NAME: ..... INDEX NUMBER:

...../.....

232/1 **SIGNATURE:**

.....

PHYSICS **DATE.....**

Paper 1

DIOCESE OF MERU
JOSEPH ALLAMANO BOYS SECONDARY SCHOOL

PHYSICS
Paper 1
2 hours
Instruction to Candidates
(a) *Write your name, index number in the spaces provided above.*
(b) *Sign and write the date of examination in the spaces provided above.*
(c) *This paper consists of* **two** *sections:* **A** *and* **B**.
(d) *Answer* **all** *the questions in sections* **A** *and* **B** *in the spaces provided.*
(e) ***All*** *working* **must** *be clearly shown.*
(f) *Silent non programmable electronic calculators may be used.*
(g) *Candidates should answer the questions in English.*

For Examiners Use Only

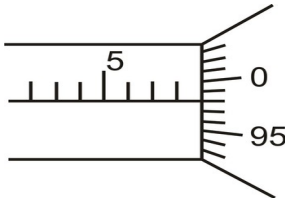
Section	Question	Maximum Score	Candidate's Score
A	1 – 14	25	
B	15	11	
	16	10	
	17	12	
	18	9	
	19	7	
Total Score		**80**	

This paper consists of 11 printed pages. Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing

SECTION A (25 Marks)

Answer all the questions in this section in the spaces provided

1. The diagram below represents the scale of a micrometre screw gauge that was used to measure the diameter of a small steel ball.



The micrometre screw gauge had an error of -0.02, calculate the radius of the ball **(1 mark)**

.....

.....

.....

2. State how heat by radiation is reduced in a vacuum flask **(1 mark)**

.....

.....

3. The figure below shows a system in equilibrium at a room temperature. The system is taken outside when the temperature is 10^0 higher.

balloon

Explain why the system tips to the right when taken outside the room. **(2 marks)**

.....

.....

.....

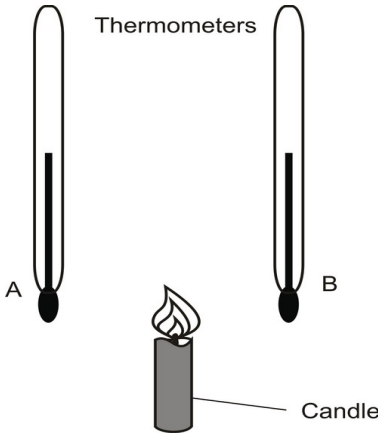
4. Use the Kinetic Theory of matter to explain the observation that evaporation from the surface of a liquid causes cooling of the liquid. **(2 marks)**

.....

.....

……

5. The shows two identical thermometers. Thermometer **A** has a blackened bulb while thermometer B has a silvery bulb. A candle is placed equidistant between the two thermometers



State with a reason the observations made after some time

(2marks)

……

……

……

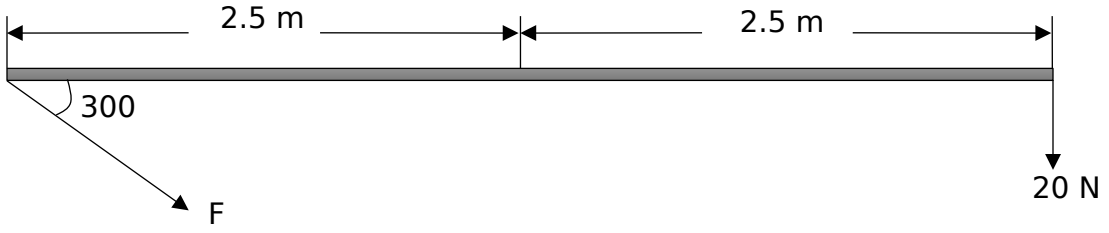
6. Explain why a metallic bench feels cooler than a wooden one if both are left in the cold overnight.

(1 mark)

……

……

7. The figure below shows a uniform bar in equilibrium under action of two forces.



Determine the value of F **(3 marks)**

……

……

……

8. A certain model of a lorry has its center of gravity 1.5m above the ground. State how the model can be improved to increase its stability with the center of the gravity remaining at the same height.

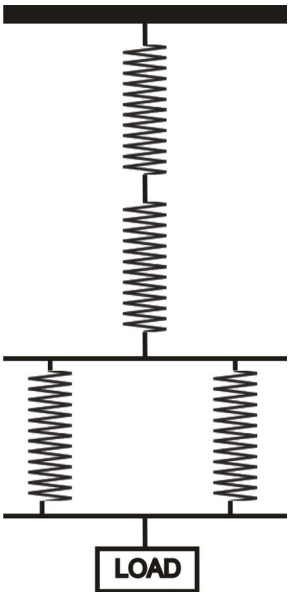
(2 marks)

.....

.....

9. The system below shows identical springs connected together. The load causes extension of 0.05m on a single spring. Calculate the total extension on the system. (assume the spring have negligible weight)

(2 marks)



.....

.....

.....

.....

.....

.....

.....

.....

.....

10. Without taking any measurements, explain a simple experiment to show that 1 gram of ice has a greater volume than 1 gram of water.

(2 marks)

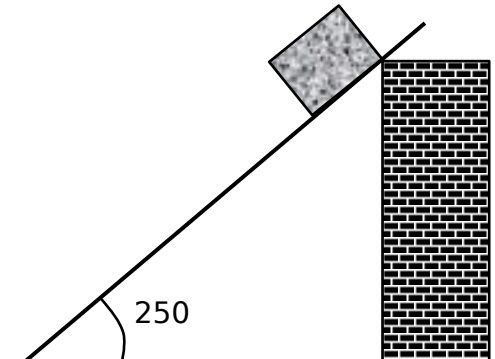
.....

.....

.....

11. The figure below shows a 60 kg mass moving down an inclined plane. If the surface offers a frictional force of 150 N, calculate its acceleration down the incline. **(3 marks)**

.....



12. Explain why ice at 0^0C is suitable as a coolant than water at the same temperature. **(1 mark)**

.....

.....

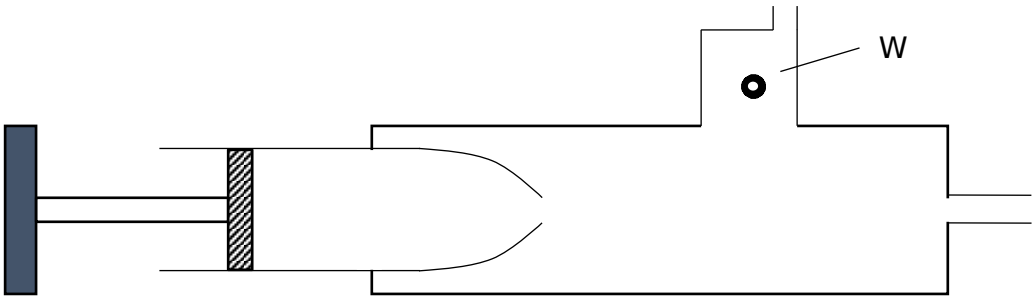
13. Convection and diffusion involves motion of fluid molecules. Distinguish between the two.

(1 mark)

.....

.....

14. In the figure below, the piston is rapidly forced in. State what happens to the wheel W. **(2 marks)**



.....

.....

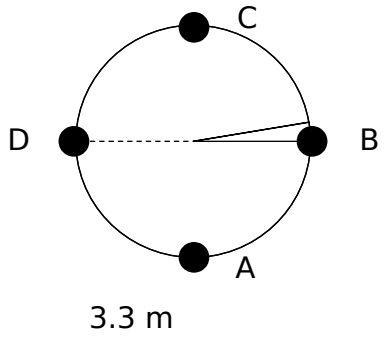
.....

.....

SECTION B (55 Marks)

Answer all the questions in this section in the spaces provided

15.(a) A stone of mass 450 g is rotated in a vertical circle of radius 1 m at a frequency of 2 revolutions per second. The center of rotation is 3.3 m above the ground.



(i) Determine the speed of the stone in m/s **(2 marks)**

……

……

……

……

(ii) Determine the tension in the string at position B and C respectively if the string has a length of 1 m.

(3 marks)

……

……

.....

.....

.....

.....

(b) The speed of rotation is now increased and the string breaks when the velocity has doubled.

(i) Show on the diagram the direction which the stone flies after the string breaks? **(1mark)**

(ii) Determine the speed at which the string breaks.
(1 mark)

.....

.....

.....

(iii) Calculate the time taken by the stone to hit the ground and hence work out the horizontal distance the stone moved before striking the ground.
(4 marks)

.....

.....

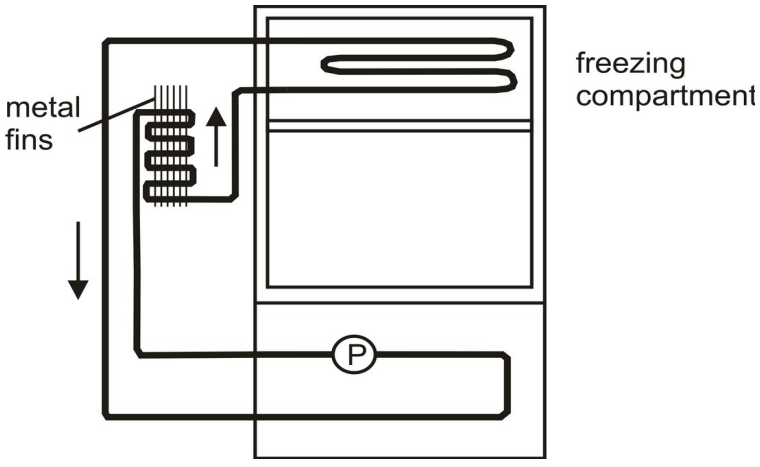
.....

.....

.....

.....

16. (a) The figure below shows the features of a refrigerator.



(i) Give the name of the refrigerant commonly used in the fridges.
(1 mark)

.....

(ii) What is the function of the pump? **(1 mark)**

.....

(iii) What is the function of the copper fins at the back of the refrigerator?

(2 marks)

.....

.....

(iv) Explain briefly how cooling takes place in the refrigerator.

(3 marks)

.....

.....

.....

(v) Why the fridge should be placed at 30cm from the wall.

(2 marks)

.....

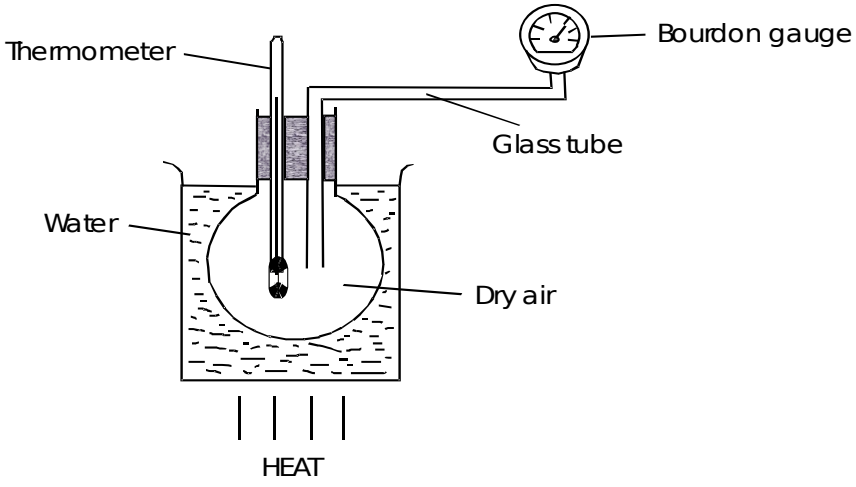
.....

(vi) What is the purpose of the double wall in a refrigerator?

(1 mark)

.....

(b) The figure below shows a simple set up for pressure law apparatus.



Describe how the apparatus may be used to verify pressure law. Initial reading of pressure and temperatures are recorded.

(5 marks)

.....

.....

.....

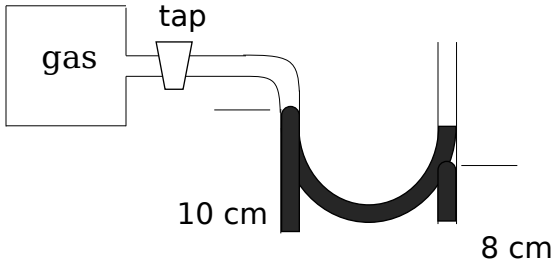
.....

.....

.....

.....

(c) A U-tube containing mercury is used as a manometer to measure the pressure of a gas in a container. When the manometer has been connected and the tap opened, the mercury in the U-tube settles as shown in the diagram below.



If the atmospheric pressure is 760 mmHg and the density of mercury is 13 600 kg/m^3, Calculate the pressure of the gas in Pascals.

(3 marks)

.....

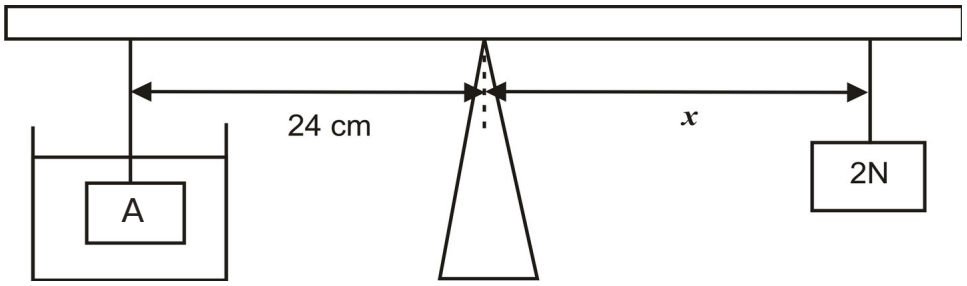
.....

.....

.....

17.(a) The figure shows a block A immersed in water. The weighs 2N in air and has a density of 2.0g/cm^3. If the bar is pivoted at its center and is in equilibrium find the distance *x*

(take *ρ of water = 1g/cm^3*) **(3 marks)**



……

……

……

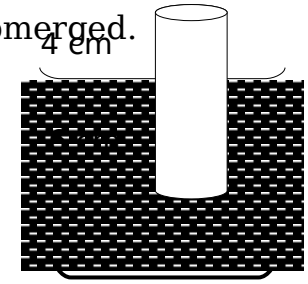
……

……

……

……

b) The diagram below shows a wooden log 10m long, density 800kg/m^3 and cross-sectional area 0.06m^2 floating in water of density 1g/cm^3 while partially submerged.



(i) Determine the weight of the block. **(3 marks)**

……

……

……

……

……

……

……

(ii) The upthrust on the block **(3 marks)**

……

……

……

(iii) The minimum weight that can be placed on the block to just make it fully submerged.

(3 marks)

……

……

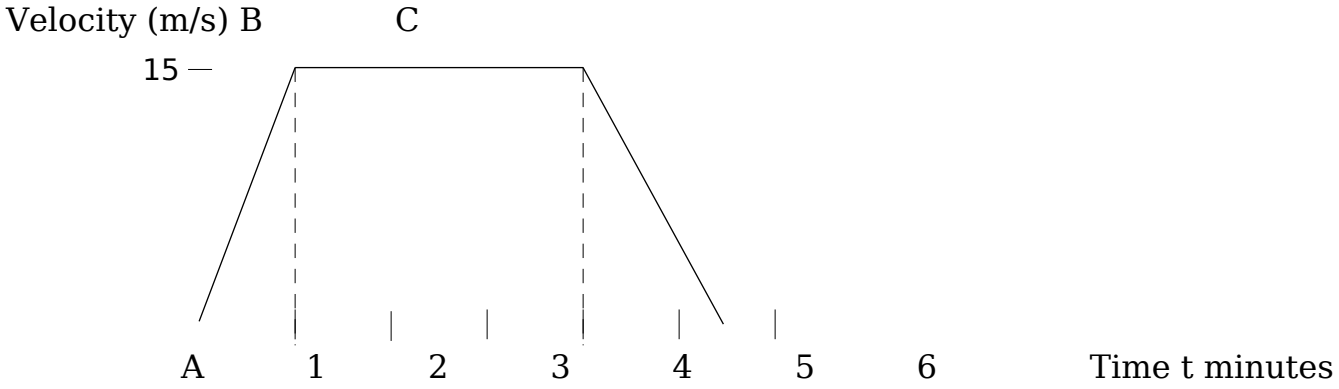
……

……

……

……

18. The figure below shows a graph of velocity against time for a moving body.



(a) Determine:

(i) The acceleration during the first portion of the graph AB.

(2 marks)

……

……

……

……

……

……

(ii) the total distance moved by the body.

(2 marks)

……

……

.....

.....

.....

.....

(b) A body initially moving at 50m/s decelerates uniformly at 2m/s^2 until it comes to rest. What distance does it cover from the time it started to decelerate?

(3 marks)

.....

.....

.....

.....

.....

.....

.....

19. (a) State the principal of conservation of momentum

(1 mark)

.....

.....

(b) A bullet of mass 20g travelling horizontally at a speed of 200m/s hits a block of wood of mass 800g suspended by a light inextensible string so that it swings freely. If the bullet emerges on the other side of the block at 80m/s, find:

(i) The initial velocity of the block after being hit by the bullet.

(3 marks)

.....

.....

.....

.....

.....

.....

.....

(ii) The maximum height through which the block may rise.

(2 marks)

.....

.....

(c) A ball bearing is dropped into a long tube carrying glycerin. Name the force acting on the ball bearing whose magnitude changes initially.

(1 mark)

.....

.....

.....