

College of Industrial Technology

Seat No.

King Mongkut's University of Technology North Bangkok

Final Examination of Semester 1

Year: 2018

Subject: 392131 Physics 1

Section: 15 - 18

Date: 28 November 2018

Time: 10.00 - 12.00

Name: _____ ID: _____ Class: _____

Instructions:

1. The examination has 5 pages (including this page) and a total score of 55 points.
2. Write all your solutions and answers on this examination sheet.
3. This is a closed book examination.
4. You are not allowed to leave the exam room during the first 1 hour after the beginning of the exam.
5. You are not allowed to open the exam papers or start to answer before the proctor's permission.
6. You are not allowed to use the restroom during the exam except in case of an emergency.
7. No documents are allowed to be taken out of the examination room.
8. Calculators are **NOT** allowed in the examination.
9. Electronic communication devices are **NOT** allowed in the examination room.

Questions no.	Mark
1 - 3	
4 - 6	
7 - 8	
9 - 10	
Sum	

Cheating in the exam is considered an extremely serious offence which will result in expulsion from the University.

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1. A 0.5 kg block with an initial speed of 5 m/s slides along a horizontal tabletop against a friction force 5 N. find

- a) How far will it slide before stopping? (2 points)
- b) What is the coefficient of friction between the block and the tabletop? (2 points)

2. A monkey climbs up a rope with the acceleration of 4 m/s^2 . This force is half of maximum tension force before the rope breaks. Find the maximum acceleration of the monkey to climb up for the rope before breaking. (4 points)

3. A person with a mass of 80 kg steps onto an elevator. (5 points)

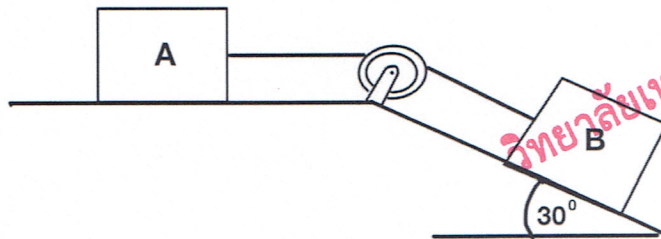
- a) What would a Newton scale read?
- b) If the elevator accelerate up at 4 m/s^2 , what is the new scale reading?
- c) If the elevator slows at -2 m/s^2 , what is the new scale reading? (Answer in Newton unit)

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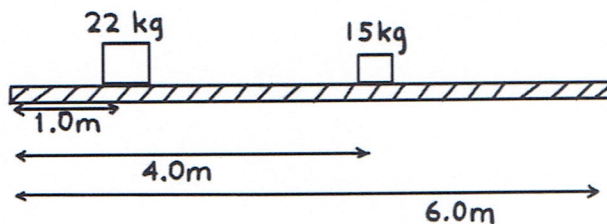
4. The mass of a ball is four times the mass of another ball when these balls are separated by a distance of 10 cm, the gravitational force between them is $6.67 \times 10^{-7} \text{ N}$.

Find the masses of two balls. (Given : $G = 6.67 \times 10^{-11} \text{ N} \cdot \text{m}^2 / \text{kg}^2$) (4 points)

5. In this figure, the two boxes have identical masses of 40 kg. Both experience a sliding friction force with $\mu_k = 0.15$. Find the acceleration of boxes and the tension in the tie cord. (9 points)



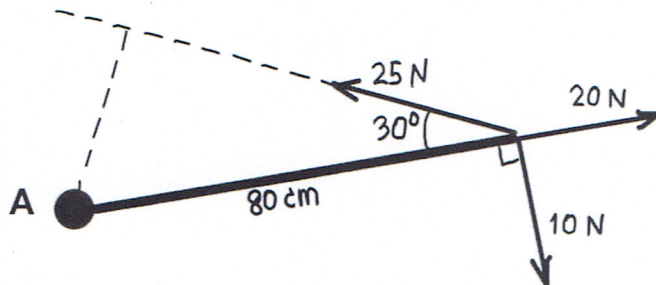
6. A uniform beam of 5.0 kg holds up the two masses as shown. Find the center of gravity of the system of objects from the left edge of the board. (4 points)



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7. Find the torque about axis A (which is perpendicular to the page).

(4 points)

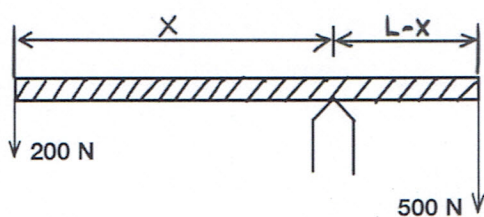


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8. A uniform, 100 N pipe and long L is used as a lever, as shown in Figure.

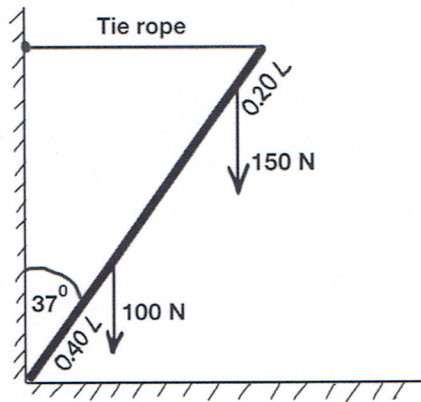
a) Where must the fulcrum (the support point) be placed if a 500-N weight at one end is to balance a 200 N weight at the other end? (6 points)

b) What is the reaction force exerted by the support on the pipe? (2 points)



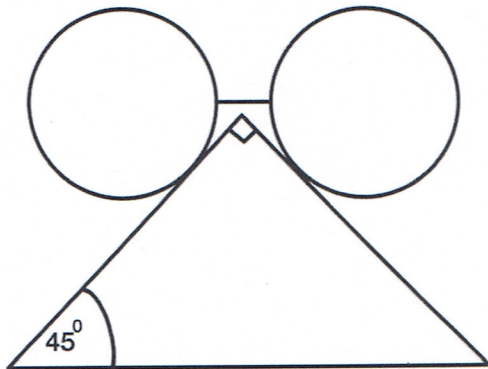
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9. The foot of a ladder rests against a wall and its top is held by a tie rope, as shown in Figure. The ladder weighs 100 N, and its center of gravity is 0.4 of its length from the foot. A 150 N child hangs from a rung the is 0.2 of the length from the top. Determine the tension in the tie rope and components of the force on the foot of the ladder (R_x and R_y). (8 points)



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10. Each sphere's weight is 10 N. From the figure, find tension of the rope. (5 points)



Good Luck : Dr. Dusit Ngamrungroj and Dr. Prakasit Changsuphan