



1) Define the following word.

(2pts)

A) Physics: the foundation of many important scientific disciplines

b) Measurement: is the process of comparing an unknown quantity with another quantity of its kind

2) Write the elements of measuring process

(3pts)

1- tools

2- units

3- physical quantities

8) Choose the correct answer.

(5pts)

A) It is defined as the interval between two events

1) Length

2) Time

3) Wight

B) Field of physics that deals with the interactions of atoms and molecules.

1) Geology

2) Engineering

3) Chemistry

C) Branch of physics which deal with properties of light

1) Acoustics physics

2) nuclear physics

3) Optics physics

D) It is defined as the amount of matter contained in a body.

1) Gravity

2) Mass

3) Wight

E) A letter which is written directly before a unit name with no space.

1) Scientific notation

2) Magnitude

3) Prefixes



(1)

1) Use the fundamental physical quantities to derive the following.

A) Velocity $\frac{\text{displacement}}{\text{time}} = \frac{m}{s} = m/s \rightarrow \text{meters per second}$ (5pts)

B) Acceleration $\frac{\text{change in velocity}}{\text{time}} = \frac{\frac{m}{s}}{s} = m/s^2$

C) Force $m \cdot a$ $K = Kg \frac{m}{s^2} = (N)$

D) Work $F \cdot d$
 $Kg \cdot \frac{m}{s^2} \cdot m$
 $(\Delta) Kg \frac{m^2}{s^2}$

E) Density $\frac{\text{mass}}{\text{volume}} = \frac{Kg}{m^3}$

2) Use the prefixes table to convert the Units.

(4pts)

A) 500000 millimeter to meter

~~nanometer~~

$$500000 \div 10^3$$

$$\frac{500000}{1000} \rightarrow 500 \text{ meters}$$

C) 3 kilometer to nanometer

$$3 \times 10^3$$

$$\frac{3 \times 10^3}{10^{-9}} = 3 \times 10^{12}$$

B) m/s to 32 km/h

$$(32) \frac{m}{s} \times \frac{1}{1000} \times \frac{1000}{1} \times \frac{1}{3600} \times 3600 = 115.2 \text{ km/h}$$

D) g/cm³ to kg/m³

$$3,000,000 \text{ kg/m}^3$$

$$32 \times \frac{1}{1000} \times \frac{1}{1000} \times 1000 = 32 \times 10^{-6}$$
$$32 \times \frac{1}{1000} \times \frac{1}{1000} \times 1000 = 32 \times 10^{-6}$$

(2)

- 3) Find the distance and the displacement for the path a person traveled from home to school as shown in the following graph. (3pts)

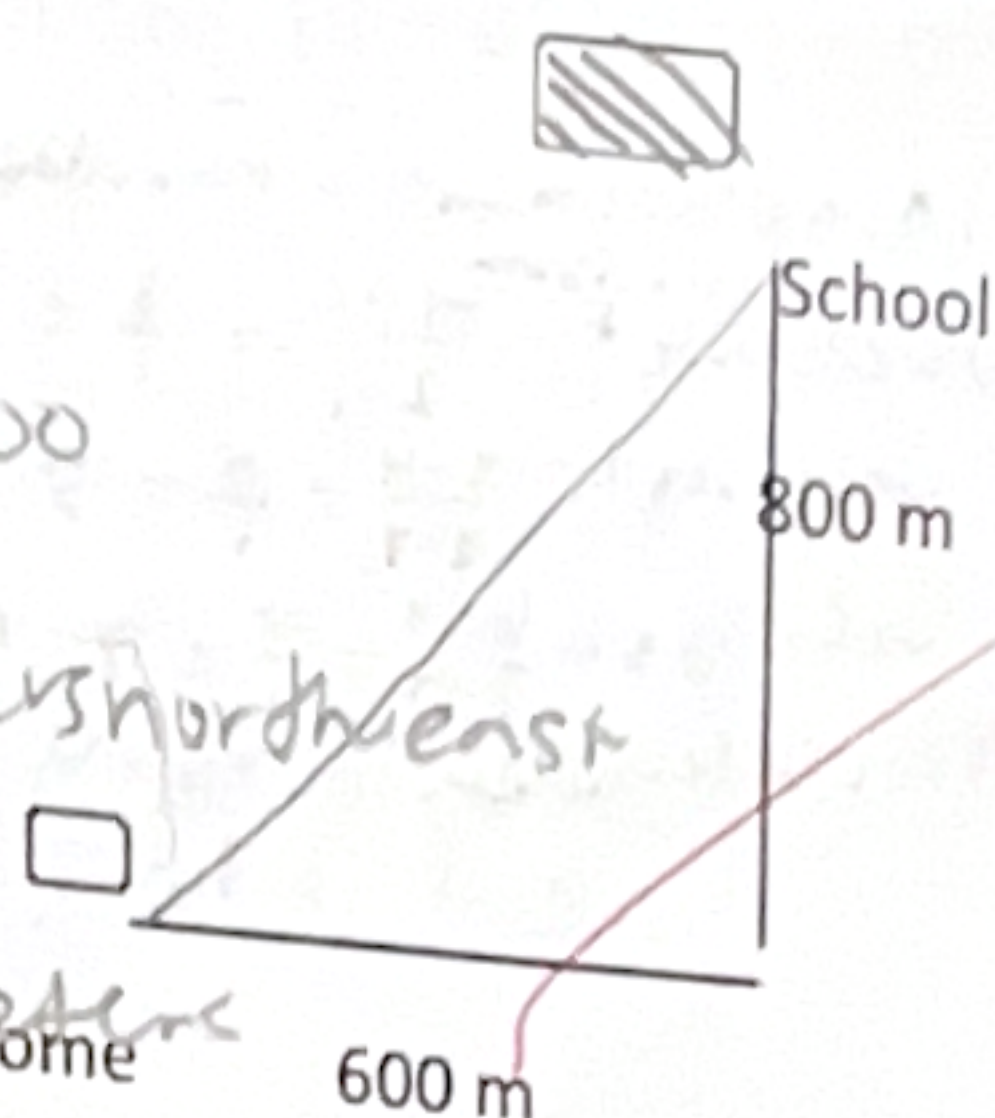
displacement $\rightarrow A^2 + B^2 = C^2$

$$600^2 + 800^2 = 1,000,000$$

$$C = \sqrt{1,000,000} = 1000$$

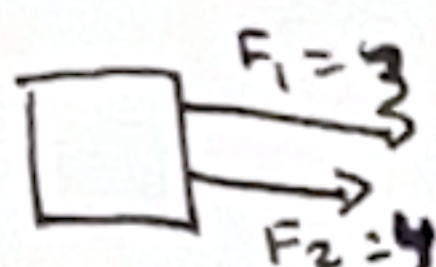
displacement = 1000 meters northeast

$$\text{distance} = 600 + 800 = 1400 \text{ meters}$$



- 4) Two forces, F_1 and F_2 . Find the resultant force (net force) in each case of the following. (4pts)

- 1) When the angle between them $= 0^\circ$



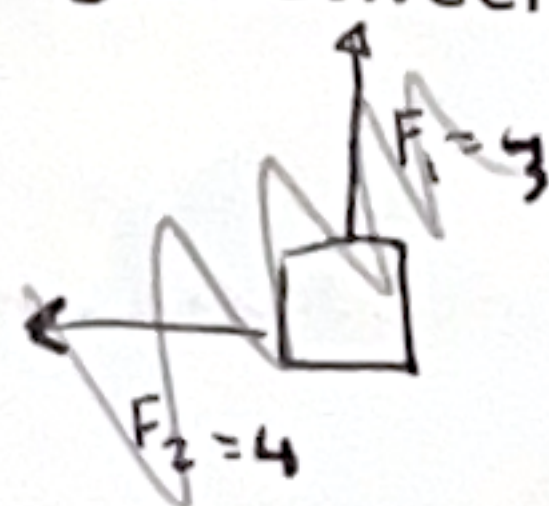
$$\text{Resultant} = 3 + 4 = 7 \text{ N east}$$

- 2) When the angle between them $= 180^\circ$



$$\text{Resultant} = 4 - 3 = 1 \text{ N west}$$

- 3) When the angle between them $= 90^\circ$



$$R = 11.18 = \sqrt{10^2 + 5^2}$$

$$\tan(\theta) = \frac{10}{5} = 2$$

$$\tan^{-1}(2) = 63.43^\circ$$

$$\text{Slope} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{d_2 - d_1}{t_2 - t_1} = \frac{\Delta d}{\Delta t} = \text{velocity}$$

(3)

5) Use the graph to describe the motion in each case.

(6 pts)

uniform = ~~not~~ changing at a constant speed (acceleration)

1) From point (a - b)

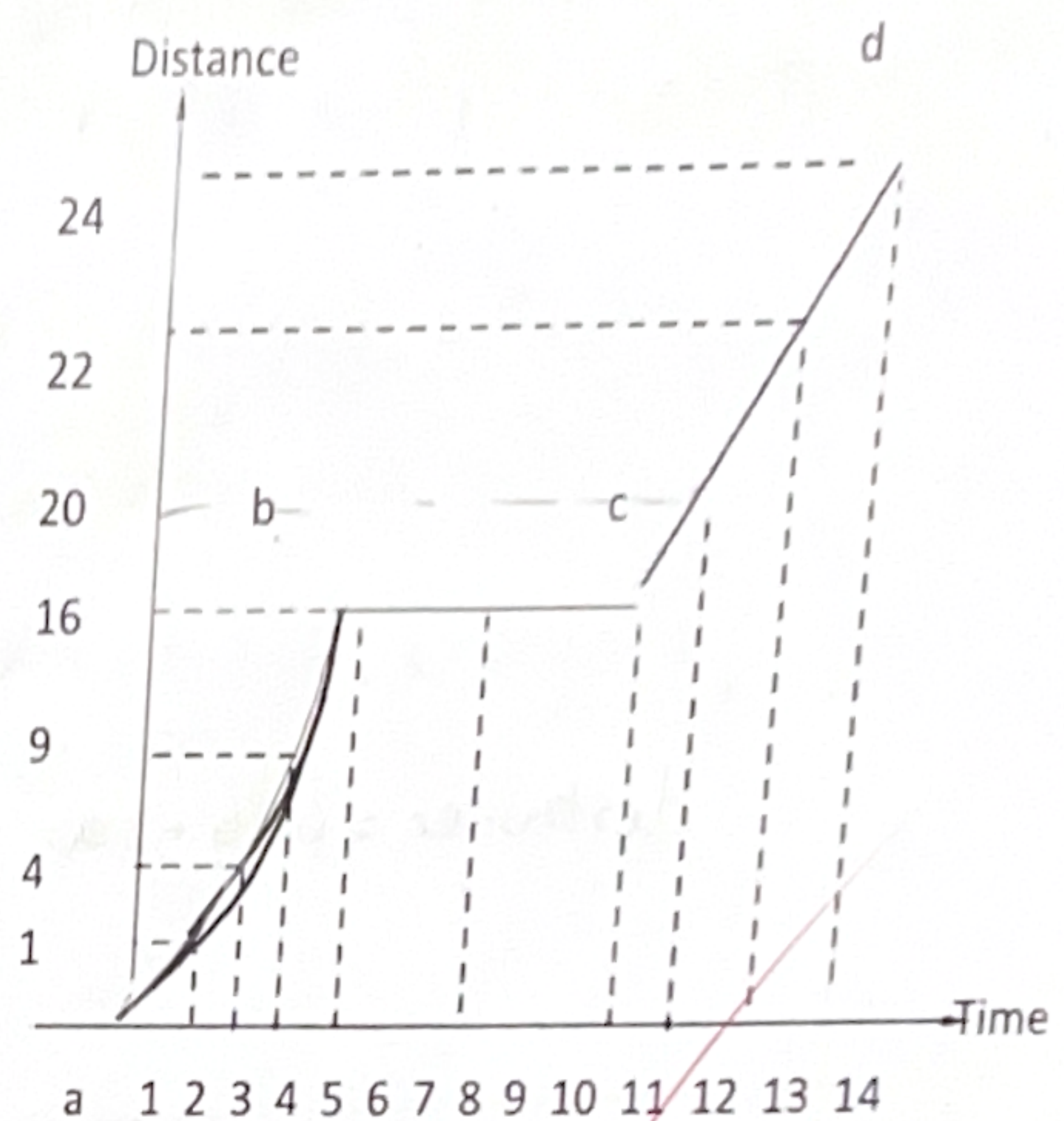
1) displacement = random

2) velocity ^{uniform} $= \frac{4-1}{2-1} = \frac{3}{1} = 3$

velocity $= \frac{9-4}{2-2} = \frac{5}{1} = 5$

velocity $= \frac{16-9}{3-2} = \frac{7}{1} = 7$

3) acceleration $= \frac{v_2 - v_1}{t_2 - t_1} = \frac{7-5}{1} = 2$



2) From point (b - c)

$d = \text{constant}$

no motion

no velocity

no acceleration

3) From point (c - d)

distance uniform

velocity = constant

acceleration = 0 bc it's the change in velocity since there is no change it is 0

(4)

1

6) Find the velocity for the motion that is described on the graph.

$$\text{Area} = \frac{1}{2} \times (b_1 + b_2) \times h$$

$$= \frac{1}{2} \times (4 + 5) \times 6$$

Area = velocity

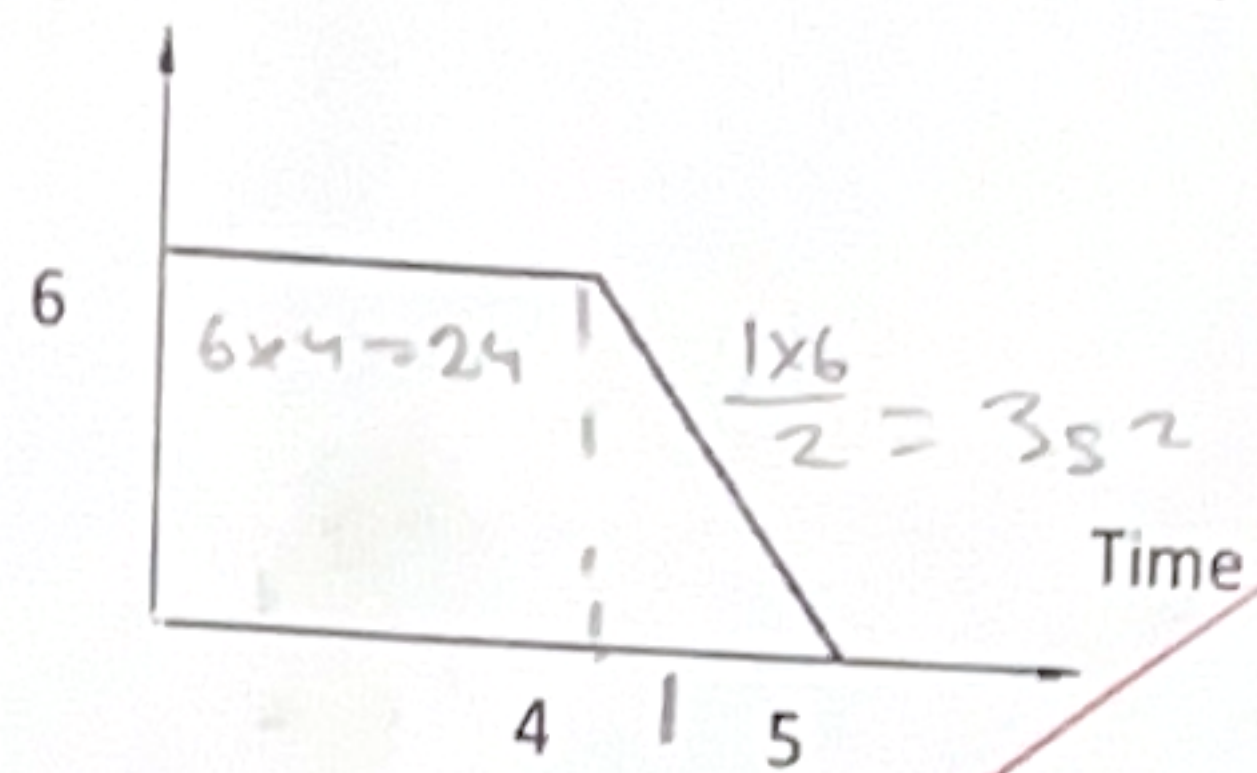
~~27 + 3 = 27~~

$$27 + 3 = 27$$

$$v = 27 \text{ m/s}$$

Acceleration

(2pts)



7) An object traveled 300m within 5 seconds; it started motion with initial velocity 12 m/s. Find

1) Acceleration = 19.2 m/s^2

2) Displacement at 3s = 122.4 m

3) Final velocity at 5s 108 m/s

$$v^1 = 12$$

$$v^2 = ?$$

$$a = ?$$

$$t = 5$$

$$d = 300$$

(6pts)

$$t = 3$$

$$d = (12 \times 3) + \left(\frac{1}{2} \times 19.2 \times 3^2\right)$$

$$d = 36 + 86.4 = 122.4 \text{ m}$$

$$v^2 = 12 + (19.2 \times 5)$$

$$v^2 = 108 \text{ m/s}$$

$$300 = (12 \times 5) + \frac{1}{2} \times a \times 5^2$$

$$60 + (12.5) \times a = 300$$

$$12.5 \times a = 240$$

$$\frac{240}{12.5} = a = 19.2$$