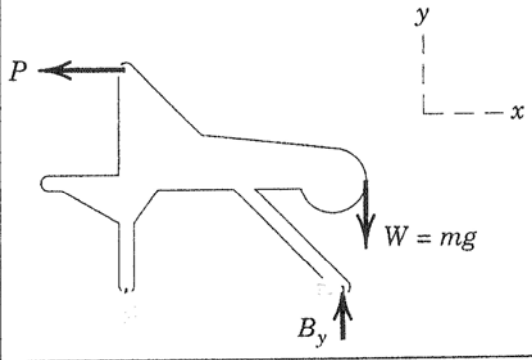
Student name

Marks obtained for Q2b

Student number

**Question # 2b (6 points)**

Incomplete FBD are shown for each mechanical system as shown below. **Complete the FBD.**

Mechanical System	Incomplete FBD
<p>1. Plane truss</p> <p>Weight of truss assumed negligible compared with <math>P</math></p> 	
<p>2. Cantilever beam</p> 	
<p>3. Beam</p> <p>Smooth surface contact at A. Mass <math>m</math></p> 	
<p>4. Rigid system of interconnected bodies analyzed as a single unit</p> <p>Weight of mechanism neglected</p> 	



Student name

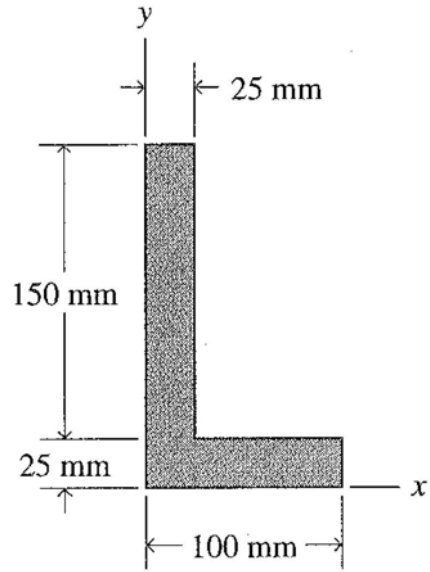
Student number

Marks obtained for Q3

**Question # 3 (12 points)**

For the section shown in the figure, determine:

- (a) the  $x$ - and  $y$ - coordinates of the centroid.
- (b) the moment of inertia about  $x$ -axis ( $I_x$ ).
- (c) the moment of inertia about the  $x$ -axis passing through the centroid ( $\bar{I}_x$ ).



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**Solution:**



Student name

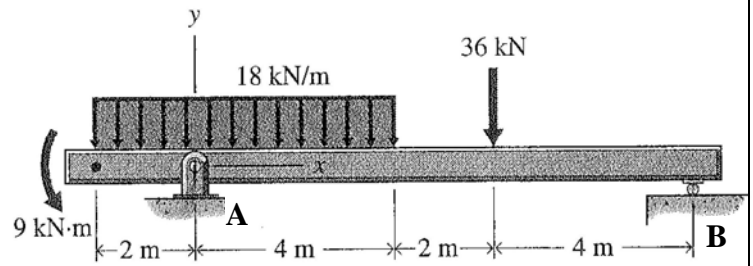
Student number

Marks obtained for Q4

**Question # 4 (8 points)**

For the beam shown in the figure, determine:

- a) the reactions at supports **A** and **B**.
- b) the shear force and bending moment values at the support **A**



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**Solution:**



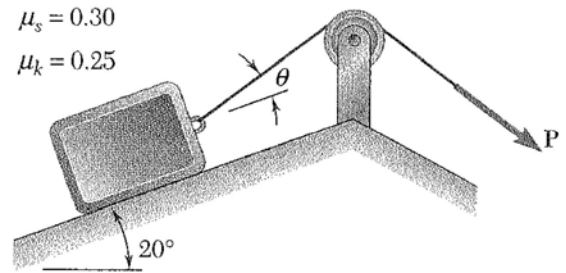
Student name

Student number

Marks obtained for Q5

**Question # 5 (8 points)**

Determine whether the **10 kg** block shown is in equilibrium, and find the magnitude and direction of the friction force when **P = 40 N** and  **$\theta = 20^\circ$** .



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**Solution:**