King Fahd University of Petroleum & Minerals

Department of Civil and Environmental Engineering

CE 201 – Statics

Semester: 152
Examination: Second Major
Date (Day): April 12, 2016 (Tuesday)
Time: 07:00 – 10:00 p.m.

Section	1	2	3	4	5	6	7
Instructor	Vohra	Al-Malack	Al-Malack	Al-Osta	Al-Attas	Essa	Al-Shayea
Time	09:00	07:00	08:00	09:00	10:00	11:00	10:00
Tick							

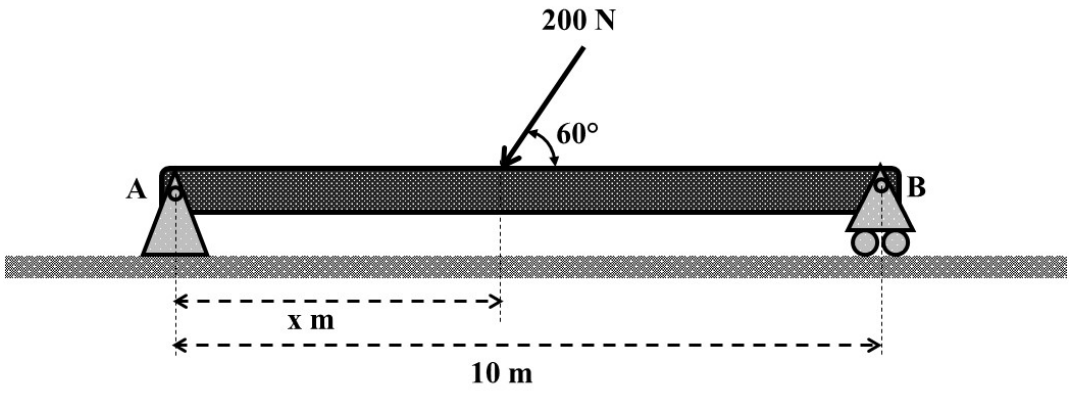
Student's Name :
Student's ID :

Problem	Assigned Grade	Earned Grade
1A	10 (Points)	
1B	15 (Points)	
2A	15 (Points)	
2B	10 (Points)	
3A	05 (Points)	
3B	20 (points)	
4A	05 (Points)	
4B	20 (points)	
Total	100 (Points)	

Good Luck

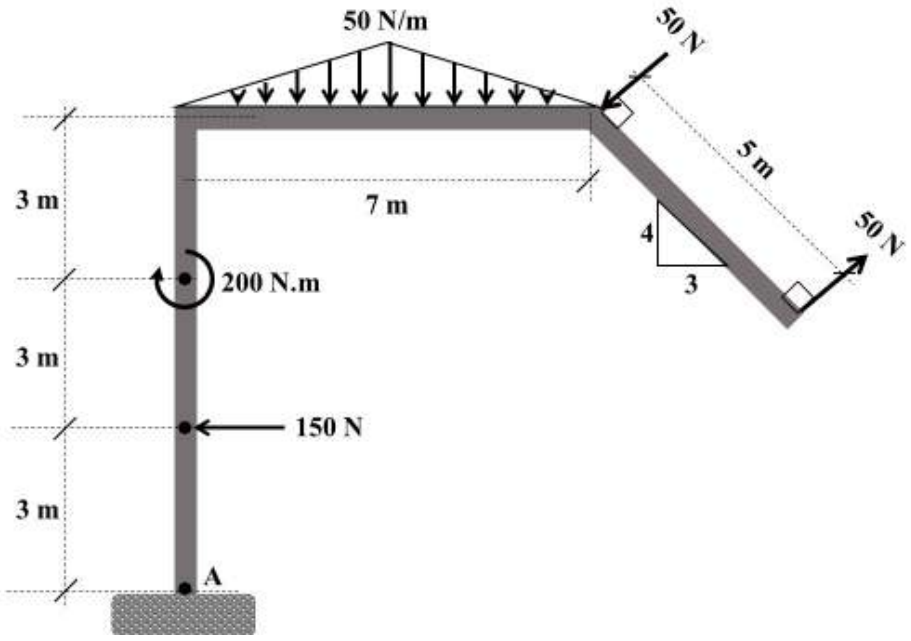
Problem 1A (10 Points)

The beam shown below is supported by pin at **A** and roller at **B**. **Determine and Draw** the horizontal and vertical reactions at **A** and **B** as functions of x. **Show all solution steps.**



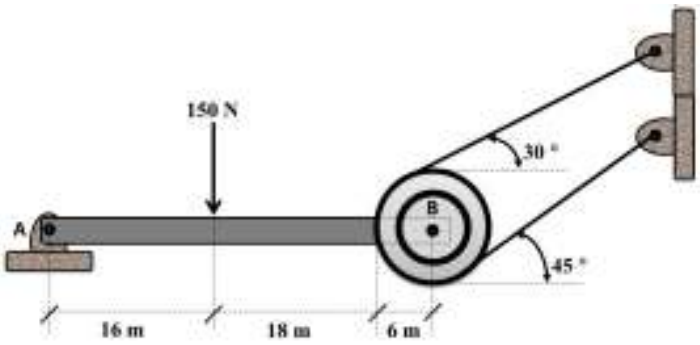
Problem 1 B (15 Points)

The beam shown below is supported by a fixed support at **A**. Replace the force and couple system acting on the beam by an equivalent resultant force and couple moment acting at point **A**. **Show all solution steps**.



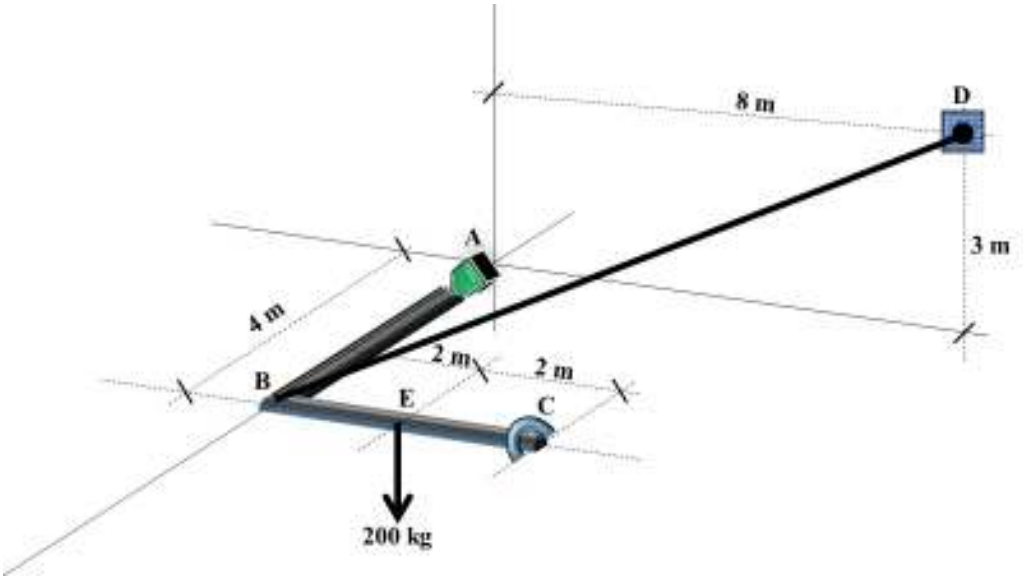
Problem 2A (15 Points)

The uniform beam is supported by pin at **A** and smooth pulley and cable at **B**. The weights of the beam and the pulley are 40 N and 50 N, respectively. Determine the reactions at support A and the tension in the cable. **Show all solution steps.**



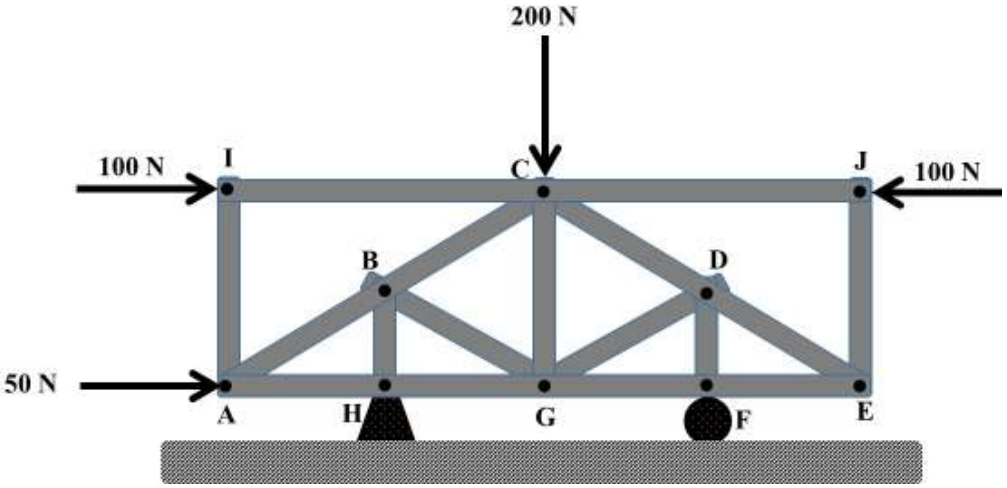
Problem 2B (10 Points)

The rod (**ABC**) shown in the below figure is supported by ball and socket at **A**, Cable BD at **B** and single journal bearing at **C**. The single journal bearing at C is **properly aligned**. **Using only one equilibrium equation**, determine the tension in cable **BD**. **Show all solution steps.**



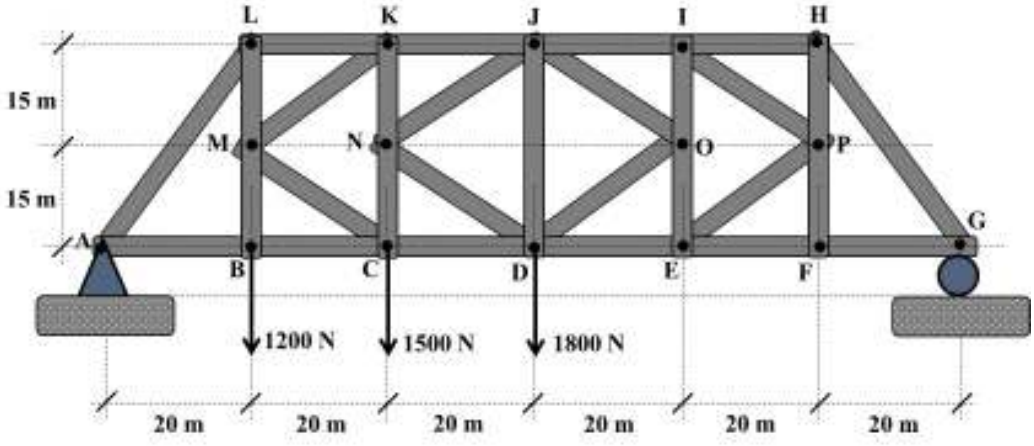
Problem 3A (5 Points)

Identify, by inspection, all zero-force members in the truss shown below. The truss is supported by pin at **H** and roller at **F**. **There will be a deduction of 1 point for each wrong answer**.



Problem 3B (20 Points)

The truss shown below is supported by pin at **A** and roller at **G**. **Using the Method of Sections**, determine forces in members **KJ**, **NJ**, **ND** and **CD**. Indicate whether members are in tension (T) or compression ©. **Show all solution steps.**



Problem 4A (5 Points)

Draw the Free Body Diagrams (**FBDs**) of the bucket and the vertical boom of the back hoe (member **HD**) shown below. The bucket and its contents have a weight of W. Neglect the weight of the members. .

Problem 4B (20 Points)

The frame shown below is composed of 3 members (**AC, CE** and **DB**) and supported by smooth surface at **A** and fixed support at **E**. Find the reactions at supports **A** and **E**, pins **B** and **C**, and slot **D**. **Show all solution steps.**