RISHIKUL SANATAN COLLEGE

CHAPTER 1: MEASUREMENT

YEAR 11 PHYSICS WORKSHEET 1 WEEK 1

1. How many **significant figures** are there in each of the following measurement?
   a) 0.060
   b) 34.0
   c) 5376
   d) 1.0076
   e) 8703

2. Write the following using the **appropriate prefixes**:
   a) 5.2×10^{-3}
   b) 3.9×10^{-12}
   c) 1.9×10^{12}
   d) 8.65×10^{6}
   e) 3.56×10^{2}

3. Calculate the following with the **appropriate** number of decimal place and significant figures.
   a) 2.15 + 4.6 + 8.921
   b) 5.62 x 3.5
   c) $4.7 \div 2.1$
   d) $5.8 - 3.2$

4. Write the following in **standard form**:
   a) 51000 m
   b) 0.0083m
   c) 56000m
   d) 0.0045

5. The dimensions of a box are given as follows:

length = 27.3 cm	width = 15.5 cm	height = 5.4 cm

Calculate the **volume** of the box using the appropriate number of **significant figures**.

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CHAPTER 2: RELATIONSHIPS

YEAR 11 PHYSICS WORKSHEET 2 WEEK 2

1. The table shows the relation between force and extension of a spring.

Force (N)	0	0.9	2.1	5.0	7.0	8.0
Extension (m)	0	0.2	0.4	1.0	1.4	1.6

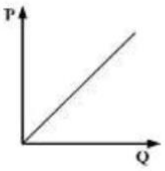
a) Sketch the **graph** of Force (N) versus Extension (m).
b) Describe the **shape** of the graph.
c) State the **relationship** between the two variables.
d) Calculate the **slope** of the graph and include its unit.
e) Write down the **mathematical relationship** between force and extension.

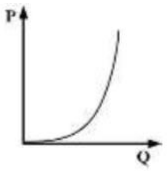
2. A group of Year 11 students investigated the effect of resultant force (F) on the acceleration (a) of a trolley. The results obtained are shown in the table given below.

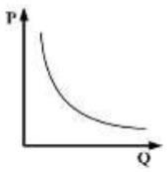
F (N)	1.0	2.0	3.0	4.0	5.0	6.0
a (ms^{-2})	0.2	0.4	0.6	0.8	1.0	1.2

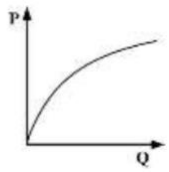
a) On the pair of axes, plot a **graph** of acceleration versus force.
b) Identify the type of **relationship** depicted by the graph in (a) above.

3. Which of the following graphs shows a **directly proportional relationship** between P and Q?

A. 

B. 

C. 

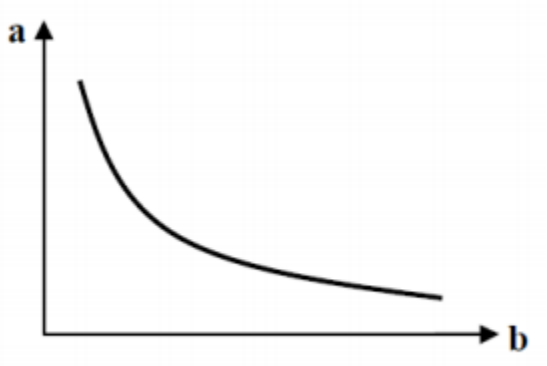
D. 

4. Use the table below to answer the questions that follows

Velocity (m/s)	Time (s)
0	0
2	1
4	2
6	3
8	4

a) Sketch the **graph** of velocity against time.
b) State the **relationship** of velocity and time.
c) Find the **constant** relating the variables.

5. The graph below shows the relationship between two variables **a** and **b**.



What kind of relationship does this graph represent?

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CHAPTER 3: SCALARS AND VECTORS

YEAR 11 PHYSICS WORKSHEET 3 WEEK 3

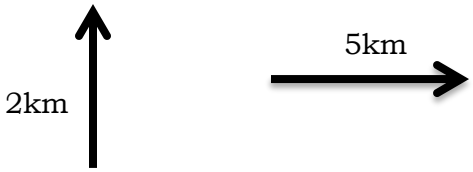
1. Define **Scalar** and **Vector**.

2. Give three **examples** of scalars and vectors.

3. A car travels 9 km towards east then it travels 4 km towards west.

   a) Calculate the **total distance** travelled by the car.
   b) Calculate the **magnitude** of the car's total displacement.

4. Shyna walks 2 km north and then she walks 5 km east.



   Draw the **resultant vector,** and give its **magnitude** and **direction**.

5. Some Antarctic explorers heading due south toward the pole travel 60 km during the first day. A sudden snow storm slows their progress and they move only 40km on the second day. With plenty of rest they travel the final 75 km the last day and reach the pole. What was the explorers' **displacement**?

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CHAPTER 4: FORCES

YEAR 11 PHYSICS WORKSHEET 4 WEEK 4

1. State **Newton's**
    a) First Law
    b) Third Law

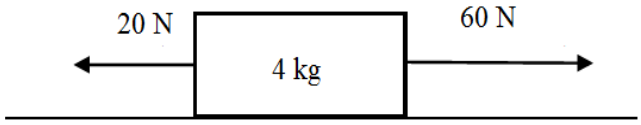
2. A Russian aerospace company NPO Lavochkin sends an unmanned spacecraft of total mass of 1538 kg on earth to the moon. The spacecraft lands on the moon which had a gravitational field of 1.6 N/kg.
    a) Calculate the **mass** of the spacecraft on the moon.
    b) Calculate the **weight** of the spacecraft on moon.

3. In a car race, Aditi switches her car of mass 500 kg to run on nitrous oxide fuel. The nitrous oxide allows her to develop 10000 N of force.

    a) State **Newton's Second Law** of motion.
    b) Calculate the **acceleration** the race car attained when it was running on nitrous oxide fuel.

4. **Define** the terms:
    a) Mass and Weight
    b) Gravitational force
    c) Magnetic force
    d) Nuclear force
    e) Friction

5. The diagram given below shows a block of mass 4 kg acted upon by a force of 60 N. A frictional force of 20 N also acts on the block.

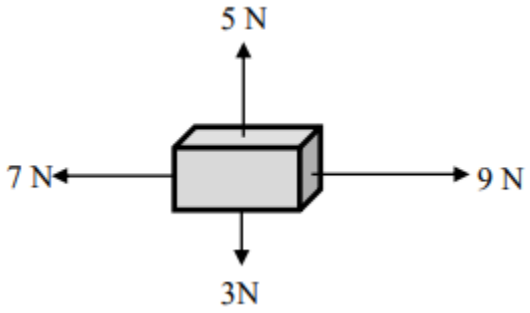


a) State the **direction** in which the block will move.

b) Calculate the **net force** acting on the block.

c) Calculate the **magnitude** of the block's acceleration.

6. The vector diagram given below shows four forces acting on a wooden solid block.



a) Determine the **magnitude** of the resultant force acting on the block.

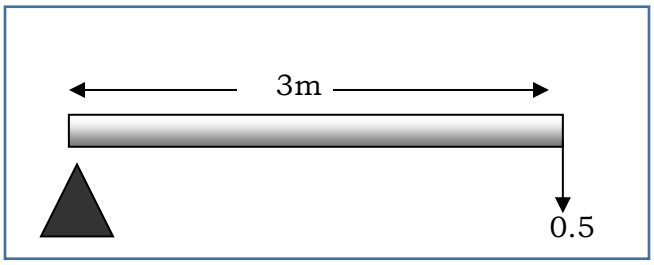
b) State the **direction** in which the block will move towards.

CHAPTER 5: MOMENTS

YEAR 11 PHYSICS WORKSHEET 5 WEEK 5

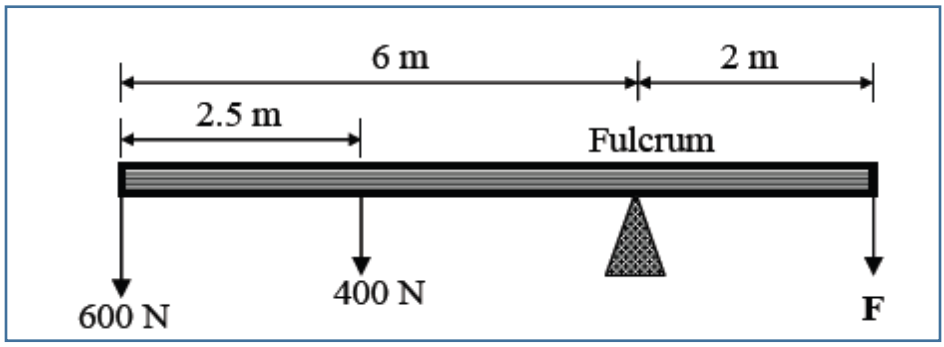
1. Define **Torque**.

2. A force of 0.5 N is applied on a lever as shown below.



Calculate the **torque** produced by the force.

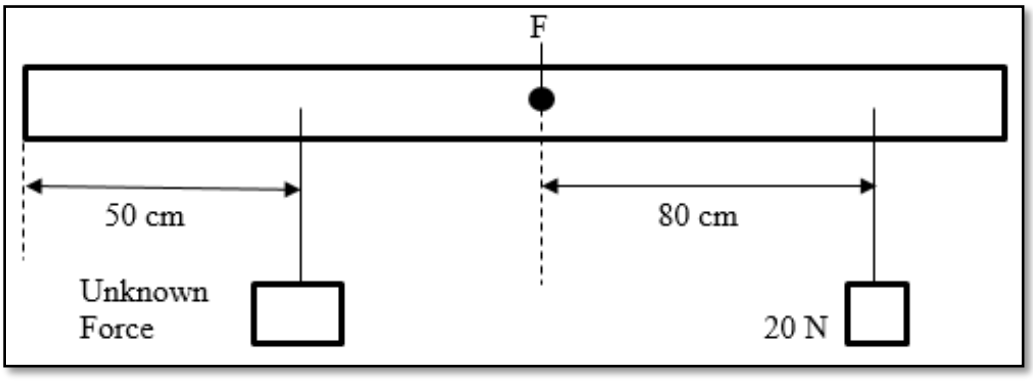
3. The diagram below shows a balanced lever with two load forces of 600 N and 400N and an effort force, F.



a) Determine the total **anti-clockwise moment**.

b) Calculate the **effort force**, F, needed to keep the lever balanced.

4. A 2 meter beam (of negligible weight) with a small hole in its center is used in conjunction with a single known weight of 20 N to find the force of an object as shown below. (Note : F is the pivot of the beam)

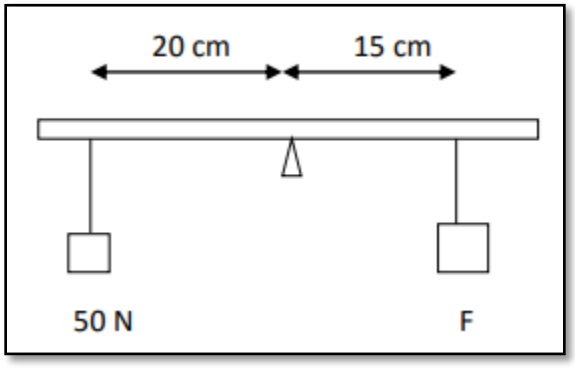


a) State the **principle of moments**.

b) What is the **sum of clockwise moments** about F?

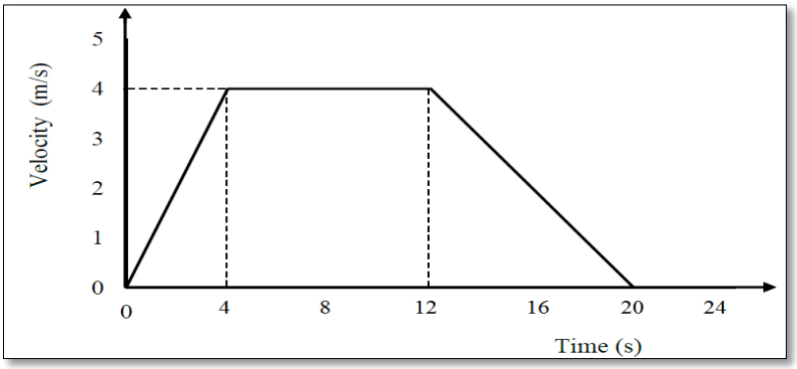
c) What is the value of the **unknown force**?

5. Find the **value of force** in the system below so that the beam is horizontally balanced.



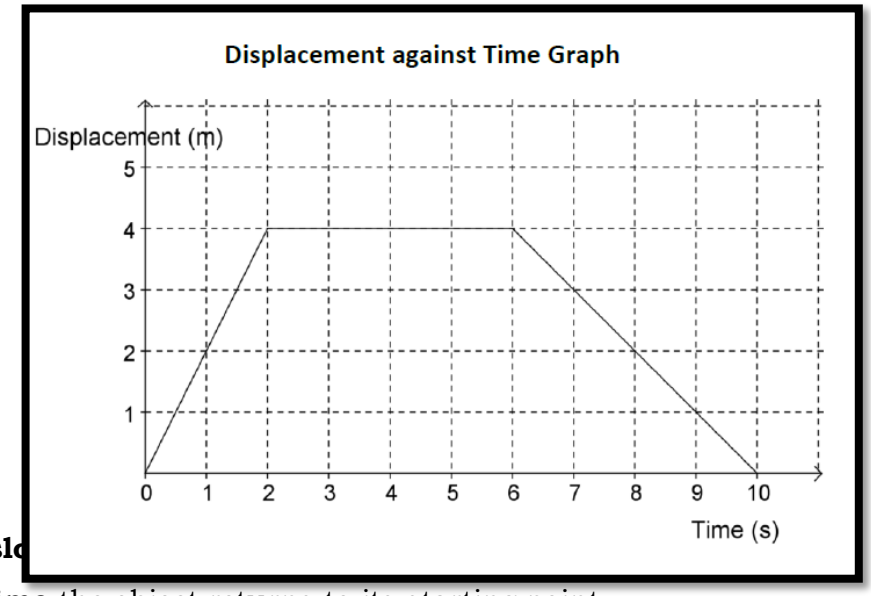
1. Differentiate between the terms **Distance** and **Displacement.**
2. A car is driven 4.0 km east for 6 minutes, then 5.0 km south for 9 minutes and finally 4.0 km west for 3.0 minutes.
    a) Calculate the **average speed** in km/h for the whole trip.
    b) Find the cars **average velocity** in km/h for the whole trip.

3. Refer to the velocity-time graph of a car given below to answer the following questions.



    a) What does the **slope** of velocity-time graph represent?
    b) Identify the **time interval** when the car is travelling at constant velocity.
    c) Calculate the car's **displacement** for first four seconds.

4. Refer to the graph and answer the questions that follow.



    a) Find the **slo**
    b) At what **time** the object returns to its starting point.

5. A ball rolls from rest down an incline with a uniform acceleration of 3 m/s^2.
   a) What is its **speed** after 7 seconds?
   b) **How long** will it take to reach a speed of 35 m/s?

6. A racing car starts from rest and accelerates at $3m/s^2$.
   a) Calculate the **speed** of the car at the end of 20 seconds.
   b) Determine the **total distance** travelled during 20 seconds.

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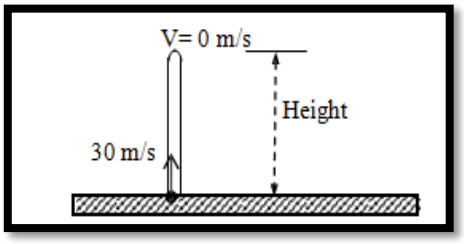
CHAPTER 7: PROJECTILE MOTION

YEAR 11 PHYSICS WORKSHEET 7 WEEK 7

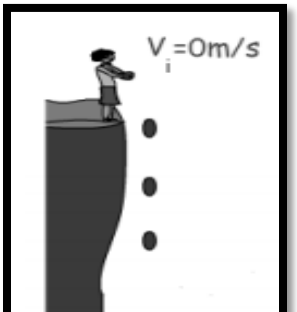
1. Why two objects of different mass while dropped from the same height, hit the ground at the same time?

2. An object is projected vertically upwards with an initial velocity of 30 m/s.



   a) What is the maximum height reached by the object?
   b) Calculate the time the object takes to reach the maximum height.
   c) Calculate the total time of flight.

3. A stone is dropped from a cliff.



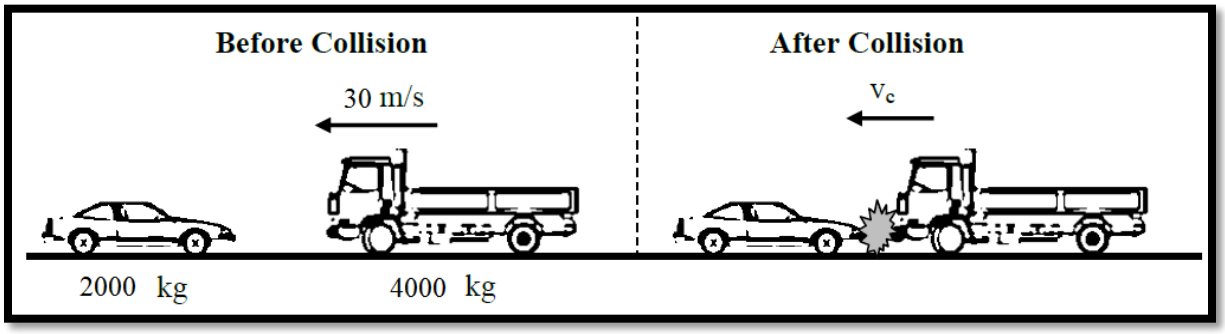
a) How far will it have fallen in 4 s?

4. A sandbag is released from a balloon that is ascending vertically at 7 m/s. The sandbag hits the ground 13 s later.
   (a) What is the **velocity** of the sandbag at the moment of release?
   (b) Describe the **motion** of the sandbag after release
   (c) Calculate the **height** of the balloon above the ground at the moment of release.

5. A stone is tossed up from the new Melrose Bridge at 15 m /s. The bridge is 25 m high. Calculate:
   (a) The **maximum height** to which the stone will rise above the bridge
   (b) The **time taken** to reach this maximum height
   (c) The **time** it will take the stone to hit the water.

1. State the law of **conservation of moment**.

2. A car of mass 2000 kg initially at rest is hit by a truck of mass 4000 kg from the front. The truck has an initial velocity of 30 m/s. The truck and the car move together after collision with a common velocity, vc.



   a) Calculate the truck's momentum **before** collision.
   b) What is the total momentum **after** collision?
   c) Calculate the magnitude of **common velocity**, v_c .

3. What is the **momentum** in kgm/s of a 10 kg truck travelling at 8m/s.

4. A truck of mass 60 kg travelling to the right at 20 m/s collides head on with an oncoming car of mass 40 kg travelling at 10 m/s. After the collision, both the car and truck couple together and move off. Sketch a **diagram** before and after the collision.

5. Calculate the **momentum** of a ball of mass 2 kg moving with velocity of 6 m/s to the east.