EXAMINATION COVERSHEET

SPRING 2020 Final Examination

UNIVERSITY OF WOLLONGONG IN DUBAI

THIS EXAMINATION CONTENT IS STRICTLY CONFIDENTIAL

Students must comply with requirements stated in the Online Examination Procedures

Student Number:	
First Name:	
Family Name:	
Date of Examination: (DD/MM/YY)	**18/05/2020**
Subject Code:	**ENGG102**
Subject Title:	**Fundamentals of Engineering Mechanics**
Time Permitted to Write Exam:	2 Hours and 00 Minutes
Time Permitted to Upload Exam Paper:	45 Minutes
Total Number of Questions:	**4**
Total Number of Pages *(including this page):*	**4**

INSTRUCTIONS TO STUDENTS FOR THE EXAM (*FURTHER TO INSTRUCTIONS POSTED ON MOODLE SITE*)

1) Download the final examination question paper onto your laptop/desktop.
2) Answers should be submitted within the time-frame specified above.
3) Answer all / Four questions. The marks are shown next to each question and the total is 100 marks.
4) Total marks for this Final Exam is 100. This Exam is worth 35 % of your final marks.

INSTRUCTIONS TO STUDENTS FOR UPLOADING EXAMS

- **Problem Solving Format questions** – answer the questions on paper with clear indication of which solution belongs to which question.
- Write your name on top of each page with page number.
- Once you are done, take clear scan as PDF of all your working and solutions. The free scanning app download links are provided to you beforehand on moodle.
- Name the file as (Your Student Number_Subject Code)
- Keep your answer sheets for reference in case the scans are not readable or corrupted.
- Upload your submission document by the deadline specified above (and on moodle).
- If you are unable to upload the answer paper(s) (on Turnitin) before the due time, DO NOT PANIC. Email it to the lecturer at sanaamir@uowdubai.ac.ae within the time-limit.
- You will be permitted only one single attempt to upload your submission for the final examination.
- The Lecturer will have the discretion to conduct viva on the submission made, if needed.
- Answers must to be posted on Moodle/Turnitin or through an online portal as specified by the Lecturer.
- IMPORTANT: This exam is an online exam and it is compulsory to switch on both audio and video of your computer. You are required to clearly show your surroundings while working on the exam.

NOTE: For all the questions below, some data is based on your student ID. Follow the instructions given in each question to calculate your data values. Round off to the nearest whole number and MENTION your data clearly before solution of each problem.

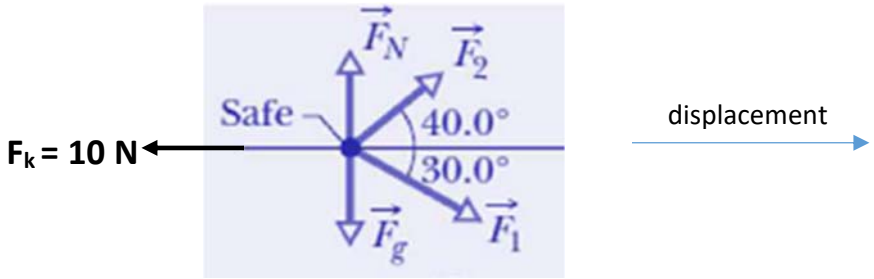
Question 1 (25 pts)

Two thieves 1 and 2 are trying to steal a "W" kg safe full of ancient artifacts from an Egyptian museum. In order to do so, they have to slide the safe across the main hall by a displacement of **12m** straight toward their truck. Thief 1 is pushing the safe by applying a force F_1 N at 30^0 downward from the horizontal and thief 2 is applying a force F_2 N by pulling the safe upward at an angle of 40^0 from the horizontal. Assume that the forces remain constant and the floor offers a force of kinetic friction F_k **10 N**. Calculate:

a. The net work done on the safe by the two applied forces and force of friction. (12pts)

b. The work done by gravitational force F_G and the normal force F_N on the safe during the **12m** displacement. (4pts)

c. Neglect friction and calculate the final speed v_f at the end of the **12m** displacement. The safe is initially stationary. (9pts)



Where,

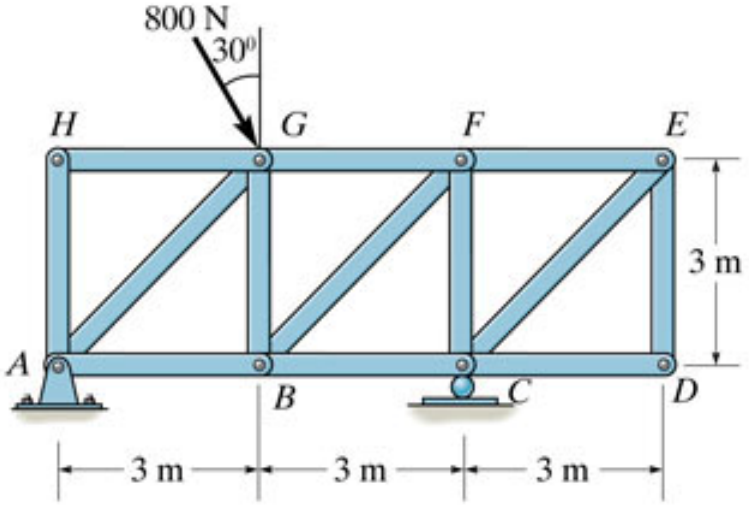
W = Student ID/200,000 kg

F_1 = Student ID/450,000 N

F_2 = Student ID/350,000 N

Question 2(a) (6 pts)

Mark the zero force members in the truss shown below.

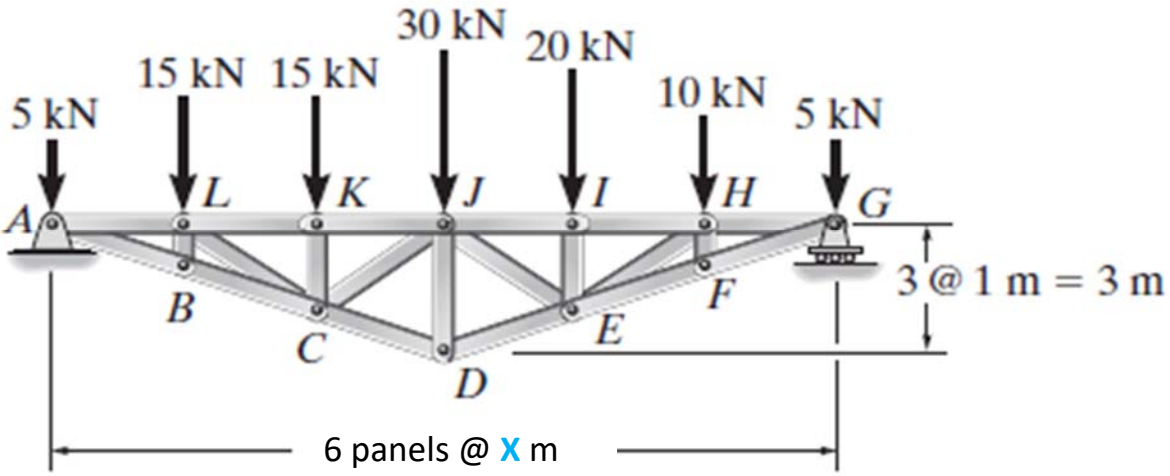


Question 2(b) (19 pts)

a) Calculate the reactions at supports A and G for the truss shown below. (4 pts)

b) Find the forces in members LK, LC, and BC of the truss by method of sections. (12 pts)

c) State whether the members forces found in part b are in tension or compression. (3 pts)



Where X = Student ID/2,000,000 m

Question 3 (25 pts)

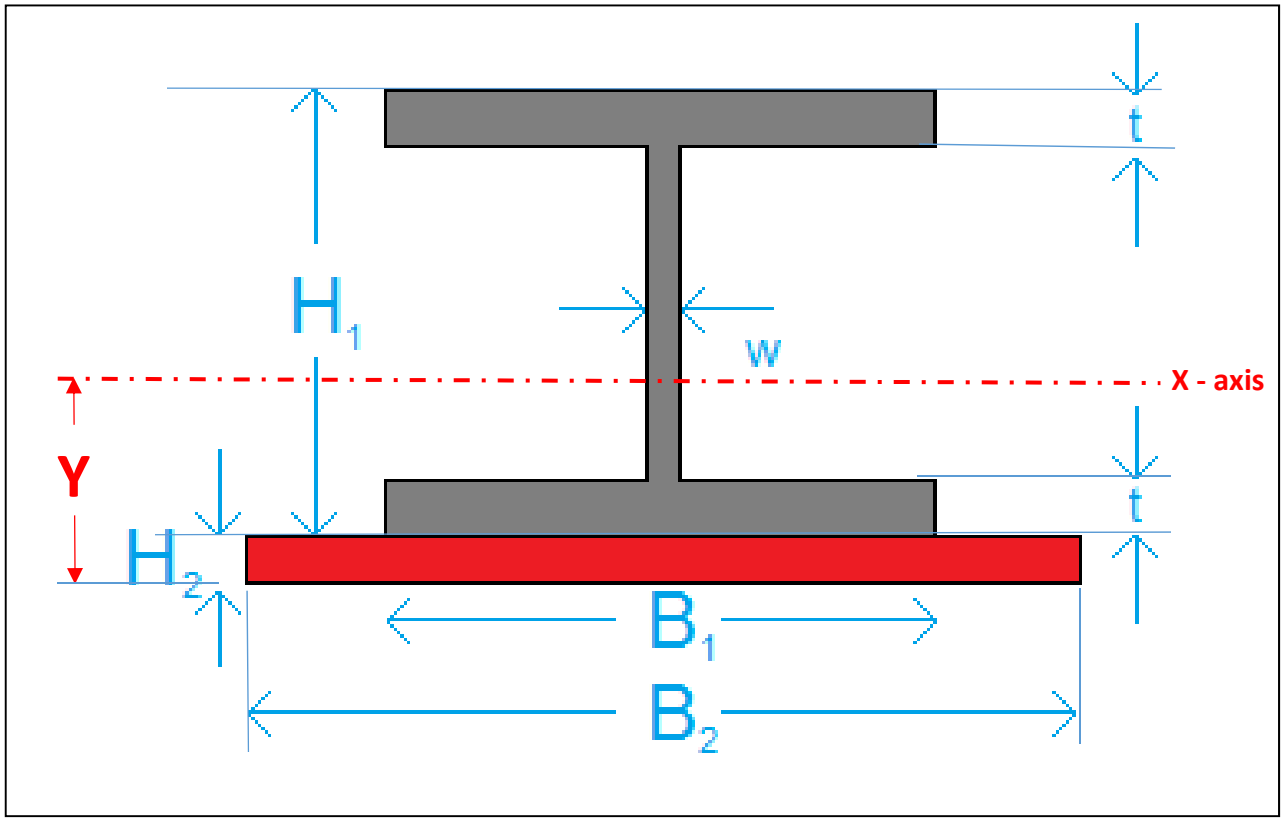
Locate the centroid Y of the area.

Where,

$H_1 = B_1$ = Student ID/30,000 mm **B_2 = Student ID/20,000 mm**

H_2 = t = Student ID/250,000 mm

w = Student ID/350,000 mm



Question 4 (25 pts)

Determine the moment of inertia of the above shape about the centroidal X axis.

Note: Any error carried forward from question 3 will NOT impact the solution for this problem.