232/1
PHYSICS
PAPER 1
2 HOURS

STRATHMORE SCHOOL

MOCK EXAM

INSTRUCTIONS TO CANDIDATES.

1. Write your name and index number in the spaces provided above.
2. Sign and write the date of examination in the spaces provided above.
3. This paper consists of **TWO** sections: **A** and **B**.
4. Answer **ALL** the questions in sections **A** and **B** in the spaces provided.
5. All working **MUST** be clearly shown
6. Mathematical tables and electronic calculators may be used.

   Take: Acceleration due to gravity $g=10m/s^2$

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATES SCORE
1	1 - 12	25	
2	13	9	
	14	12	
	15	15	
	16	12	
	17	6	
TOTAL		80	

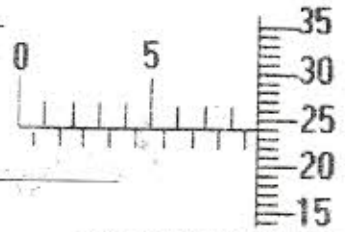
This paper consist of 8 printed pages

Candidates should check the questions paper to ensure that all the pages are printed as indicated and no questions are missing.

SECTION A (25 marks)
Answer all questions in the spaces provided.

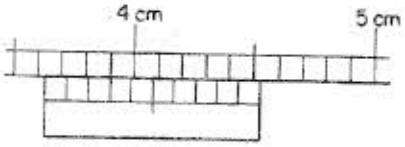
1. Give the reading of the instruments shown. (2 marks)

Micrometer: _____



Micrometer screw gauge

Vernier Callipers: _____

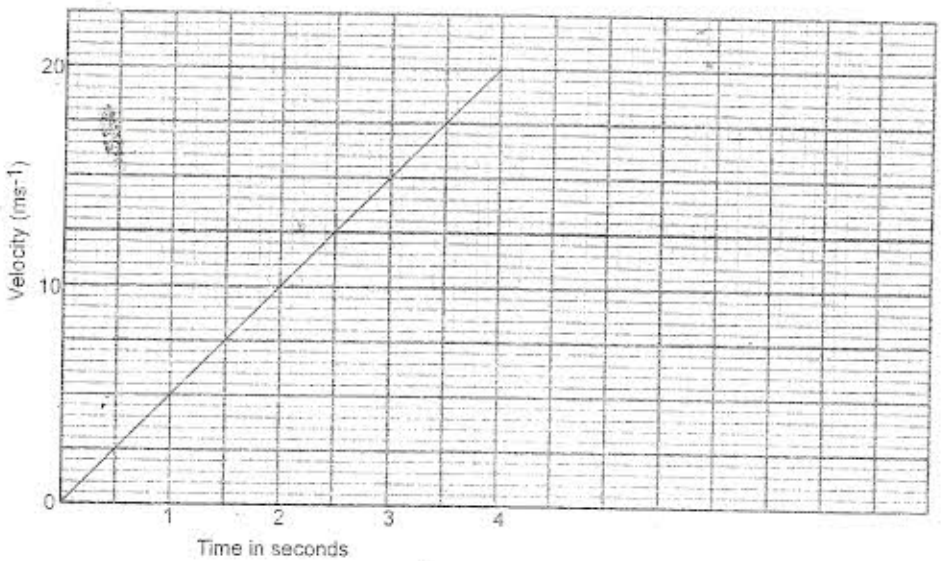


Vernier Callipers

2. Hydraulic machines use liquids and not gases for the transmission of pressure. Why are gases unsuitable for use in this machines. (1 mark)

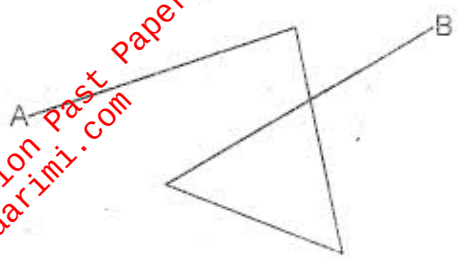
3. a) Define acceleration and state its units. (1 mark)

b) The graph represents the motion of a body of mass 2 kg under the action of a constant force **F**. Determine the value of **F**. (2 marks)



4. State **ONE** reason why mercury is better than water as a thermometric liquid. (1 mark)

5. The Fig ure below shows the motion of a smoke particle in a smoke cell being observed through a microscope.



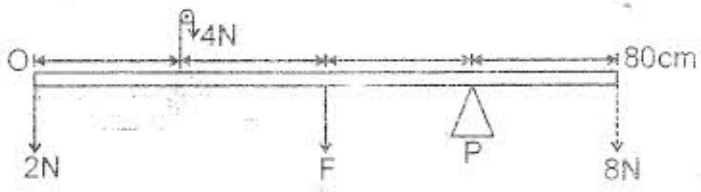
a) Account for the motion. (1 mark)

b) State the law of motion obeyed by the particle between **A** and **B**. (1 mark)

6. In an attempt to prepare a cup of tea, a student placed boiling water into a glass tumbler. The glass tumbler broke into pieces. Explain this observation. (2 marks)

7. Afit a form four student of mass 75 kg runs up at constant speed in 0.5 minutes a flight of 50 steps each 16cm high. Calculate the average power developed by the student. (2 marks)

8. A wooden plank of negligible weight and 80 cm long, is supported by a knife edge at **P**. Weights of 2, 4, **F** and 8 Newton act as shown.



i) Calculate the value of **F** (2 marks)

ii) Draw on the figure the force acting on **P** and calculate its value. (1 mark)

9. A bullet is fired horizontally from a gun at the top of a cliff 80m high to hit a target 920m away from the foot of the cliff. Determine the speed that the bullet should have to hit the target. (3 marks)

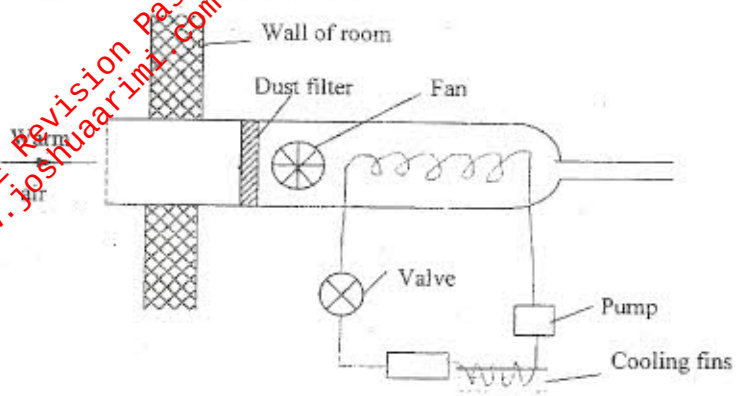
10. A metal cube of length 2cm has a weight of 0.56N when fully immersed in a liquid of relative density 1.2. Determine the density of the metal. (3 marks)

11. Calculate the total pressure experienced by a diver 20 m below the surface of the sea water of density 1.25 g/cm^3. (Atmospheric pressure 750 mmHg, rd of mercury 13.6). (2 marks)

12. Streamline flow is preferred to turbulent flow in movement of liquids in pipes. Explain why? (1 mark)

SECTION B (55 marks)
Answer all questions in the spaces provided.

13. In an air conditioning unit, air is cooled by being blown past coils in which a liquid is continuously flowing as illustrated in the Fig.



a) Explain briefly how the unit is able to cool the air. (3 marks)

b) State with reasons the part of the room that this unit should be placed in order to achieve the desired effect. (2 marks)

c) What effect will increasing the surface area of the coils have on the cooling achieved? Explain. (2 marks)

d) State one desired property of the liquid used in the cooling unit. (1 mark)

e) State the role of the fan unit. (1 mark)

14. a) Define specific heat capacity of a substance. (1 mark)

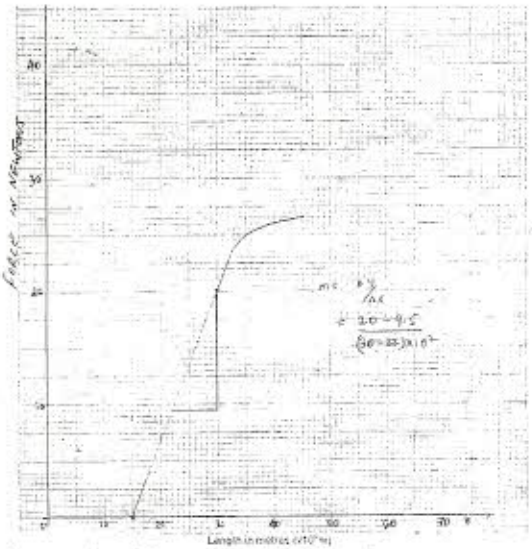
b) i) You are provided with the following apparatus: a beaker, water, a thermometer, a stirrer, an electric heater of known power rating P, a d c power supply, a switch, a stop watch, a balance.
Draw a labelled diagram to show how you would set it up to measure the specific heat capacity of water. (2 marks)

ii) Explain what readings you would take and how you would use them the to calculate the specific heat capacity. (3 marks)

iii) Give **TWO** reasons why the value that would be obtained in ii) above is not very accurate. (2 marks)

c) 10 g of a certain fuel produces 3.5×10^7 J/kg of heat when burnt in a plentiful supply of oxygen. This mass of fuel was burnt and the heat obtained was used, without loss, to heat 400g of a liquid originally at 10^0C. After all the heat had been absorbed by the liquid, 140 g of it remained as a liquid.
The specific heat capacity of the liquid was 2.5×10^3 J/kgK and its boiling point was 80^0C. Calculate the specific latent heat of vaporisation of the liquid. (Ignoring heat losses, the thermal capacity of the container and any liquid evaporated before reaching its boiling point.) (4 marks)

15. a) The graph shows how the length of an elastic band varies with the force applied on it.



i) State the natural length of the band. (1 mark)

ii) Determine the elastic constant of the band. (2 marks)

iii) Determine the energy stored in the band when stretched to a length of 35cm. (2 marks)

iv) The band is now released suddenly from a length of 35cm to project a marble of mass 20g. Calculate the velocity with which the marble takes off. (3 marks)

b) A stone of mass 450g is rotated in a vertical circle at 3rps (revolutions per second). If the string has a length of 1.5m determine:

i) The linear velocity (2 marks)

ii) The tension of the string at positions A, B and C. (5 marks)

16. (a) State the law of conservation of momentum. (1 mark)

(b) Distinguish between elastic and inelastic collisions. (2 marks)

(c) A bullet of mass 22g travelling horizontally with a velocity of 300m/s strikes a block of wood of mass 1,978g which rests on a rough horizontal surface. After impact the bullet and the block move together and come to rest when the block has travelled a distance of 5m. Calculate:

i) The velocity bullet/wood after impact. (2 marks)

ii) The force of friction between wood and surface. (2 marks)

(d) A car starts from rest and accelerates uniformly at 2 m/s² for 5s. It then travels at constant velocity for the next 3s before accelerating again at 2.5m/s2 for 2 more seconds. The car is then brought to rest in another 2s.

i) Sketch a velocity-time graph for this motion. (2 marks)

ii) From the graph, calculate the total distance travelled. (3 marks)

17. (a) i) Define Velocity Ratio of a machine. (1 mark)

ii) Give **two** reasons why a block and tackle are never 100% efficient. (2 marks)

(iii) The figure below represents a block and tackle with the load rising at a uniform speed. Calculate the efficiency of the machine if M.A. = 3.5. (3 marks)