

LABASA SANGAM(SKM) COLLEGE
DEPARTMENT OF MATHS/PHYSICS
RESOURCE MATERIAL 1 2021
YEAR 11 PHYSICS

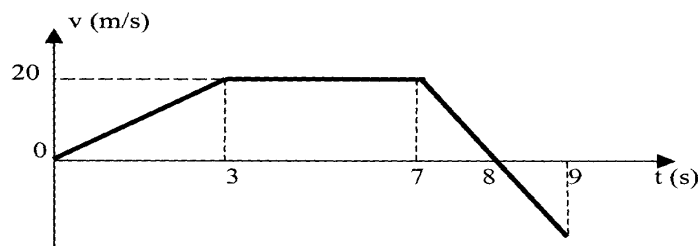
Instructions:

Attempt the following questions on a separate sheet of paper.

1. A toy car starts from rest, accelerates uniformly in a straight line and gains a speed of 50m/s in 3s.

- i) Calculate the acceleration of the toy car.
- ii) What distance does it travel in 3s?
- iii) What would be its velocity after 6s of motion?

2. The velocity-time graph shows the motion of a car along a straight road.



- i) How far has the car travelled after 7s?
- ii) Calculate the acceleration of the car in the first 3s.
- iii) Calculate the average speed of the car during first 7s.

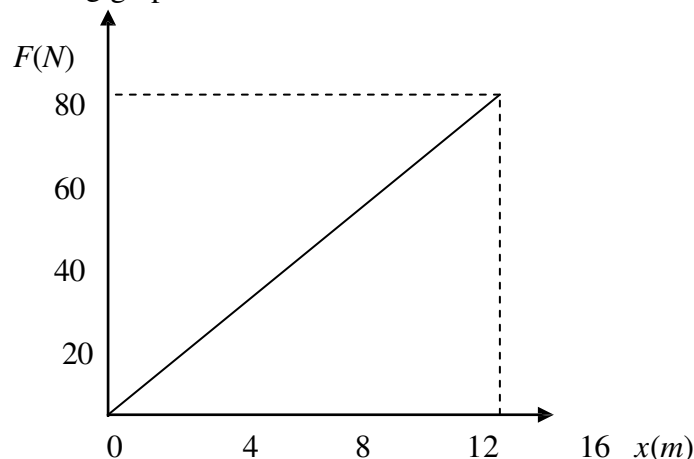
3. State the number of significant figures in the following

- i) 0.505
- ii) 12.0
- iii) 4.83×10^3
- iv) 1.969

4. Differentiate the following terms:

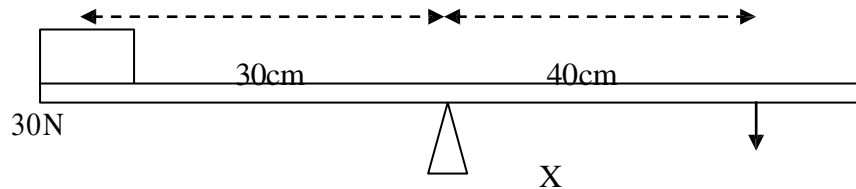
- i) Displacement and distance
- ii) Velocity and speed

5. A group of Year 11 students were trying to discover the relationship between Force and the extension of the spring. They did an experiment and from the results they obtained the following graph.

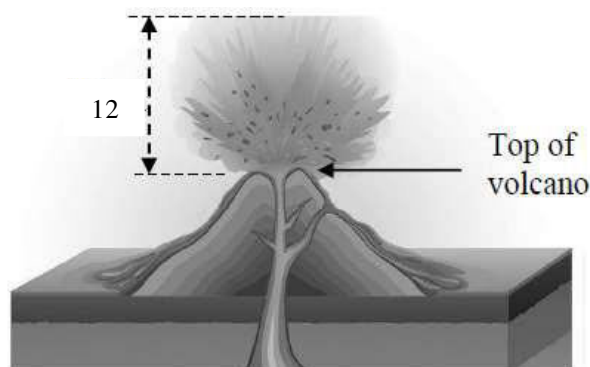


- i) From the graph, determine the relationship between force and extension of the spring.
- ii) Define Hooke's Law.
- iii) Calculate the spring constant.
- iv) What is the total energy in the spring when it is stretched by 12 cm?

6.



- i) State the principle of moments.
 - ii) Calculate force **X**.
7. A body starts from rest and moves with a uniform acceleration of 4 m/s^2 in a straight line.
- i) What is the velocity after 8 seconds?
 - ii) How far has it travelled in this time?
 - iii) After how long will the body be 150 m from its starting point?
8. A Russian aerospace company NPO Lavochkin sends an unmanned spacecraft of total mass of 1838 kg on earth to the moon. The spacecraft lands on the moon which had a gravitational field of 1.6 N/kg
- i) Calculate the mass of the spacecraft on the moon.
 - ii) Calculate the weight of the spacecraft on moon.
9. An active volcano called Mount Saint Helen erupts and throws molten lava to a maximum vertical height of 12 km. The lava rolls off on the sides of the mountain after it travels through the air as shown in the diagram.

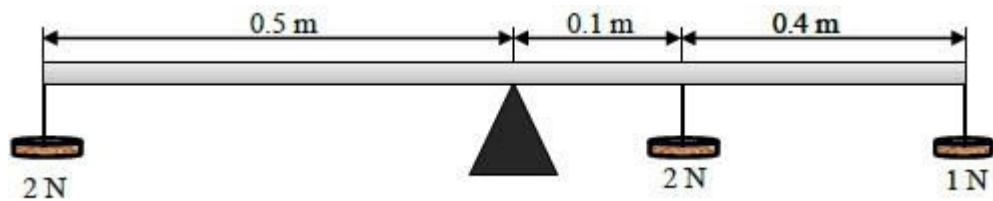


Source: <https://www.worldatlas.com>

Calculate the:

- i) initial velocity with which the molten lava erupts from the top of the volcano.
 - ii) time the lava travels in the air just before it reaches the top of the volcano.
10. A car travels 80 km/h north and then 80 km/h east.
- i) Convert 80 km/h to m/s.
 - ii) Calculate the **resultant velocity** of the motion in m/s.

11. Tevita uses a metre ruler to set up an experiment on moments as shown in the diagram below. The pivot is at the centre but the ruler is not balanced.



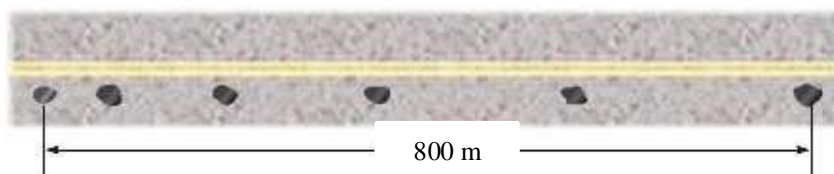
- Show through calculations that the magnitude of the resultant moment is 0.3 Nm.
 - State the direction in which the metre ruler turns.
12. An object is acted on by two forces with opposite directions. The forces are 75N and 81N.



- Determine the **net force** acting on the object.
 - What is the **mass** of the object if its acceleration is 6 m/s^2 ?
13. A bullet leaves a rifle with a velocity of 501 m/s. While accelerating through the barrel of the rifle, the bullet moves a distance of 0.820 m.
- Determine the acceleration of the bullet.
 - How long does it take the bullet to cover the distance of 0.820 m?
14. A car starts from rest, accelerates uniformly in a straight line and gains a speed of 30m/s in 4s. Calculate the acceleration of the toy car.
15. The following data was obtained for an object in motion

$v \text{ (m/s)}$	0	2	4	6	8
$t \text{ (s)}$	0	1	2	3	4

- Plot the graph of velocity vs time.
 - State the **relationship** between velocity and time.
 - Determine the **constant of proportionality**.
16. One drop of oil falls straight down onto the road from the engine of a moving car every 6.00 s as shown in figure below.



- Determine the frequency of the oil drop.
- Calculate the average speed of the car.