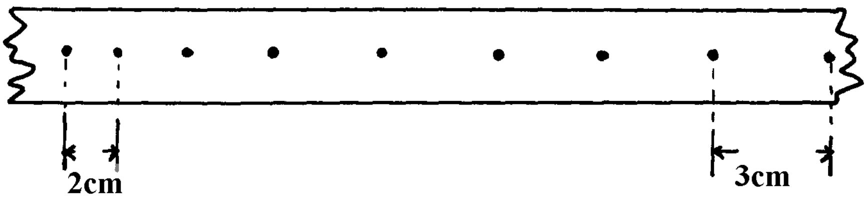
Linear motion

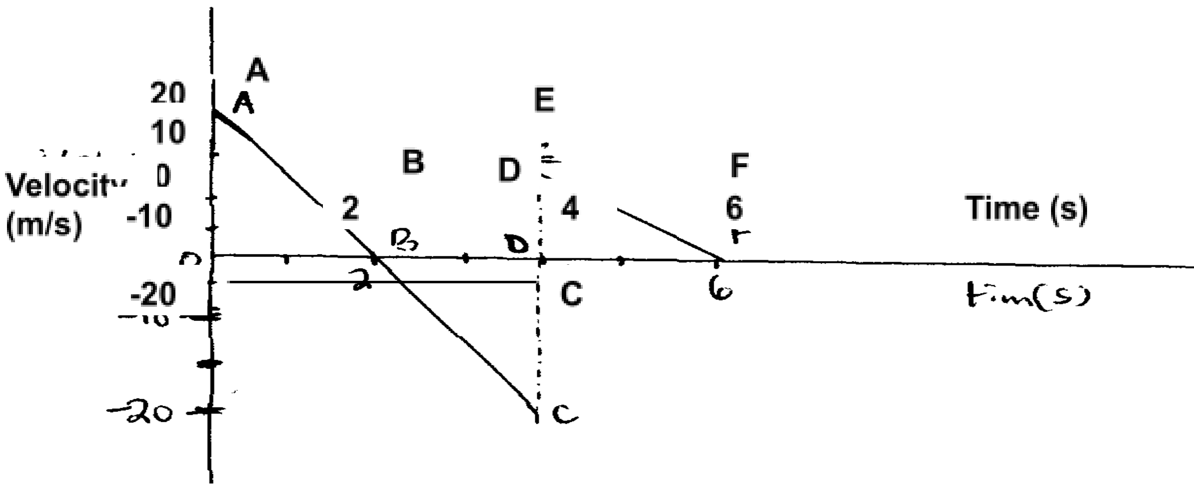
1. a) Distinguish between the terms '**uniform velocity'** and '**uniform acceleration'**

b) The figure below shows a section of a ticker tape. The dots were made at a frequency of 50 Hz.

Determine the acceleration of the trolley pulling the tape



c) The graph below shows a part of the motion of a basket ball which is projected vertically upwards from the ground and is allowed to bounce on the ground



i) Explain the motion of the ball relating it to its different positions along the following

I.AB II.BC III.CE

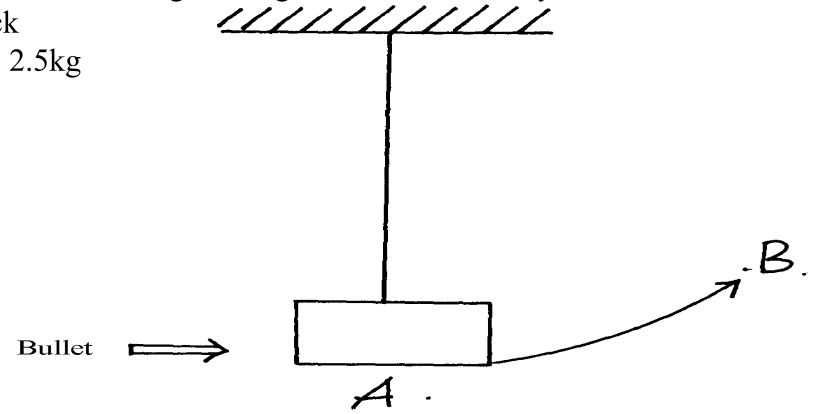
ii) From the graph calculate the acceleration due to gravity

c) State Newton's second law of motion

2. One end of a metal rod is heated in a flame. After some time the other end becomes hot.

Explain this observation

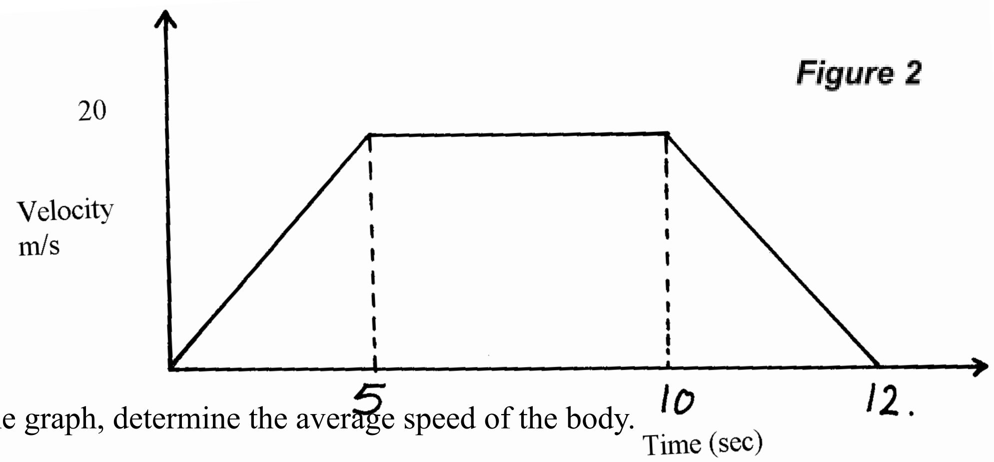
3. A bullet of mass 150g moving at an initial velocity of 80m/s strikes a suspended block
of mass 2.5kg



3. (a)The block swings from point **A** to **B**. Determine the vertical displacement between **A** and **B**

. (b) What observations are you likely to observe on the block after collision

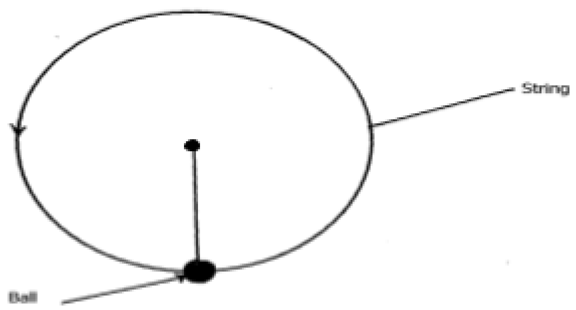
4. The diagram below shows a velocity – time graph of a certain motion.



From the graph, determine the average speed of the body.

5. The diagram below shows a ball being whirled in a vertical plane.

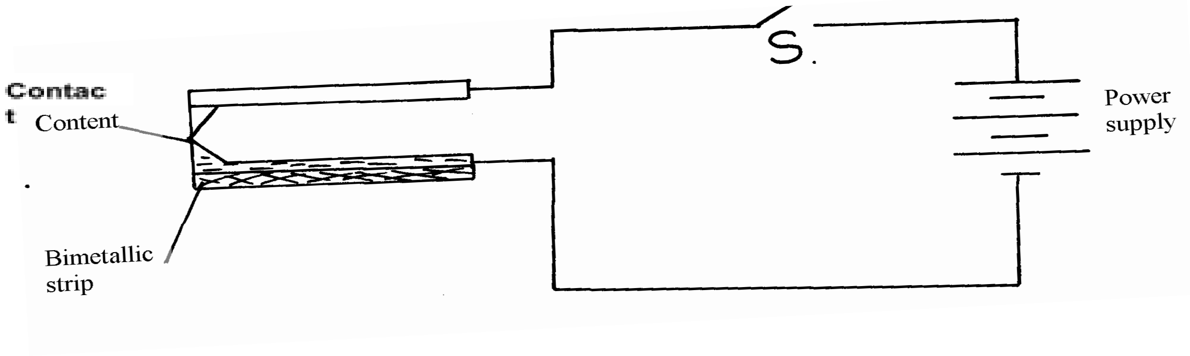
Figure 7



(a) Sketch on the same diagram, the path followed by the ball if the string cuts

when the ball
is at position shown in the diagram.

6. The figure below shows a circuit diagram for controlling temperature of a room.

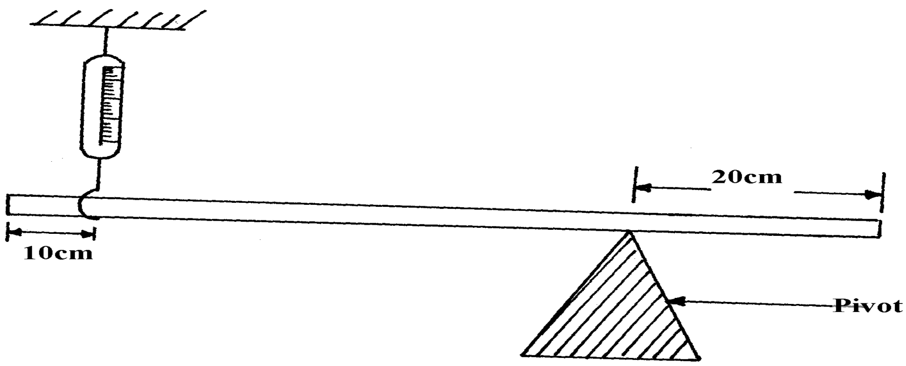


(i) Explain the purpose of the strip.

(ii) Describe how the circuit controls the temperature when the switch S is closed.

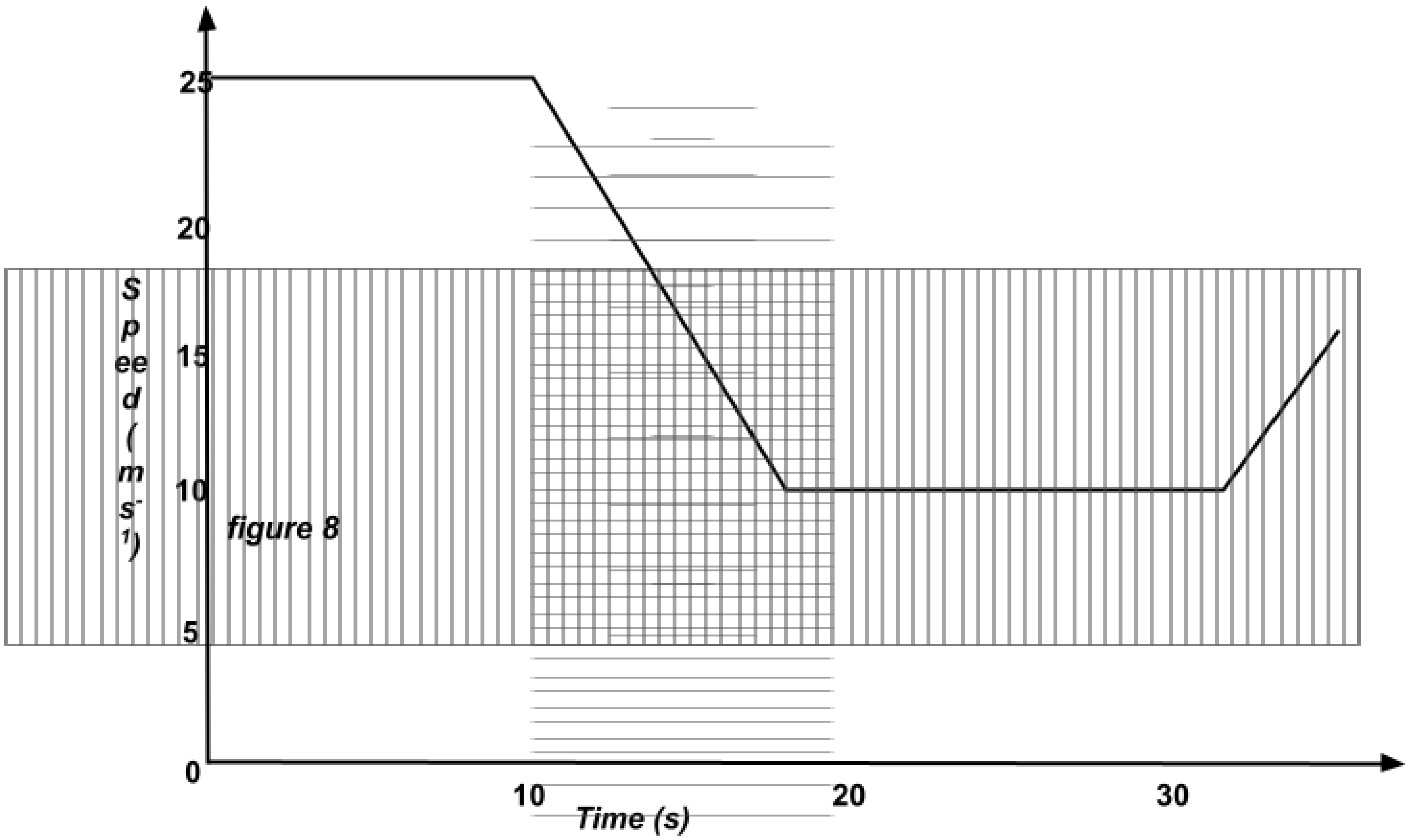
7. The ***figure 5*** below shows a uniform bar of length 1.0m pivoted near one end. The bar is kept
in equilibrium by a spring balance as shown:

figure 5



Given that the reading of the spring balance is 0.6N, determine the reaction force at the pivot

8. The ***figure 8*** shows the motion of a train over a section of track which includes a sharp bend



(a) The section of the track with the sharp bend has a maximum speed restriction. The train

decelerates approaching the bend so that at the start of the bend, it has just reached the

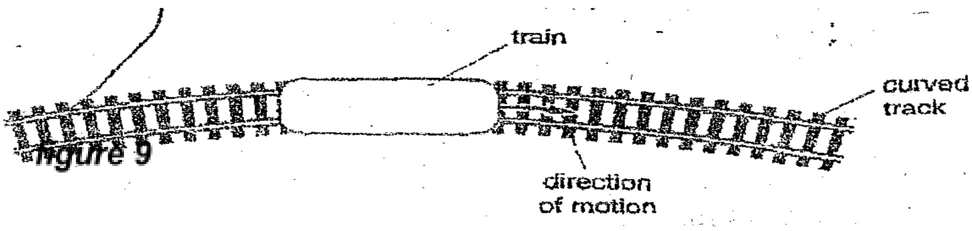
maximum speed allowed. The train is driven around the bend at the maximum speed

allowed and accelerates immediately on leaving the bend. Calculate the length of the bend

(b) The train has to slow down to go round the bend. Calculate the deceleration

(c) As the train is driven round the bend, there is an extra force acting, called the centripetal force.

(i) On the ***figure 9*** below, draw an arrow to show the direction of this force



(ii) State the effect that this force has on the motion

(iii) State how this force is provided

(d) ***Figure 10*** below shows a car with a dummy driver before and after a collision test:

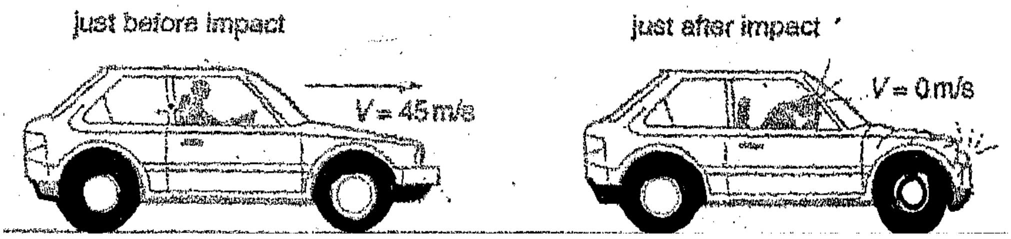


Figure 10

The mass of the dummy driver is 90kg. The impact time to reduce the dummy's speed from

$45ms^{-1}$ to zero is 1.2 seconds:

(i) Calculate the average force on the dummy during impact

(ii) State the main energy transformation during the collision

(iii) Calculate how much of the dummy's energy is transformed during the collision

9. (a) The velocity-time graph in the figure below illustrates the motion of a ball which has

been projected vertically upwards from the surface of the moon. The weight of the object on

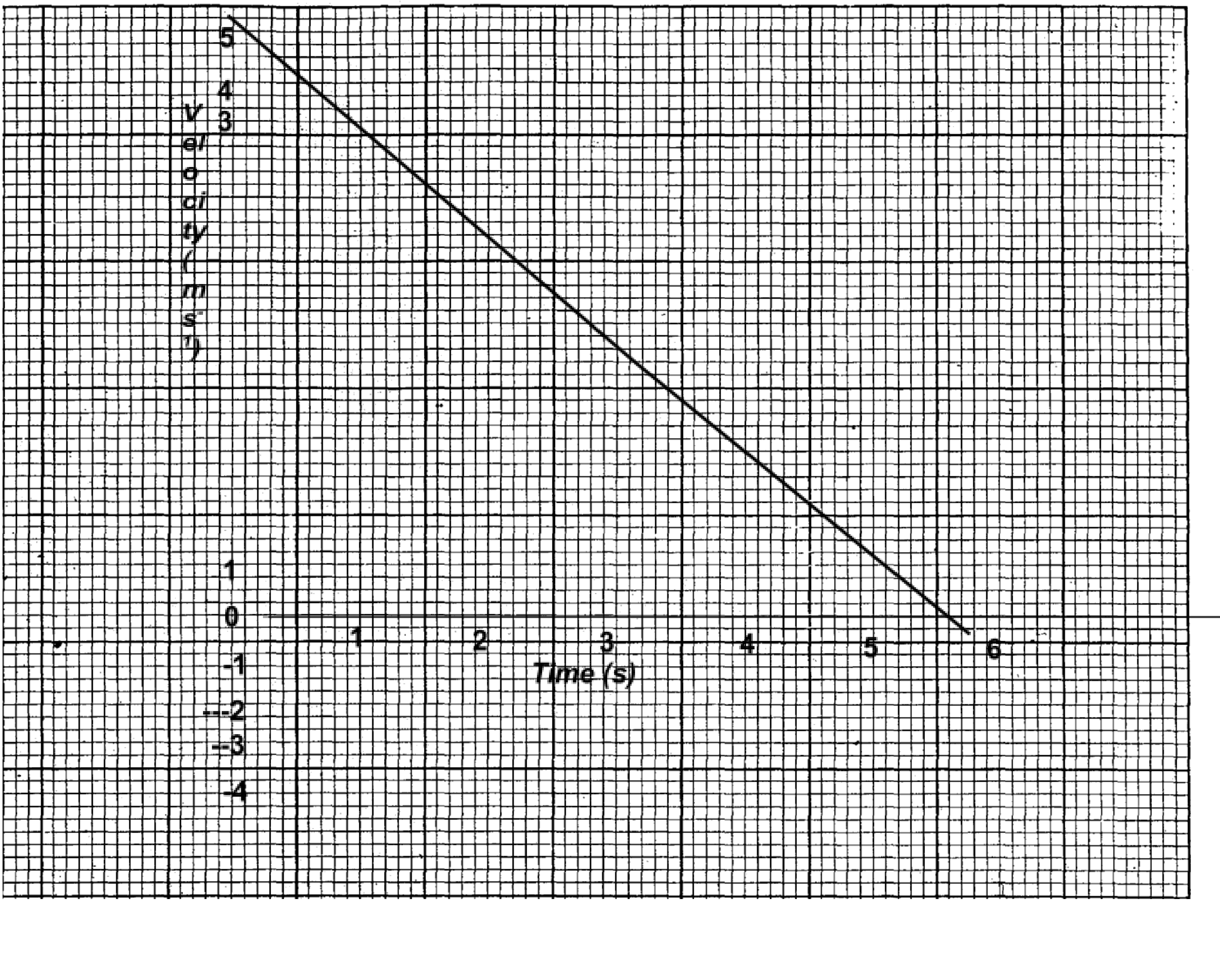
earth's surface is 20N, when the acceleration due to gravity is $10ms^{-2}$.

(i) State why the velocity becomes negative after 3seconds.

(ii) Determine the acceleration of free fall on the moon showing clearly your work

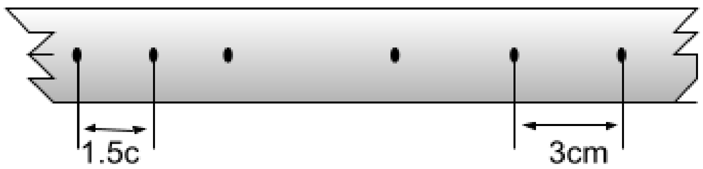
(iii) Determine the total distance travelled by the ball in 5.0sec

(iv) Find the weight of the ball on the moon



(v) If the ball was projected vertically upwards on the earth with the same velocity.
What difference would you expect to observe in the velocity-time graph above. Illustrate with a
sketch on the same axis

(b) The figure below represents part of a tape pulled through a ticker-timer of frequency 50Hz
moving down an inclined plane.



If the trolley was allowed to move down the inclined plane for 4 seconds, calculate the distance
it covers

10. (a) State Boyle's law

(b) The volume of a bubble at the base of a container of water is $3cm^3$. The depth of water is
30cm. The bubble rises up the column until the surface ;
(i) Explain what happens to the bubble as it rises up the water column

(ii) Determine the volume of the bubble at a point 5cm below the water surface
(c) A faulty thermometer records 11°C instead of 0°C and 98°C instead of 100°C. Determine
the reading on the thermometer when dipped in liquid at a temperature of 56°C

11. Figure 9 is a velocity- time graph describing the motion of a particle

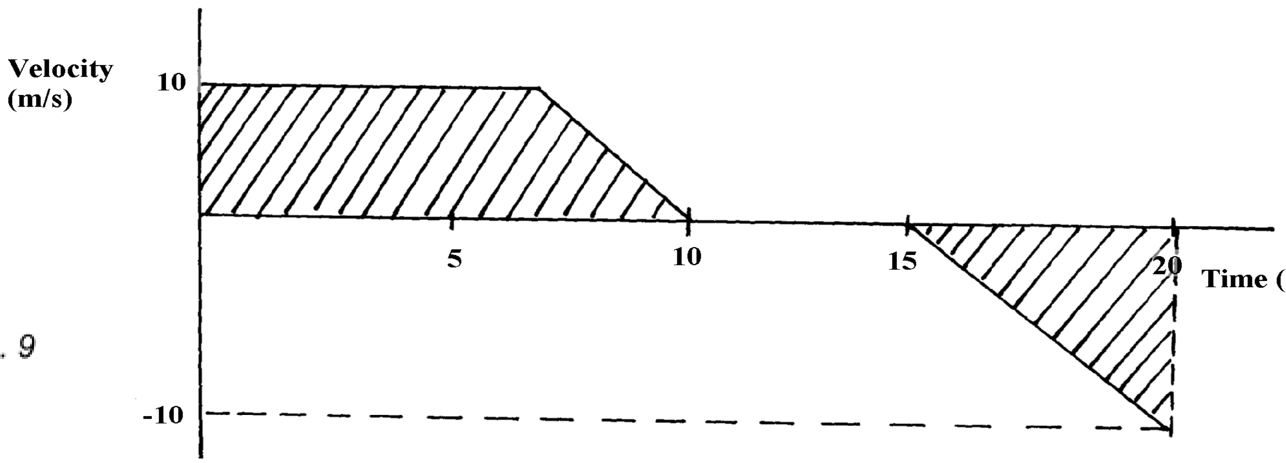


Fig. 9

What does the shaded area represent?

12. a) State Newton's first law of motion

b) A parcel is to be dropped from an aeroplane traveling horizontally at $120ms^{-1}$, at an altitude of 720m, to fall into a certain village.

Determine:

i) The time taken for the parcel to reach the ground

ii) How far ahead of the plane, the village should be when the parcel is released

c) A small stone, $M_1$of mass 20g is attached to a string which in turn is passed through a smooth thin cylinder. The other end of the string is tied to mass M_2. The mass M_1 is whirled in a horizontal circle of radius 1m and mass M_2 remains stationary as shown in figure 10

i) State **two** forces acting on the system other than the tension in the thread on M_2

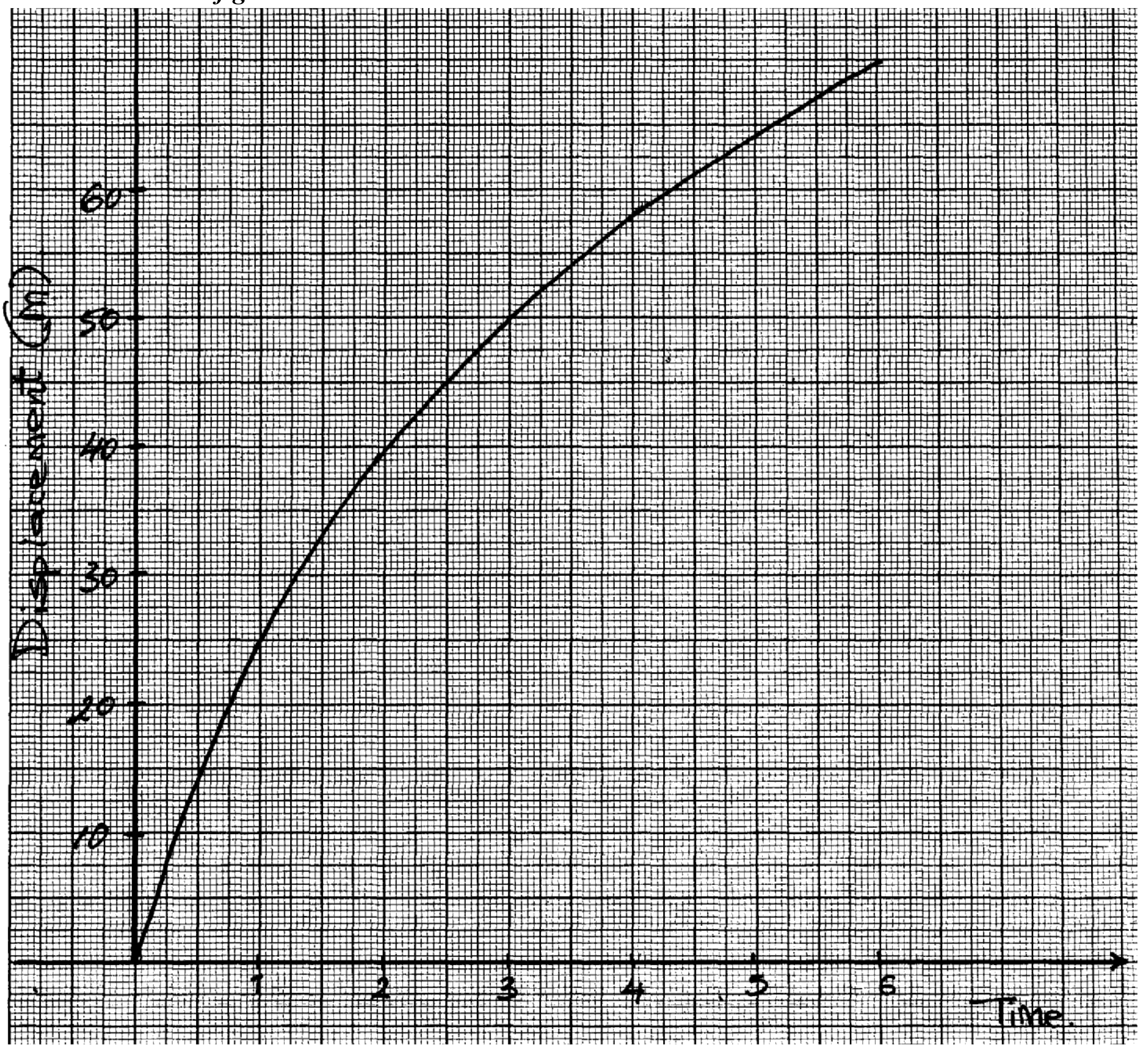
ii) Explain the observation made on mass M_2 if the speed of M_1, is increased

iii) Calculate the velocity of M_1, if the mass M_2 is 50g and the radius of the circle is 1m

13. (a) Define uniform velocity

(b) The graph ***figure 10*** below shows displacement –time graph of **a** in motion

fig 10



(i) Determine the instantaneous velocities at **t = 1second** and at **t = 4 seconds**

(ii) Use the results in **(b)(i)** above to determine the acceleration of the body

14. A ball of mass 100g is kicked horizontally from the top of a cliff. If the ball takes 4 seconds

to hit the ground, determine the height of the cliff

15. A ball is kicked vertically upward from the ground with a velocity of 60m/s and reaches a maximum

height (h), it then falls freely back to the ground and bounces upwards to a height of 5M

(a) Sketch a velocity-time graph to represent the motion of the ball from the time it is kicked

vertically upwards until it bounces to a height of 5M

(b) Determine:

(i) the time taken by the ball to reach the maximum height(h)

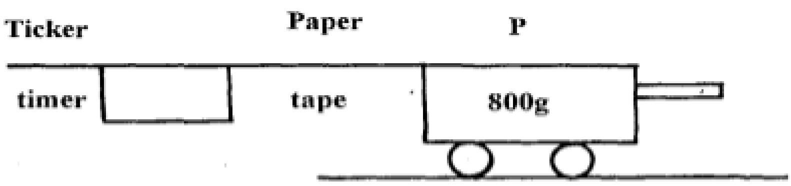
(ii) The maximum height (h) reached by the ball

(iii) The velocity with which it bounces after striking the ground for the first time

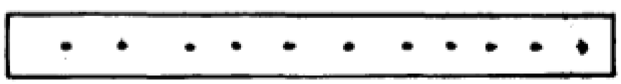
(c) State any assumption made in your calculations in **(b)** above

16. In an experiment on momentum, trolley **P** of mass 800g was attached to a ticker timer of frequency 50Hz. Trolley P, initially moving with a velocity of 0.5m/s, was made to collide

with a stationary trolley **Q** of mass 400g. A copy of the tape as it appeared after the collision is presented in the figure below:-



Tape drawn to scale



(a) Determine the velocity of the trolley **P** after collision

(b) Calculate the impulsive force experienced by trolley **P**

(c) State the type of collision

17. I. (a) State the **three** equations of linear motion.

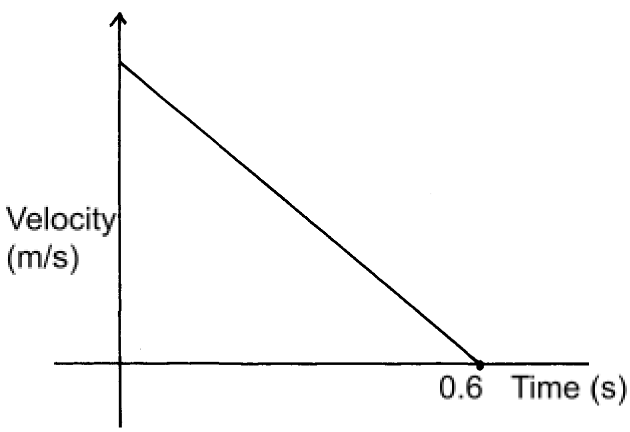
(b) A car is traveling uniformly at 100km/hr when the driver observes a road block ahead.
He takes 0.5 s before applying the brakes which brings the car to rest with a uniform
deceleration of $4m/s^2$. Determine the distance traveled by the car from the time the driver
observed the road block until the car comes to rest.

(c) A car moves at a constant speed of $20ms^{-1}$ for 50s and then accelerates uniformly to a speed
of $25ms^{-1}$ over a period of 10s. This speed is maintained for 50 s before the car is brought to
rest with uniform deceleration in 15s.
(d) Draw a graph of velocity (Y – axis) against time (graph paper to be availed)
(II) Calculate:
(i) The average speed for the whole journey.

(ii) The acceleration when the velocity changes from 20 ms^{-1} to $25ms^{-1}$.
m, show that $v^2=2as +u^2$

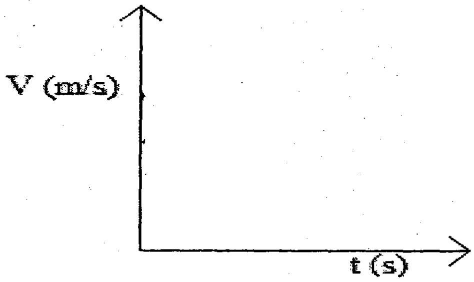
18. Sketch a velocity-time graph for a body moving with zero acceleration

19. The figure below shows a velocity –time graph of a ball bouncing vertically upward from
the ground. The velocity upward is taken positive.



Determine the maximum height when the ball rises.

20. (a) On the axes provide below, sketch a graph of velocity V versus time (t) for uniformly accelerated motion given that when t = 0, V is greater than zero.



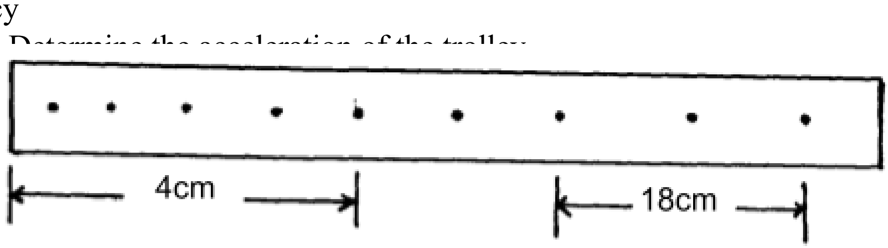
(b) A car is brought to Rest from a speed of 20 ms^{-1} in time of 2 seconds. Calculate the deceleration.

21. (a). State the law of **linear momentum**

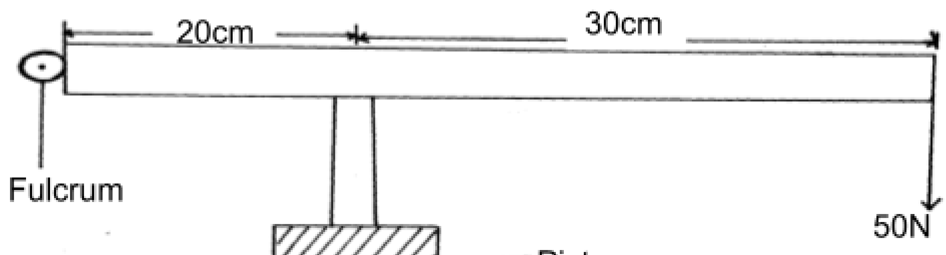
(b). A marble of mass 50g moving on a horizontal surface at a velocity of V collides with another glass marble of mass 75g resting on same horizontal surface. After collision, the marble bounces back a long the path at a speed of 3.5m/s while the other marble moving with a speed of 3.0m/s .Forward .

Determine the speed V.

(c). The paper below was attached to a trolley and pulled through a ticker tape times of frequency 50Hz Determine the acceleration of the trolley



(d). Study the figure below

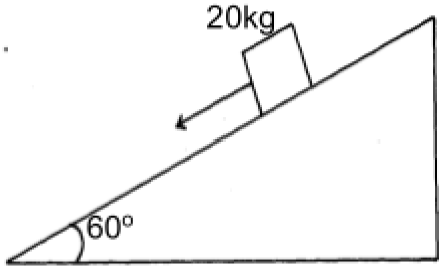


Calculate the pressure in the steam in the cylinder which would just raise the piston if area of

of the piston in contact with steam is $2cm^2$ and Atmospheric pressure is1.0 x 10^5 Nm^{-2}.

(e) State a reason why the earth is colder at night than daytime during a sunny

21. A block of mass 20kg slides downward a plane inclined of 6o0 with the horizontal. The coefficient of friction between the plane and the block is 0.4.



Calculate the acceleration of the block.

22. A body accelerates uniformly from initial velocity of U m/s to a final velocity of V m/s

in time t seconds. If acceleration during the motion is a m/s^2 and the distance covered is S

Linear motion

1. a) Uniform velocity :- The change in displacement for equal time intervals is the same.

Uniform acceleration:- Change in velocity for equal time intervals is the same.

b) Determine the acceleration of the trolley pulling the tape

$V_a = \frac{2}{0.02} = 100cm/s$ $V_b = \frac{3}{0.02} = 150\ cm/s$ $a = \frac{V-U}{t}$

$= (150 - 100)/(7X0.02 - 0.02)$

$a = 416.67\ cm/s^2$

c) i) Determine the motion of the ball relating it to its different positions along the following

I AB the body is projected upwards and at B V = O

II BC the body falls back to the starting point (moving in the opposite direction)

III CE the body be rebounds on the ground (at starting point) and starts moving up again

ii) From the graph calculate the acceleration due to gravity

$a = \frac{v-u}{t}$

$= \frac{0-20}{2}$

$a = -10m/s^2$

$= 10m/s^2$

2. Conduction
Free electrons at the heated and gain more kinetic energy and spread the heat energy to other parts of the rod

3. (a) Momentum before collision = momentum after collision

$\frac{150 \times 80}{1000} = 2.65 \times V$

$16 = 2.65V$

$V = \frac{16}{2.65}$

$= 6.0377$

But $\frac{1}{2} mV^2 = mgh$

$h = \frac{V^2}{2g} = \frac{(6.0377)}{2 \times 10}$

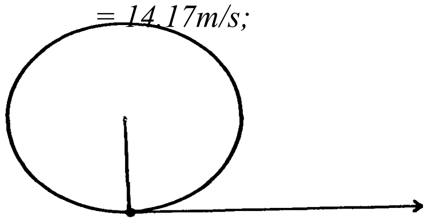
$h = \frac{36.4538}{20}$

$= 1.82269m$

(b)The block will be deformed

4. Total distance = Area under graph;
$= \frac{1}{2} (12 + 5) \times 20$; OR
$= 170m$;
Average speed $= \frac{170m}{12s}$
$= 14.17m/s$;

5.



6. (i) Acts as a thermostat
(ii) On closing, the switch, current becomes complete, the current flows causing heating effect,
the bimetallic strip bends downwards and contents separates.
when the room becomes cool the strip bends upward completing the current and the process
repeats itself on and off regulating the temperature
- Weight of the fluid in which it floats

7. Clockwise moments = anticlockwise moments at equilibrium
$0.6 \times 0.7 = W \times 0.3$;

$$W = \frac{0.6 \times 0.7}{0.3}$$
$= 1.4N;$

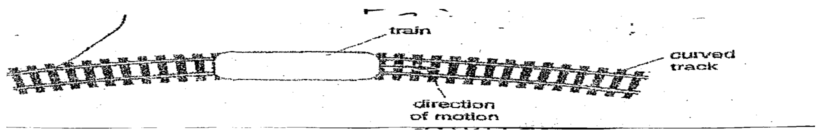
$0.6 + R = 1.4$

$R = 0.8N;$

8. (a) Length = area under curve
$= 10 \times (32-18);$
$= 10 \times 14 \quad = 140m;$

(b) $\frac{10-25}{18-10} = \frac{-15}{8}; = -1.875ms-1$ Decal = 1.875ms-1;

(c)(i)



(ii) Keep the train in circular motion;
(iii) Friction force between the wheels and rails;

(d) (i) $F = \frac{m(v-u)}{t}$
$= \frac{90(0-45);}{1.2}$
$= -3375N;$

(ii) Kinetic energy – Heat + sound + P.E(deformation;

(iii) $E = ½ Mv^2;$
$= ½ \times 90 \times 45s;$
$= 91,125J;$

9. (a) (i) When a body is projected vertically upwards, it under goes a uniform retardation due to
the gravitational pull. The body thus slows down, comes to rest them starts falling with an
increasing velocity (in opposite direction)

(ii) Acc of free fall = gradient / slope of the graph
$= \frac{5 - 0}{3 - 0} = \frac{5}{3} = 1.66ms^{-2}$

(iii) Total distance = Area under the curve
$(½ \times 5 \times 3) + (½ \times 2 \times 3.3.)$
$\frac{15}{2} + \frac{10}{3} = \frac{30}{6} + \frac{20}{6} = \frac{50}{3} = 25 = 8\,{}^1/_3 m$

(iv) - Wt in the moon = mg = $2kg \times {}^5/_3 = {}^{10}/_3 = 3\,{}^1/_3 N$

(v) - It will accelerate faster at 10ms-1 from the graph
- It will attain a maximum height after ½ second

(b) $V_1 = \frac{1.5cm}{0.025} = 75cms^{-1} = V_2 = \frac{3.0cm}{0.02s} = 150cms^{-1}$

$a = \frac{V_2 - V_1}{t} = \frac{150 - 75}{0.02 \times 4} = \frac{75}{0.08} = 937.5cm^{-2}$ or $9.375ms^{-2}$

$S = ut + \frac{1}{2} ast^2$

$= (0.75 \times 4) + \frac{1}{2} \times 9.375 \times 4^2 = 3 + 75 = 78m$

10. a) The volume of a fixed mass of gas is inversely proportional to its pressure provided temperature is kept constant.

(b) (i) The bubble expands as it comes up finally bursts when at the surface

(ii) $p_1V_1 = P2V_2$

$(76 + 30) \times 3 = (76 + 5) V_2$

$106 x3 = 81 X V_2$

$V_2 = \frac{106 \times 3}{81}$

$= 3.93cm^3$

(c) $100^oC - 0^oC = 98 - 11$

1 division $= \frac{87}{100}$

Reading $= \frac{8 \times 56}{1000}$

$= 48.72^oC$

11. Distance traveled√1

12. a) A body continues with its state of rest or uniform motion unless acted upon by some external forces√1

b) i) $s = \frac{1}{2} gt^2$

$720 = \frac{1}{2} \times 10 \times t^2$√1

$t^2 = 144$

$t = \sqrt{144} = 12$ sec √1

ii) Range = ut

$= 120 \times 12$√1

$= 1440m$ √1

c) i) – Centripetal force acting on M_1 √1

- Weight (M_2g) acting on M_2√1

ii) M_2 moves upwards; √1

When the speed of M1 increases centripetal force remains the same, the radius of the circle described by M1 increases√1

iii) Centripetal force = weight of M_2

$M_1V^2/_r = M_2g$
$0.020\ V^2/_1 = 0.050 \times 10$√1
$V^2 = 0.5/_{0.02} = 25$√**1**
$V= \sqrt{25} = 5m/s$√1

13. (a) Constant rate of change of displacement with time 1
OR- A body is said to be moving with uniform velocity it its rate of change of displacement with
time is constant
(b) (i) For one correct tangent 1
Velocity t = 1s $= \frac{42 - 20}{2 - 0.5}$ (correct reading form graph and expression
$= 14.67m/s$

Velocity at t = 4s $= \frac{67.5 - 30}{5 - 0.5}$ 1 (correct reading from graph ad expression)
$= 8.33m/s$ (accuracy) 1

(ii) $a = \frac{V - u}{t} = \frac{8.33 - 14.67}{4-1} = \frac{6.34}{3}$ 1 1
$= 2.11m/s^2$ 1

14. $S = \frac{1}{2} gt^2$ since $u = 0$
$= \frac{1}{2} \times 10 \times 4 \times 4$
$= 80m$

15. b) i) $t = \frac{v - u}{g}$ √
$= \frac{0 - 60}{-10}$ √
$= 6$ secs √
ii) $h = ut - \frac{1}{2} gt^2$ √
$= 60 \times 6 - \frac{1}{2} \times 10 \times 6^2$ √
$= 360 - 180$
$= 180m$√
iii) $V^2 = U^2 + 2aS$√
$O = U^2 + 2 \times -10 \times 5$√
$O = U^2 - 100$
$U = 10m/s$√
c) Resistance/ friction with air is negligible

16. a) Length of nine dots = 6.9cm√
Time taken $= {}^1/_{50} \times 9 = 0.02 \times 9$
$= 0.185$√
Velocity $= \frac{6.9cm}{0.18s}$√
$= 38cm/s$ or $0.38m/s$ √
b) $Ft = 0.8 \times 0.5 - 0.8 \times 0.38$ √

$Ft = 0.096$

$F = \frac{0.096}{0.18} = 0.533N$

17. *a) Equations of linear motion.*

i) $V = u + at$. 1

ii) $V^2 = u^2 + 2as$ 1

iii) $S = ut + \frac{1}{2} at^2$. 1

b) $\frac{100 \text{ km/h} \times 10}{36} = 27.78 m/s$

In 0.5 sec the driver covers 27.78m/s x 0.55 = 13.89 M 1

After applying brake

$a = -4m/s^2$

$u = 27.78m/s$.

$v = 0$

$\therefore v^2 = u^2 + 2as$ 1

$-2as = u^2$. since $v = 0$

$S = \frac{u^2}{-2a} = \frac{(27.78m/s)^2}{(-2)(-4m/s^2)} = 96.47M$ 1

Total distance covered = (13.89 + 96.476)M = 110.36 M 1

c) (i) See the graph paper

(ii)

(i) Average speed of the whole journey = $\frac{\text{Total distance covered}}{\text{Total time taken}}$

Distance = Area under the graph

= (20m/s x 50s) + (½ (20 + 25) x 10) + ½ (50 + 65) x 25

= 1000m + 225m + 1437.5m = 2662.5m 1

Total time = 125s

Speed = $\frac{2662.5}{125s}$ = 21.3 m/s 1

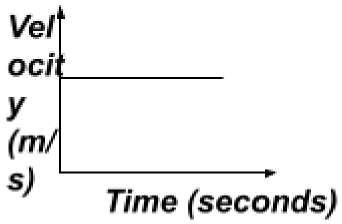
= 21.3 m/s 1

(ii) $a = \frac{v-u}{t}$

$= \frac{(25 - 20) m/s}{10 s}$ 1

$= 0.5m/s^2$ 1

18.

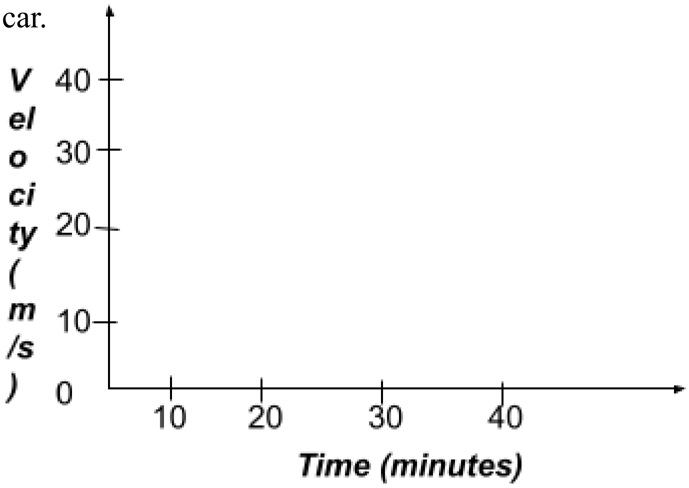


Linear motion

1. A footballer kicks a ball of mass 0.6kg initially at rest using a force of 720N. If the foot was in contact with the ball 0.1seconds, what was the take off speed of the ball?

2. A car starting from rest accelerated uniformly for 5minutes to reach 30m/s. it continues at this speed for the next 20minutes and then decelerates uniformly to come to a stop in 10minutes.

On the axes provided, sketch the graph of the velocity against time for the motion of the car.



Linear motion

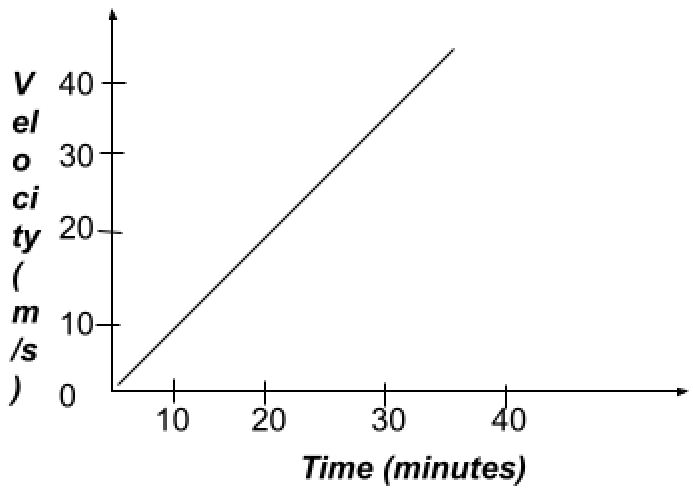
1. $Ft = m(V-U)$

$720x\ 0.1 = 0.6V$ 1

$V = \frac{72}{0.6}$

$= 120ms^{-1}$ 1

2.



Machines & inclined planes

1. (a) - Energy is the ability to do work
   - Work is done when a force applied on an object moves it through a certain distance

(b) (i) $V.R = \frac{1}{\sin\theta}$

$= \frac{1}{\sin 30^o}$ 1

$= \frac{1}{0.5}$

$= 2$ 1

M.A x V.R

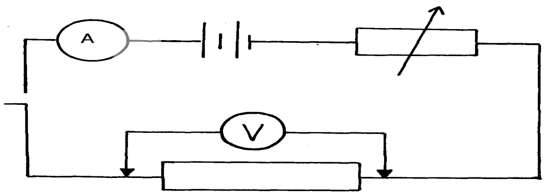
= 75 x 2

= 150 1

(ii) $Effort = \frac{Load}{M.A}$ 1

$= \frac{1500N}{150}$

= 1 10N



Resistors

1. – The ammeter should be in series
   - Voltmeter in parallel
   - Variable resistor in series
   - The apparatus must be workable
2. a) ii) $gradient = \frac{10v}{0.5A}$ 1 mk

$= 20\ \Omega$ 1 mk

iii) $\frac{1}{200} + \frac{1}{100} + \frac{1}{R} = \frac{1}{20}$ 1 mk

$\frac{1}{R} = \frac{1}{20} - \frac{1}{200} - \frac{1}{100}$

$\frac{1}{9} = \frac{9}{200}$ 1 mk

$= 20\ \Omega$ 1 mk

b) Current through 10 Ω resistor = 2A

p.d across 10 Ω resistor = 2 x 10

= 20v

p.d. across 5 Ω = 20v

current = 20 = 4A 1 mk

5

Total current 4 + 2 = 6A

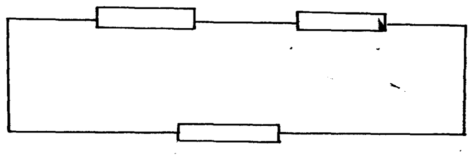
Current through 2 Ω = 6A

p.d = 6 x 2 = 12V

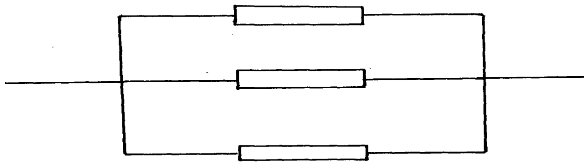
Total voltage = 12 + 20

= 32V

3. (i)



(ii)



b) i) 2.1 V

ii) 2.1 v – 1.8V = Ir = 0.1V

$r = \frac{0.3}{0.1} = 3$

iii) 0.1 X R = 1.8 V

R = 18R

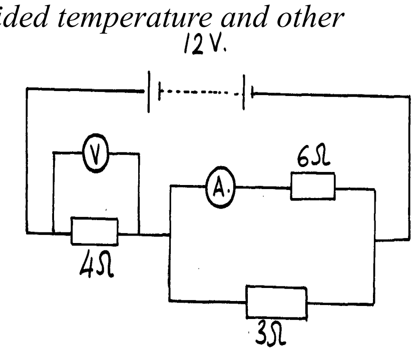
4. - Length of conductor
- Type /nature of material
- Diameter/thickness of material

b) E = IR + Ir

3.0 = I(3.5 + 0.5) = I (4.0)

I = 0.75A

5. a) – The current passing through a conductor is directly proportional to the potential difference across its ends provided temperature and other physical conditions are kept constant



6. $\frac{I}{R} = \frac{1}{5} + \frac{1}{2} = \frac{7}{10}$

$R = {}^{10}/_{7}\Omega$

$RT = \frac{10}{7} + \frac{3}{1} = \frac{31}{7}\Omega$ (Effective resistance)

but $I = \frac{12.4 \times 7}{31} = 2.8A$

∴p.d across the 3Ω resistor = 2.8 x 3 = 8.4V (p.d across the 3Ω resistor)

∴p.d across the 5Ω and 2Ω = 12.4 – 8.4 = 6.0V

∴Current across the 5Ω resistor = ${}^{6}/_{5}$ = 1.2A (answer 3mks)

7. Rs = 3 + 4

$Rp = \frac{7 \times 5}{7 + 5} = \frac{35\Omega}{12}$

$I_1 = \frac{6}{35} \times 12 = 2.057A$ 1

I through 3Ω resistor = I_1

$I_1 \times 5 = I_2$

$5(2.05 - I_2).25 - 5I_2$

$10.25 - 5I_2 = I_2$ 1

$6I_2 = 10.25 - UI_2 = \underline{10.25} = 1.708A$ 1

6

8. *a) (ii)*

(ii) Effective resistance:

$$R_E = 4 + \frac{6 \times 3}{3 + 6}$$

$$= 4 + \frac{18}{9}$$

$$= 6\Omega$$

$$V = IR$$

$$I = \frac{12}{6} = 2A$$

$$\therefore V = 2 \times 4 = 8V$$

(ii) $V = 12 - 8 = 4V$

$$\therefore V = IR$$

$$I = \frac{4}{6} = \frac{2}{3} = 0.667A$$

(iii) Effective resistance in parallel

$$R_E = \frac{6 \times 6}{6 + 6} = \frac{36}{12} = 3\Omega$$

The potential drop will increase; hence the reading of V will decrease

(c) (i) Step-down- The voltage is reduced from 240V to 8V

(ii) To reduce loss of energy due to eddy currents

(iii) $\frac{V_P}{Vs} = \frac{Np}{Vs}$

$$\frac{740}{8} = \frac{4800}{Vs}$$

$$Vs = \frac{4800 \times 8}{240}$$

$= 20 x8 = 160turns$

9 *(i) – Set Galvanometer to zero balance by adjusting the variable resistor L.*

- *P.d across BD is therefore zero* 1
- *P.d across AB = P.d across AD* 1

P.d across BC = p.d across DC

I_1 *flows through K & L* $(I_1 = I_3)$ 1

I_2 *flows through M and N* $(I_2 = I_4)$ 1

$I_1K = I_2M$ 1

$I_3L = I_4N$

$$\frac{I_1K}{I_1L} = \frac{I_2M}{I_2N}$$

$$\frac{K}{L} = \frac{M}{N}$$ 1

1

(ii) The method does not depend on the accuracy of the current measuring instrument

(b) 1 $\frac{R}{25\Omega} = \frac{0.38}{0.62}$

$R = \frac{25 \times 0.38}{0.62}$

$= 15.32\Omega$ 1

10. $C_{11} = 4\mu f + 5\ \mu f = 9\mu\, f$ ½

$\frac{I}{C_T} = \frac{1}{3} + \frac{1}{9} + \frac{1}{3}$

$\frac{3 + 1 + 3}{9} = \frac{7}{9}$

$CT = 9 = 1.29\mu F$

11. (i) Minimum current is when y is at max resistance , i.e 100Ω (x and Y parallel)

current $I = \frac{220V}{100\Omega}$

$= 2.2A$

(ii) Maximum current is when R = 500Ω at y (when X and Y are parallel)

$I = \frac{220V}{50\Omega} = 4.4A$

(c) (i) For the upper resistors in series

$R = 1 + 4 = 5\Omega$

for the lower resistors in series

$R = 2 + 3 = 5\Omega$

For the combined resistance of the parallel sets

$\frac{I}{R} = \frac{1}{5} + \frac{1}{5} = \frac{2}{5}$

$R = 2.50\Omega$

Total resistance = 2.5 + 5.50Ω = 8.00Ω

(ii) Current 1y = 0.5A

$Vy = 40\Omega \times 0.25A = 1.0V$

$V_2 = 2\Omega \times 0.25A = 0.5V$

$Vy_2 = 0.5V$

*

(d) - Thickness/x-sectional area – Resistance is inversely proportional to the thickness of a *conductor*

- Length : Resistance is directly proportional to length of a conductor