NAME: …… INDEX NO: ……

SCHOOL: …… DATE : ……

CANDIDATE'S SIGNATURE:……

232 / 1
PHYSICS
PAPER 1
THEORY
JULY / AUGUST 2014
TIME: 2 HOURS

KURIA EAST SUB-COUNTY JOINT EXAMINATIONS COUNCIL 2014

Kenya Certificate of Secondary Education (KCSE)
PHYSICS
PAPER 1
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES:

(a) *Write your **Name, School** and **Index Number** in the spaces provided.*

(b) ***Sign** and **write** the **Date** of examination in the spaces provided above.*

(c) *This paper consists **two** sections **A** and **B**.*

(d) *Answer **all** questions in Section **A** and **B** in the spaces provided.*

(e) *All working **MUST** be clearly shown.*

(f) *Non programmable silent electronic calculators **may be** used.*

(g) *Take **g = 10ms^{-2}** where applicable.*

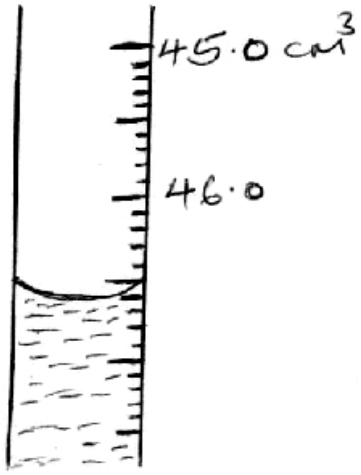
FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	CANDIDATE'S SCORE
A	1 - 11	25	
B	12	08	
	13	12	
	14	08	
	15	11	
	16	06	
	17	06	
	18	01	
	19	03	
TOTAL SCORE		**80**	

SECTION A (25 MARKS)

Answer ALL questions in this section in the spaces provided

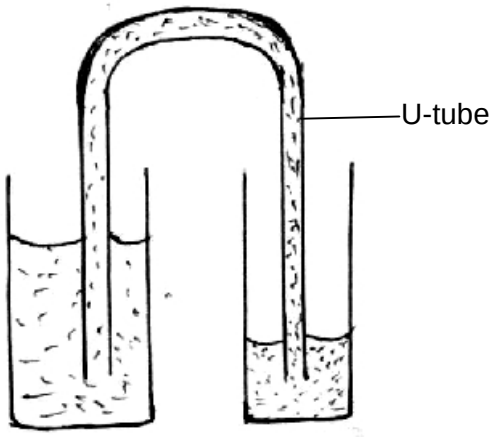
1. In an experiment to measure the density of a liquid, a student filled a burette with a liquid to the $0cm^3$ mark. The figure below shows a section of the burette showing the level of the liquid after 54.5g of the liquid had been run out.



Determine the density of the liquid. (1mk)

2. A bag of sugar is found to have the same weight in the planet earth as an identical bag of dry saw dust on planet Jupiter. Explain why the masses of the two bags must be different.
(2mks)

3. The figure below shows a liquid being siphoned from one beaker to another.

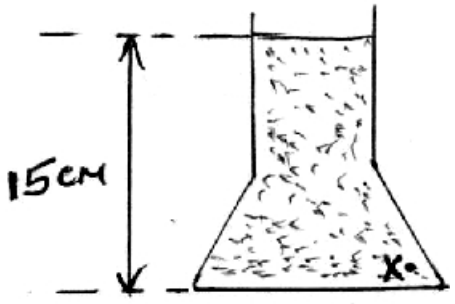


(i) Indicate on the diagram the direction of flow of the liquid. (1mk)

(ii) Show that the force driving the liquid through the U-tube is proportional to the height h. (3mks)

(iii) State what would happen to the flow if the system in the figure above was put in vacuum. (1mk)

4. The figure below shows a conical flask 15cm high, filled with a liquid of density 1200kg/m^3. The atmospheric pressure of the surrounding is 8.4 x 10^{4}Pa.

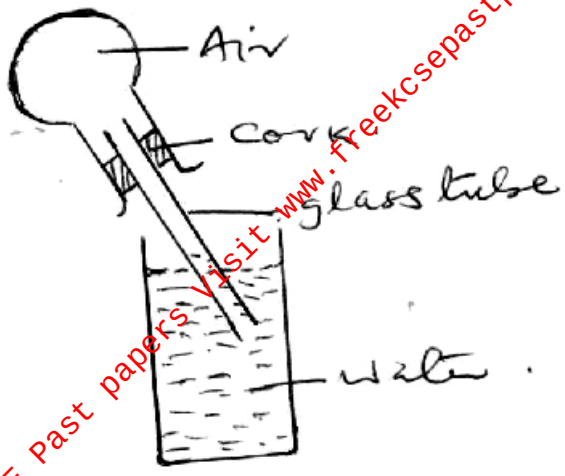


Determine the pressure at the point marked x, at the bottom of the flask. (3mks)

5. State the reason why it is easier to separate water into drops than to separate a solid into smaller pieces. (3mks)

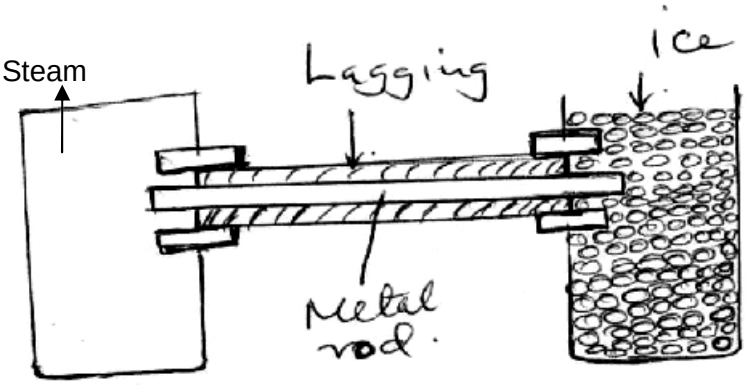
6. Explain why a glass container with thick walls is more likely to crack than one with a thin wall when a very hot liquid is poured into it. (2mks)

7. The figure below shows a flask fitted with a glass tube dipped into a beaker containing water at room temperature. The cork fixing the glass tube to the flask is airtight.



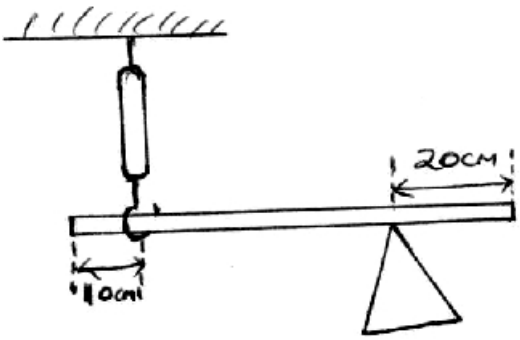
State and explain what is observed when ice-cold water is poured on the flask. (2mks)

8. In the figure below, one end of a metal rod is placed in steam and the other end in melting ice. The length of the rod in between is lagged.



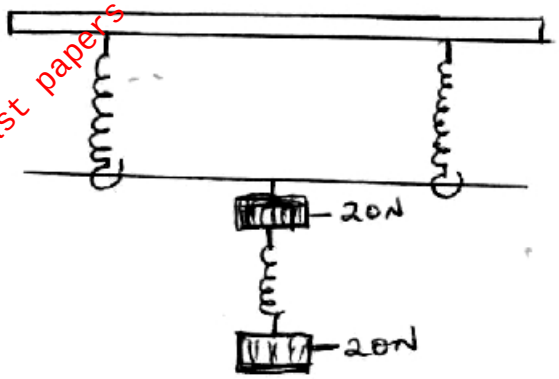
State **two** factors that determine the rate at which ice melts. (2mks)

9. The figure 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.



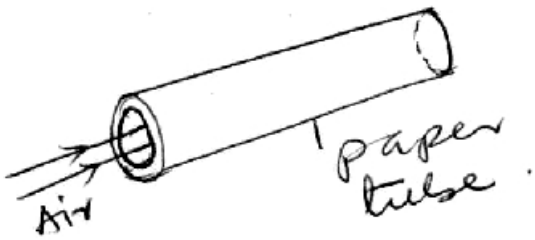
Given that the reading of the spring balance is 0.6N, determine the weight of the bar. (2mks)

10. The three springs shown in the figure below have negligible weight. The extension produced on the system of springs is 20cm.



Determine the spring constant of an individual spring. (2mks)

11. The figure below shows a sheet of paper rolled into a tube.



When a fast stream of air is blown into the tube, the paper tube collapses. Explain this observation. (2mks)

SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided

12. (a) A matatu starts from rest and accelerates to cover a distance of 49m in 7 seconds.
Determine:-

(i) Its acceleration. (3mks)

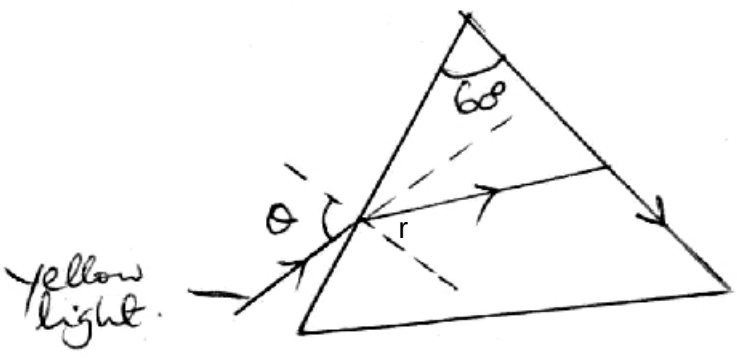
(ii) Its velocity after 7 seconds. (2mks)

(b) A trolley moving on a horizontal bench of height 1.2m, strikes a barrier at the edge of the bench. The brass mass on the top of the trolley flies off on impact and lands on the ground 2.5m from the edge of the bench.
Determine:-

(i) The time taken by the brass mass to reach the ground. (2mks)

(ii) The speed at which the trolley struck the barrier. (2mks)

13. The figure below shows the path of a ray of yellow light through a glass prism. The speed of yellow light in the prism is 1.88×10^8m/s.



(a) Determine the refractive index of the prism material for the light (speed of light in a vacuum C = 3.0×10^8m/s). (3mks)

(b) Show on the figure the critical angle (c), and determine its value. (4mks)

(c) Given that $i = 21.2^0$, determine the angle θ. (2mks)

(d) On the same figure, sketch the path of the light after striking the prism if the prism was replaced by another of similar shape but lower refractive index. (Use a dotted line for your answer). (2mks)

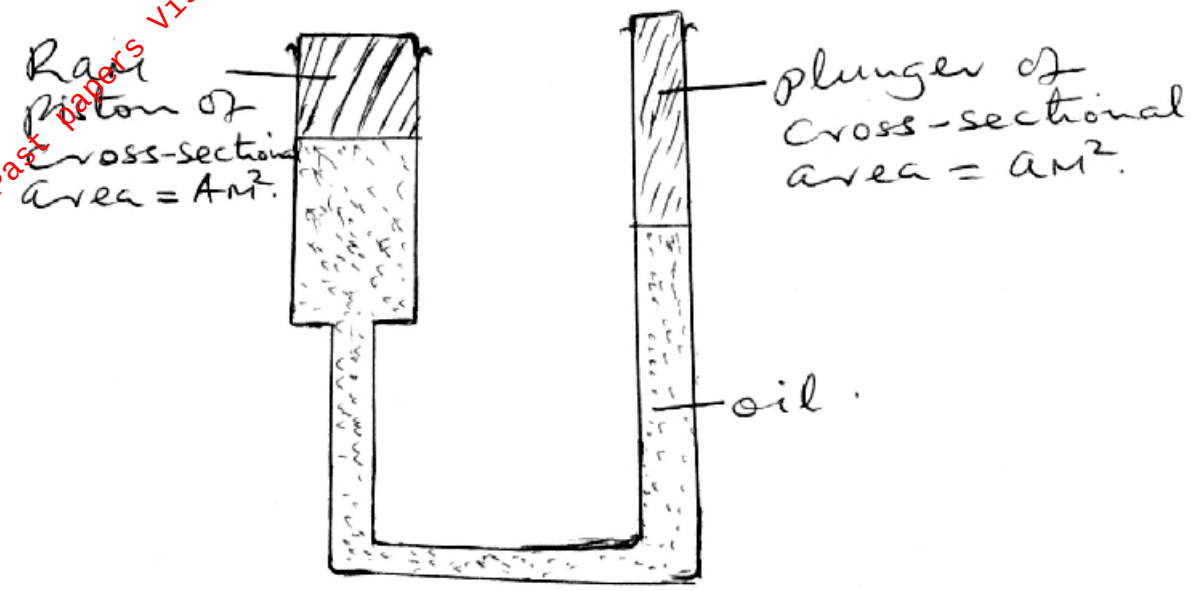
14. A gun is fired vertically upwards from the top of an open truck moving horizontally at a uniform velocity of 50m/s. The bullet achieves a maximum height of 45m.

(i) State with reason, whether or not the bullet will land on the truck. (3mks)

(ii) Calculate the distance covered by the truck just before the bullet reaches the level from which it was fired (take g = $10ms^{-2}$). (5mks)

15. (a) Define the term velocity ratio of a machine. (1mk)

(b) The figure below shows part of a hydraulic press. The plunger is the position where the effort is applied while the Ram piston is the position where the load is applied. The plunger has cross-section area (am^2) while the Ram piston has cross-section area (Am^2).



When the plunger moves down a distance d the Ram piston moves up a distance D.

(i) State the property of the liquid pressure on which the working of the hydraulic press works. (1mk)

(ii) Derive an expression for the velocity ratio (V.R) in terms of A and a. (4mks)

(c) A machine of velocity ratio 45, overcomes a load of 4.5×10^3N when an effort of 135N is applied.

Determine:-

(i) The mechanical advantage of the machine. (2mks)

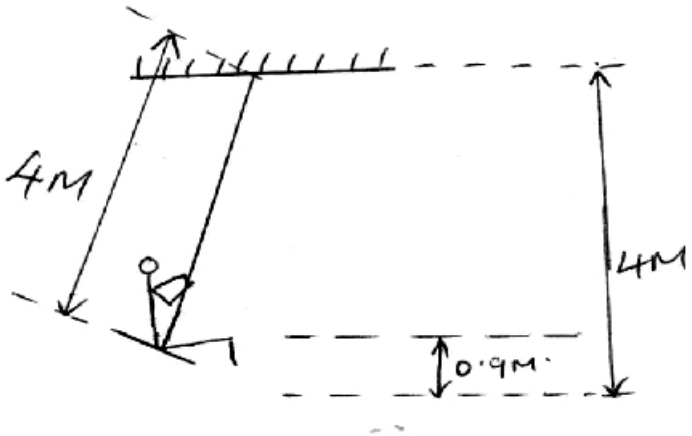
(ii) Efficiency of the machine. (2mks)

(iii) The percentage of the work that goes to waste. (1mk)

16. (a) Ice cubes float on water and solid benzene sinks in liquid benzene. Explain this observation. (2mks)

(b) A block of wood weighing 2N is held under water by a string attached to the bottom of a container. The tension in the string is 0.5N; determine the density of the wood. (4mks)

17. A child of mass 20kg sits on a swing of length 4m and swings through a vertical height of 0.9m as shown in the figure below.



Determine:

(i) The speed of the child when passing through the lowest point. (3mks)

(ii) The force exerted on the child by the seat of the swing when passing through the lowest point. (3mks)

18. On the axes provided in the figure below, sketch a graph of pressure (p) against the reciprocal of volume (I/v) for a fixed mass of an ideal gas at constant temperature. (1mk)

19. A heating element rated 2.5kW is used to raise the temperature of 3kg of water through 50^0. Calculate the time required to effect this. (Specific heat capacity of water is 4200J/kgk). (3mks)