

## Newton's Laws: Exam Revision Tracker



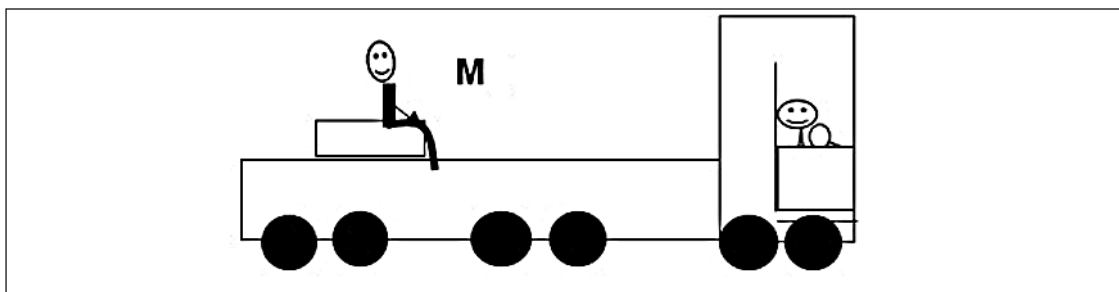
| Attempt #1   |       | Attempt #2   |       | Attempt #3   |       | Attempt #4   |       |
|--------------|-------|--------------|-------|--------------|-------|--------------|-------|
| Total        | Score | Total        | Score | Total        | Score | Total        | Score |
| 6            |       | 16           |       | 10           |       | 18           |       |
| Percentage = |       | Percentage = |       | Percentage = |       | Percentage = |       |

## Newton's Laws: Attempt #1

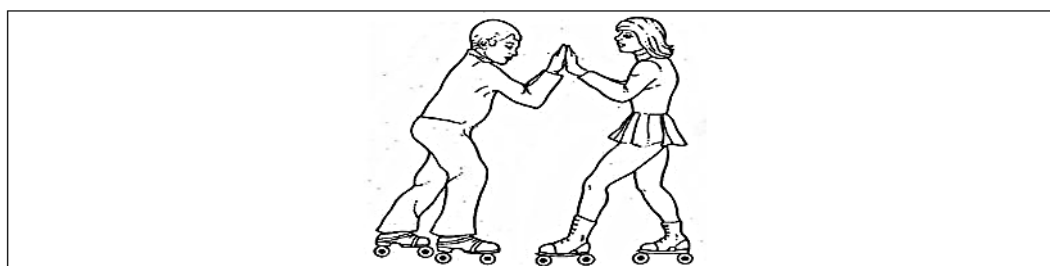


**Total = 6 Marks**

A truck is moving at a constant velocity and is suddenly hit from the rear (back) by a fast-moving bus. A loose-standing crate is placed on the back of the truck and a man, **M**, is sitting on the crate.



1. In which direction does the man, **M**, fall?  
Write down only BACKWARDS or FORWARDS. (1)
2. State in words Newton's laws of motion you used to answer QUESTION 5.1. (2)
3. Luxolo and Kay with masses 80 kg and 50 kg respectively are standing on roller-skates facing each other. Initially they are at rest. They push against each other and both move away in opposite directions. (IGNORE FRICTION)



- 3.1 How does the force exerted on Kay compare to the force exerted on Luxolo?  
  
Write only GREATER, SMALLER or EQUAL TO. (1)
- 3.2 Explain how their accelerations compare. (2)

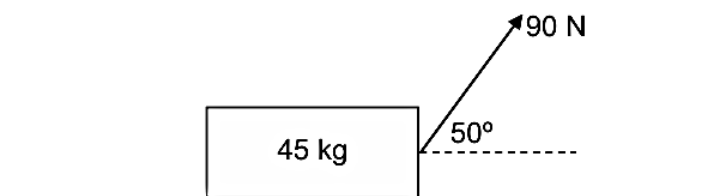
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### Newton's Laws: Attempt #2 ⚡

Total = 16 Marks

A box, with a mass of 45 kg, is pulled with a force of 90 N at an angle of  $50^\circ$  to the horizontal. The box moves at a **CONSTANT VELOCITY**.

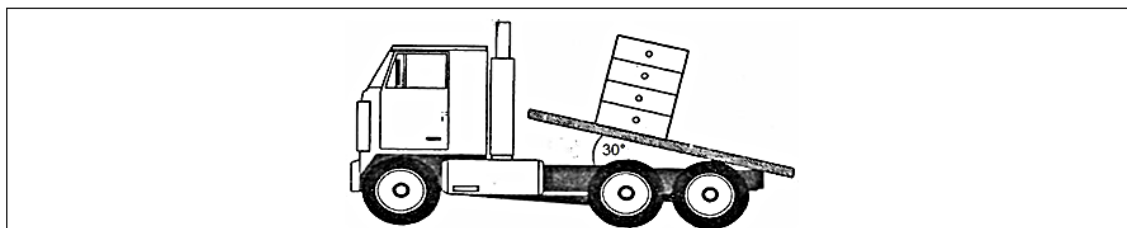


1. Define the term *kinetic frictional force*. (2)
2. State *Newton's First Law of Motion* in words. (2)
3. Calculate the magnitude of the horizontal component of the applied force. (2)
4. Calculate the magnitude of the normal force. (4)
5. Calculate the coefficient of kinetic friction. (4)
6. Will the coefficient of kinetic friction change if the angle of the applied force is decreased? Write only YES or NO and give a reason. (2)

### Newton's Laws: Attempt #3 ⚡

Total = 10 Marks

A wooden cabinet of 60 kg rests on the back of a tip-up truck. The back tilts slowly, until it makes an angle of  $30^\circ$  with the horizontal. The cabinet does **NOT** move.



1. Calculate the magnitude of the frictional force. (3)
2. Calculate the coefficient of static friction. (3)
3. The angle of  $30^\circ$  is now increased. How will this change affect the following:  
 (Write down only INCREASES, DECREASES or REMAINS THE SAME)
  - 3.1 The coefficient in QUESTION 3.2? (1)
  - 3.2 The frictional force? Explain your answer. (3)

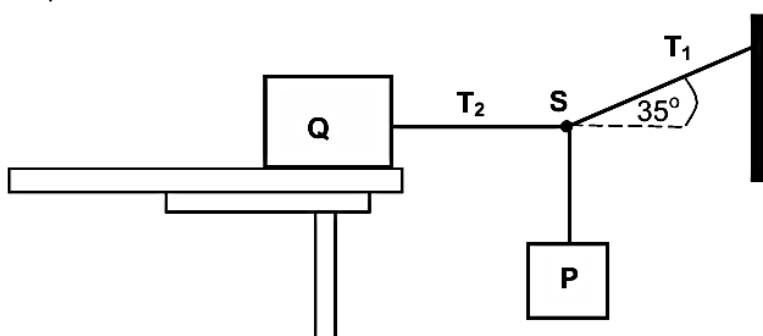
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**Newton's Laws: Attempt #4** ⚡

Total = 18 Marks

A block **Q** of mass 70 kg is at rest on a table. It is connected to block **P** by means of two light inextensible strings knotted at **S**. A third string is arranged in such a way that the string connecting block **Q** is **horizontal** as shown in the diagram below. The coefficient of static friction between block **Q** and the surface of the table is 0,25. The knot **S** is in equilibrium.



The tension in the string connecting block **Q** is  $T_2$  and that for the string that pulls at  $35^\circ$  is  $T_1$  as shown in the diagram.

1. Define the term *static frictional force* in words. (2)
2. Explain what is meant by *the knot S is in equilibrium*. (2)
3. Draw a labelled free-body diagram to show all the forces acting on:
  - 3.1 The knot at **S** (3)
  - 3.2 Block **Q** (4)
4. Calculate the maximum weight of block **P** for which block **Q** will just begin to slip. (7)

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