

NAME:.....STREAM.....

**END OF YEAR EXAMINATIONS**

**ULSCE-S.3 PHYSICS**

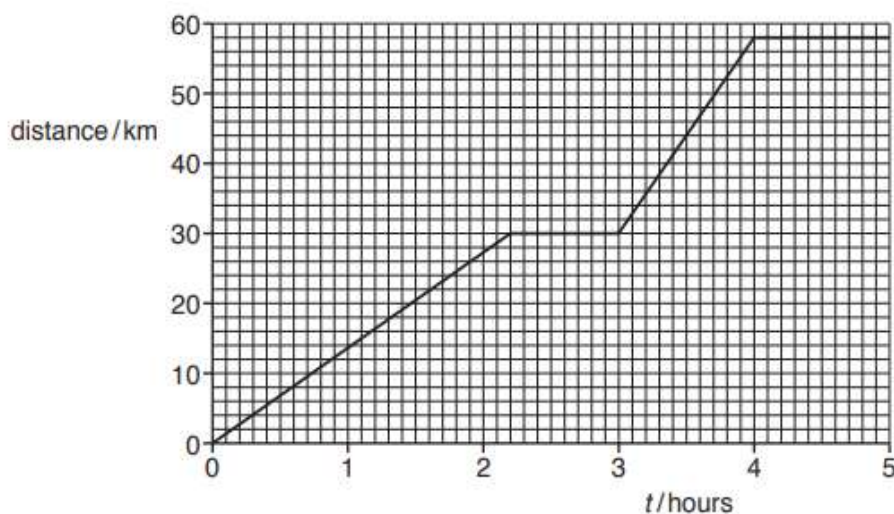
**TIME: 2 hours:15 minutes**

**INSTRUCTIONS:**

Attempt all question in section A and any two question in section B

**SECTION A**

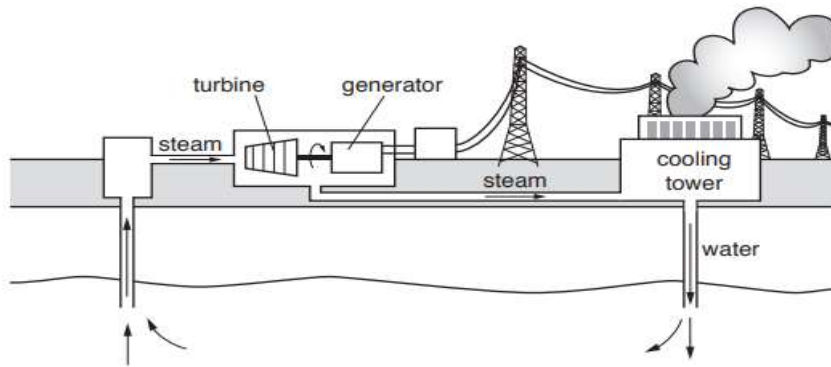
1. Fig 1.1 shows the distance-time graph for a journey made by a cyclist between town A and town B



**Fig. 1.1**

The cyclist leaves town A at time  $t = 0$  and arrives at town B at  $t = 4.0$  hours.

- a) Determine the distance between the two towns .....[1]
- b) The speed of the cyclist near the end of the journey is greater than the speed at the beginning. State how the graph shows this.  
.....  
.....[1]
- c) Calculate the average speed of the journey from A to B  
.....  
.....  
.....[2]
2. A simplified diagram of geo thermal power station



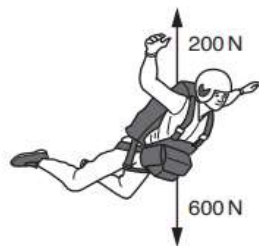
a) Describe the energy changes involved in the process of generation electricity

.....[2]

b) Water from the cooling tower at  $30^{\circ}\text{C}$  passes into the ground and is heated to  $160^{\circ}\text{C}$ . The specific heat capacity of water is  $4200\text{J}/(\text{kg } ^{\circ}\text{C})$ . Calculate the thermal energy (heat) needed to heat  $90\text{Kg}$  of water from  $30^{\circ}\text{C}$  to  $160^{\circ}\text{C}$ .

.....[3]

3. Figure below shows a parachutist falling vertically towards the ground. With a mass of  $60\text{kg}$  and weight of  $600\text{N}$



a) State what is meant by:

i. Mass .....[1]

ii. Weight .....[1]

b) Calculate the acceleration of the parachutist when the air resistance is  $200\text{N}$

.....[3]

4. Fig below shows part of a toy which contains ring-shaped permanent magnets. A plastic rod pass through the center of both magnets.

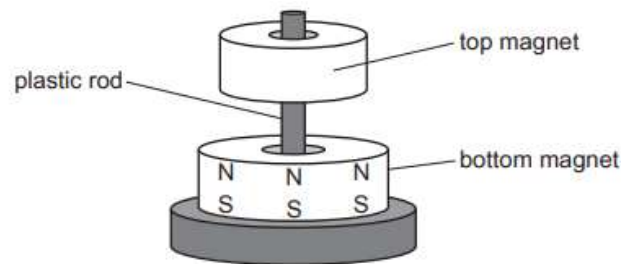


Fig. 6.1

The top magnet can move up and down freely around the plastic rod.

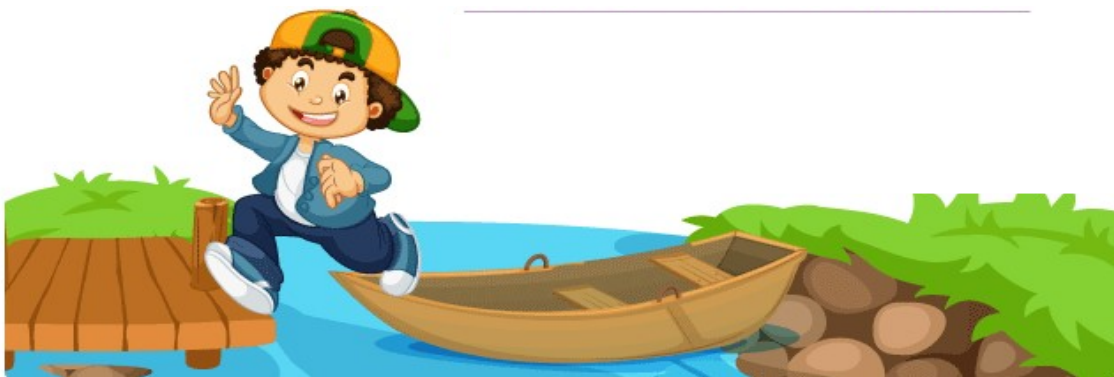
- a) The top magnet can float in the air above the bottom magnets. On fig 6.1 mark the poles on the top magnet and explain why it floats in the air above the bottom magnet

.....  
 .....  
 .....[2]

- b) The top magnet is replaced with ring made of iron, state and explain what happens to the iron ring.

.....  
 .....  
 .....[2]

5. Using the Diagram below,



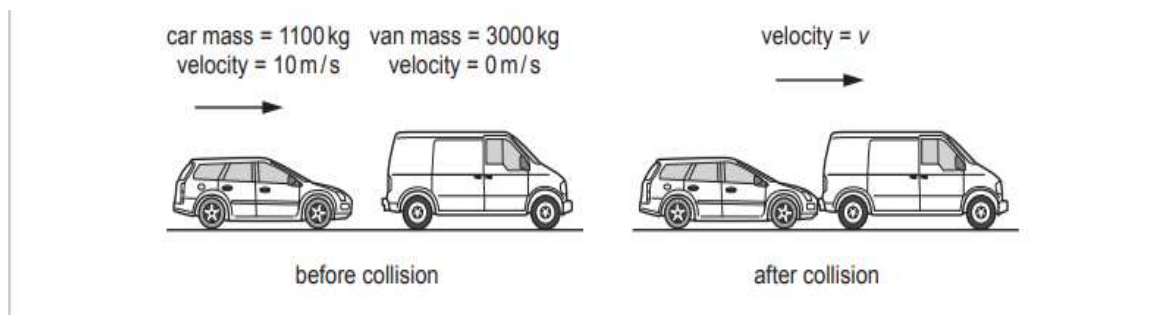
- i. Which law of motion is shown and explain what takes place in the diagram.

.....  
 .....[2]

- ii. Give any two other real life situations where such a law is applied

.....  
 .....[2]

6. In a safety test, a car of mass 1100kg travels at a speed of 10m/s and collides with a stationary van of mass 3000kg. after the collision the car and the van move together with a velocity  $v$ .



- a) Define the term momentum

.....  
 .....[1]

- b) Calculate the velocity  $v$  of the car and the van after collision

.....  
 .....  
 .....  
 .....[2]

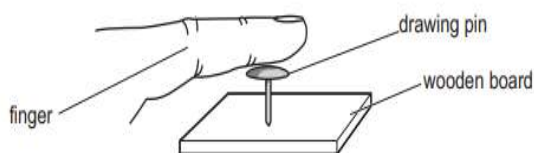
- c) Calculate the total kinetic energy of the car and van after the collision

.....  
 .....  
 .....[2]

- d) During many collision, passengers are advised to put seat belts, as physics students what is there use and what might happen to passengers with seat belts?

.....  
 .....  
 .....

7. A student pushes a drawing pin into wooden board, the area of contact of pin with the finger is  $5.0 \times 10^{-5} \text{ m}^2$ . The student pushes with a force of 26N and pin has a very small mass



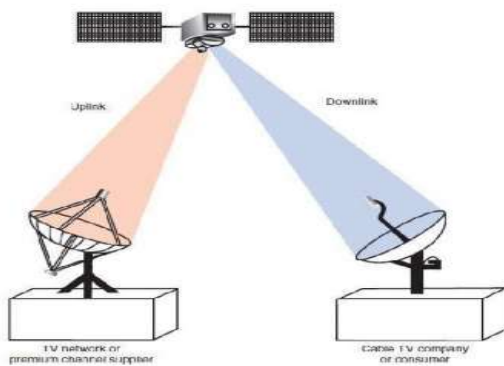
a) Calculate pressure exerted by the finger on the drawing pin

.....  
 .....  
 .....[2]

b) Explain why the drawing pin goes into the wooden board but not into the finger.

.....  
 .....  
 .....[2]

8. In communication satellite, signals move at speed of light ( $3 \times 10^8$  m/s)



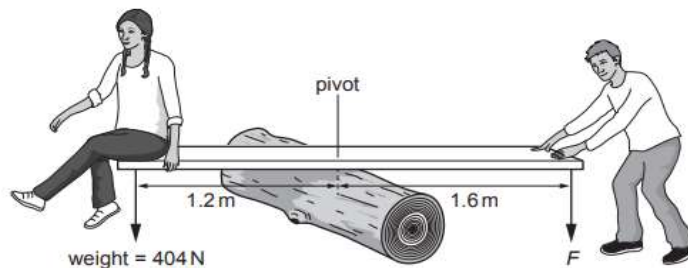
If Kampala is at a distance of 6400km from London and TV station in London is transmitting football match using electromagnetic radio waves. Find the frequency of waves sent and the time taken for transmission?

.....  
 .....  
 .....[4]

Define the Term wavelength as applied to waves?

.....  
 .....[1]

9. A plank balance horizontally on a log of wood, which acts as a pivot. A girl sits on one end of the plank and her brother pushes down on the other end to make the plank balance horizontally as show below



Calculate the moment of the girl's weight about the pivot and show that it is close to 480Nm.

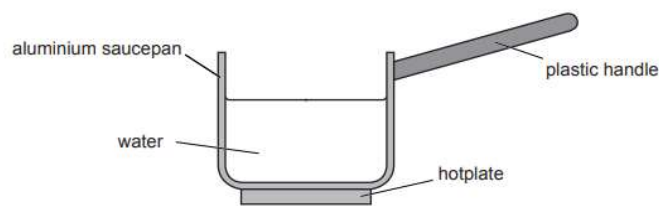
.....  
 .....  
 .....[2]

The plank balances horizontally when the boy pushes down with a force  $F$  at distance of 1.6m from the pivot.

State and use the principle enables balancing to find the size of the force  $F$

.....  
 .....  
 .....  
 .....  
 .....[3]

10. An aluminum saucepan with a plastic handle contains cold water placed on a hot plate



a) Explain why the pan is made from aluminum but handle is made from plastic

.....  
 .....  
 .....[2]

b) If the hot plate is switched on and as the temperature of water increases, explain the cause of increase in temperature.

.....  
 .....  
 .....[2]

c) State and explain the process by which water is able to boil to its boiling point

.....  
 .....  
 .....[2]

d) What is the value of boiling point of water in Kelvin scale

.....[1]

## SECTION B

11. A school has a tank which supplies water to students at their dormitory. Sometimes, students discover that as they collect water from the taps flow of water comes slows down.



Explain what cause the water to slow down and suggest what can be done to solve the issue using your knowledge as a physics student

[10]

12. Mr Jimmy house newly built on hilly area was struck by lightning during a rainy season



- a) Explain to him the cause of this and how he could prevent the tragedy above from happening again.
- b) A young girl after playing around with balloon on her blanket, it got stuck on her head. As a student of physics explain what is happening.

[10]

13. From the figure below answer the questions that follow



- a) Explain as physics students the risk the people have as they are traveling
- b) If the driver is over speeding and notices an accident ahead what might happen

[10]

END