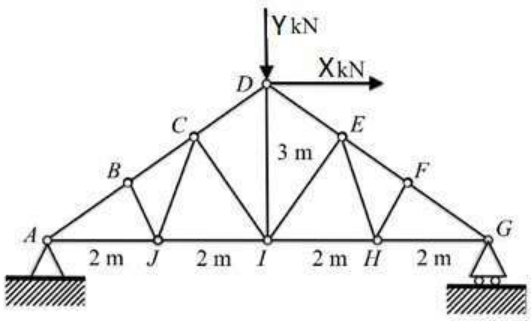
Started on	Thursday, 10 February 2022, 3:05 PM
State	Finished
Completed on	Thursday, 10 February 2022, 3:50 PM
Time taken	45 mins
Grade	[redacted]

Question 1

Consider the truss below with applied load X, Y (Both non-zero) kN as shown and identify the zero-force members



Note: This question has negative marks, ticking all the available options can lead to net negative marks

- 1. AB
- 2. BC
- 3. CD
- 4. DE
- 5. EF
- 6. FG
- 7. GH
- 8. HI
- 9. IJ
- 10. AJ
- 11. BJ
- 12. CJ
- 13. CI
- 14. DI
- 15. EI
- 16. EH
- 17. FH

The correct answers are: BJ, CJ, CI, DI, EI, EH, FH

Question **2**

For the truss in above question derive the loads, in kN in the following members, if Y = 5 kN and X = 9 kN

Indicate tensile forces as positive (+) and compressive (-) as negative before each force value

Force in member CD, in kN is

One possible correct answer is: 1.4583333333333

Force in member JI, in kN is

One possible correct answer is: 7.8333333333333

Force in member HI, in kN is

One possible correct answer is: 7.8333333333333

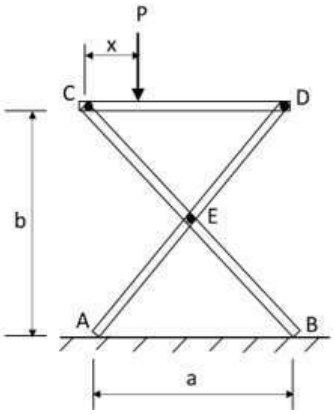
Force in member BJ, in kN is

One possible correct answer is: 0

Question **3**

A folding campstool rests upon the smooth horizontal floor and is loaded with a concentrated load P = 125 N, as shown in figure. The cross members AD and CB are connected by a pin at 'E'. The distance of this concentrated load from the left end is 'x= 67mm'. Dimension a = 584 mm and b = 551 mm

Dimension of AB is equal to the dimension of CD



Determine the magnitude of the reaction force, in N, acting at point B

One possible correct answer is: 14.340753424658

Determine the magnitude of the reaction force, in N, acting at point A.

One possible correct answer is: 110.65924657534

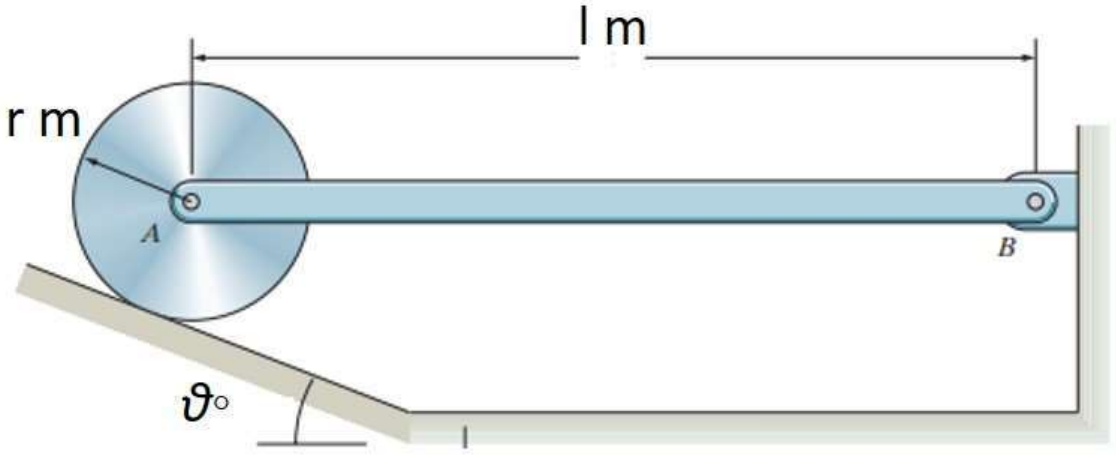
Determine the magnitude of the reaction force, in N, acting on the pin E

One possible correct answer is: 163.79833707964

Question 4

The homogeneous horizontal bar AB weighs 39 N. The homogeneous disk weighs 16 N. The coefficient of kinetic friction between the disk and the sloping surface is μk = 0.23, while the coefficient of static friction between the disk and the sloping surface μs = 0.27. The pins at A and B are frictionless

The radius of the disc, r = 1 m, while the length of the member AB is l = 3.2m, Angle θ = 30 degrees



Determine the magnitude of the normal force, in N, at the point of contact between the disk and inclined plane

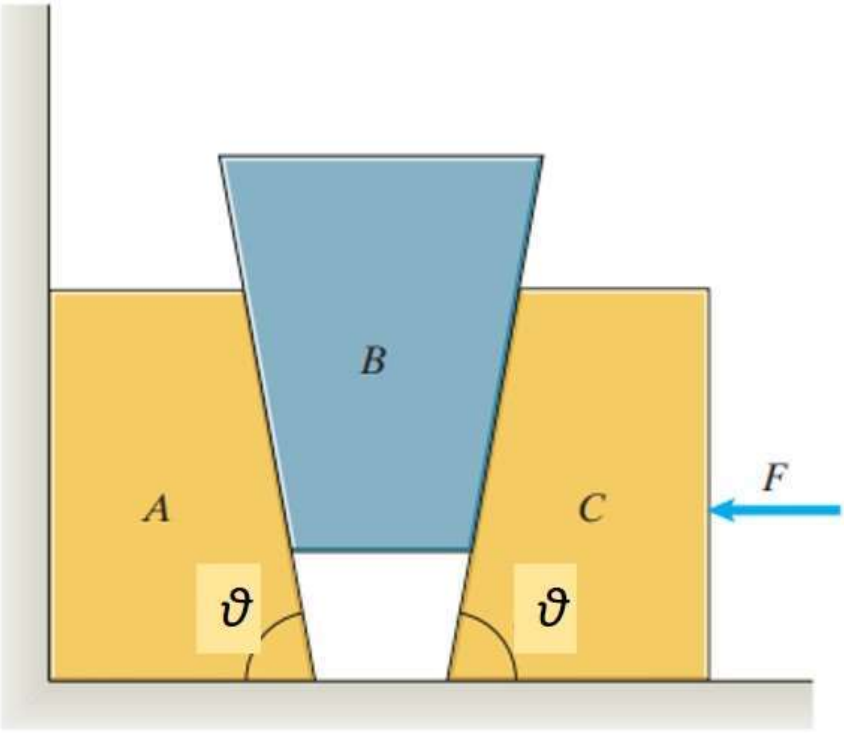
One possible correct answer is: 40.991866534415

What is the magnitude of the couple, in Nm that is required to be applied to the disk to cause it to rotate at a constant rate in the counter clockwise direction?

One possible correct answer is: 8.322923846595

Question **5**

In the figure, the three blocks A, B and C are each weighing 112 N. The friction in every surface is 0.1. The angle theta is 70 in degrees.



When there is impending motion of block B upwards, what is the normal reaction force, in N between the block A and B?

One possible correct answer is: 225.76925873001

What is the minimum value of force F, in N to move the central block B upwards?

One possible correct answer is: 236.6760463747

◄ Test 1 Part A

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Test 2 ►