FINAL
ALTERNATIVE ASSESSMENT

(COVER PAGE)

Session	:	**August 2020**
Programme	:	Diploma in Mechanical Engineering (DMEN)
Course	:	**EGR1174: Engineering Statics**
Date of Examination	:	14 December 2020 (Monday)
Time	:	12.00noon – 2.15pm Reading Time : Nil
Duration	:	2 Hours 15 Minutes

Special Instructions :

This paper consists of **FOUR (4)** questions. Answer all **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Material permitted :

Non-Programmable Scientific Calculator

Materials provided :

Formulae List

Examiner(s)	:	**Nur Hafizah Habideen**
Chief Moderator	:	Dr Aaron Edward Teo

*This paper consists of **5** printed pages, including the cover page*

DIPLOMA IN MECHANICAL ENGINEERING PROGRAMME (DMEN)
EGR1174: ENGINEERING STATICS
FINAL ALTERNATIVE ASSESSMENT: AUGUST 2020 SESSION

Instructions: This paper consists of **FOUR (4)** questions. Answer all **FOUR (4)** questions in the answer booklet. All questions carry equal marks.

Question 1

Figure Q1 shows a truss. Calculate the force in each member and determine if the members are in tension or compression. Given P_1 = 8 kN, P_2 = 12 kN.

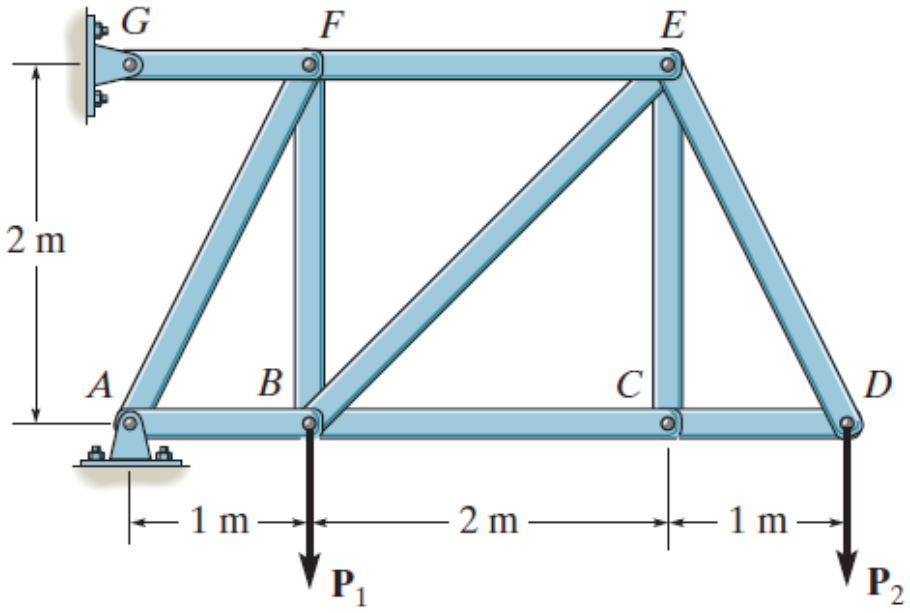

Figure Q1

(25 marks)

Question 2

a) Figure Q2a shows a brake system that is used to stop a wheel from rotating. The wheel is subjected to a couple moment M_o = 360 Nm. Calculate the minimum force P, if the coefficient of static friction between the wheel and the block is μ_s = 0.6.

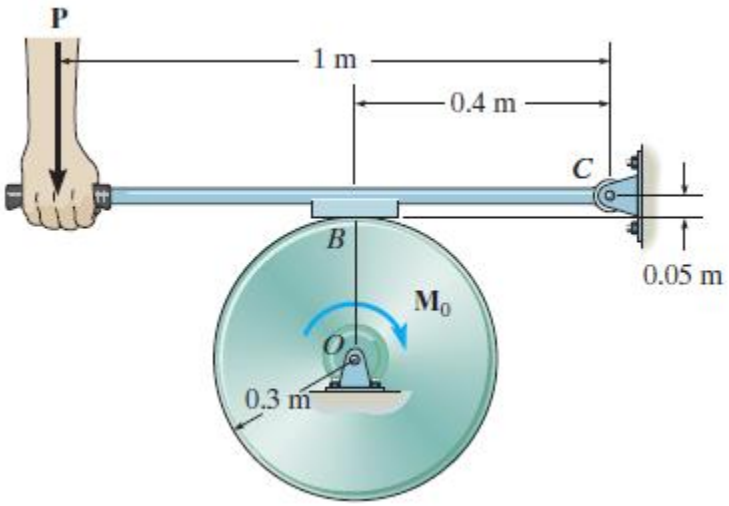

Figure Q2a

(12 marks)

b) The arrangement of beam *AD* is shown in Figure Q2b. The coefficients of static friction at the top and bottom surfaces of the triangular block are μ_{CA} = 0.25 and μ_{CB} = 0.35 respectively. Determine the horizontal force P which must be applied to the triangular block in order to remove it from underneath the beam. What will happen to the triangular block when P = 0? Neglect the weight and size of the triangular block and the thickness of the beam.

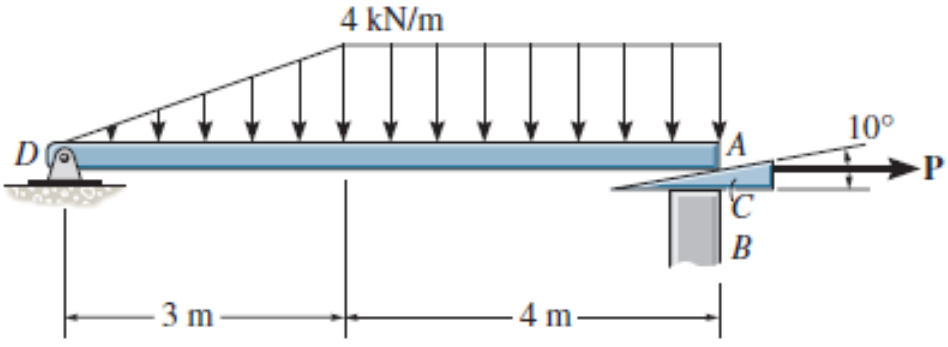

Figure Q2b

(13 marks)

Question 3

(a) Determine the internal normal force, shear force, and moment at points *C* in the beam.

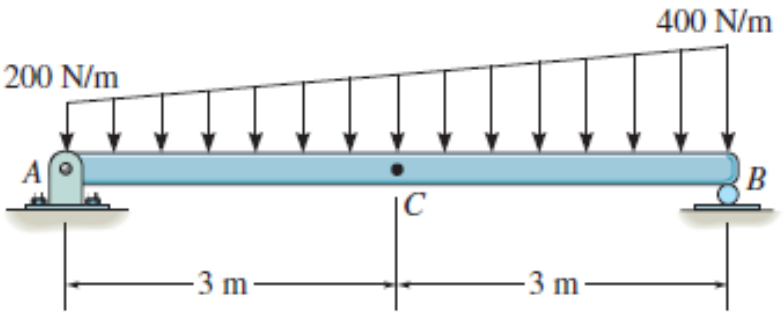

Figure Q3a

(15 marks)

(b) Draw the shear and moment diagrams for the beam.

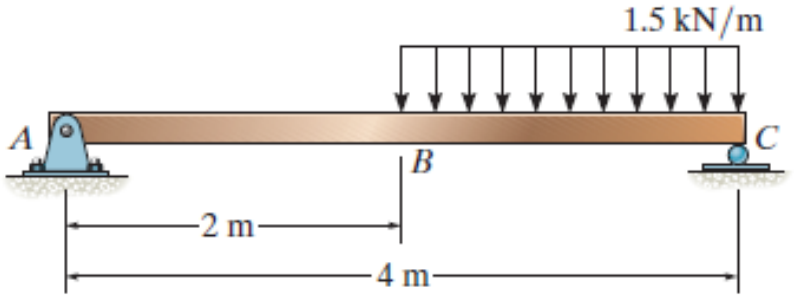

Figure Q3b

(10 marks)

Question 4

(a) Determine the centroid $\bar{y}$, of the beam's cross-sectional area.

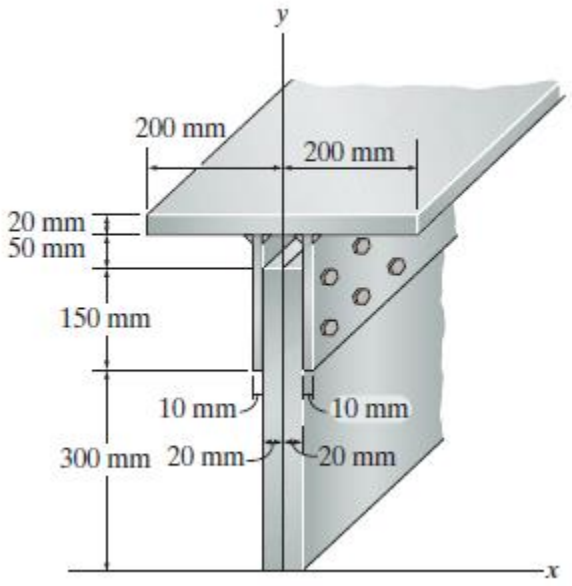

Figure Q4a

(9 marks)

(b) Determine the location $\bar{y}$ of the centroid of the beam's cross-sectional area and then calculate the moment of inertia about the x' axis.

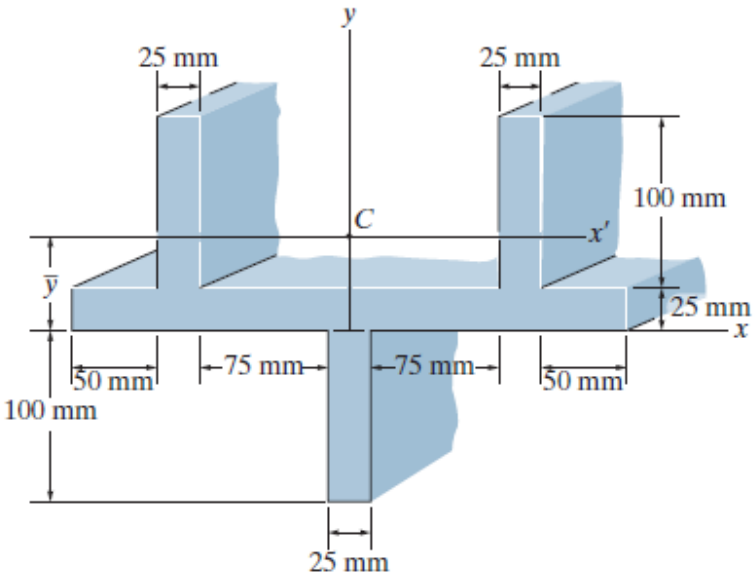

Figure Q4b

(16 marks)

~THE END~