MANGU HIGH SCHOOL

NAME: .....CLASS:.....

INDEX NO.....ADM NO.....

232/1
PHYSICS
PAPER 1
JULY 2016

Instructions to candidates

- This paper consists of two sections **A** and **B**.
- Answer **ALL** the questions in the two sections in the spaces provided after each question
- All working **MUST** be clearly shown.
- Electronic calculators and mathematical tables may be used.
- Take g=10N/kg
  Density of water=1g/cm^3

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EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
Section A	1-13	25	
Section B	14	15	
	15	16	
	16	14	
	17	10	
	TOTAL	80	

- This paper consists of **10** printed pages.

SECTION A (25 MARKS)

1. The thickness of a glass block is 11.55cm.A Venires calliper that has an error of +0.04 is used to measure this thickness. State the reading on the caliper. (1mk)

2. The earth moves around the sun at constant speed .Explain why it is true to say that the earth is accelerating. (1mk)

3. A uniform rod of length 4m and mass of 4kg is pivoted at 3.6m mark. The rod is held horizontally with a vertical rope at the 4m mark as shown below:

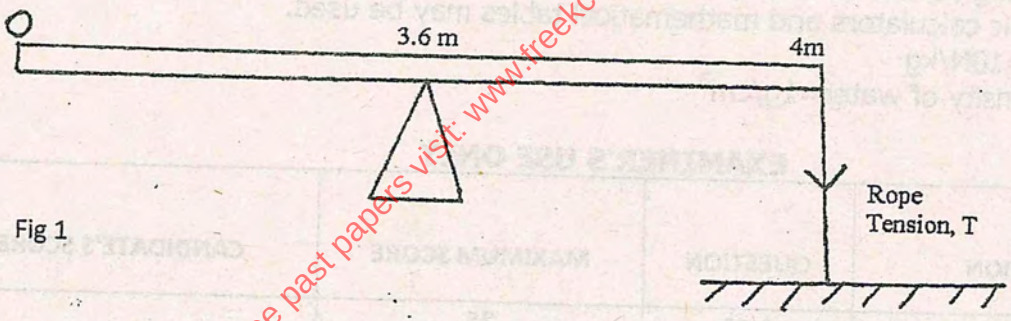

Fig 1

Calculate tension T in the rope (Take g = 10N/ kg) (2mks)

4. An electric motor raise a 60kg mass at a constant velocity .Calculate the power of the motor if it takes 30 seconds to raise the mass through a height of 25m. (3mks)

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5. An aircraft 300m from the ground, travelling horizontally at 400 m/s releases a parcel. Calculate the horizontal distance covered by the parcel from the point of release. (Ignore air resistance) (3mks)

6. The diagram below shows a gas cooker thermostat

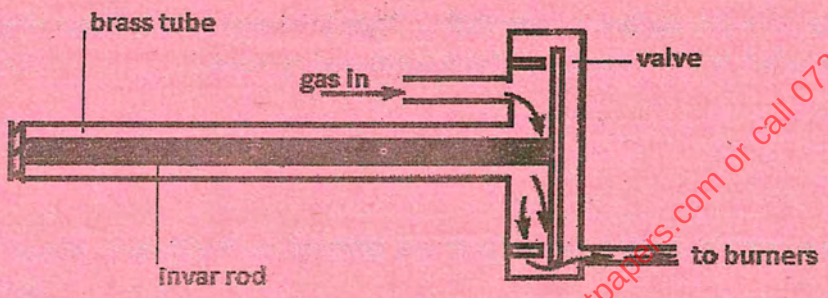

Fig 2

Briefly explain how the thermostat works (3mks)

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7. The diagram below shows a funnel inverted over a light pith ball on a table. Air is blown into the funnel as indicated on the diagram.

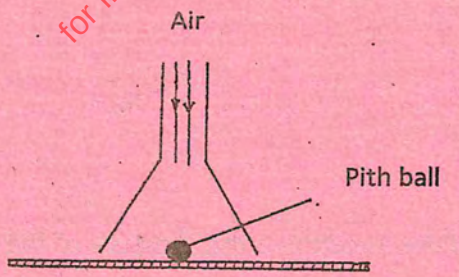

Fig 3

State and explain what is likely to be observed. (2 marks)

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8. The table below shows results of an experiment carried out to study properties of a spring.

Force (N) added	0	5	10	15	20
Length of spring (cm)	10	11	12	13	14

State with a reason whether the experiment was done within elastic limit of a spring. (1mk)

9. A bottle of wine rests on a flat surface on the table. State and explain the effect of the stability of the bottle when the temperature of the surrounding rises (2mks)

10. In a vacuum flask, the walls enclosing the vacuum are silvered on the inside. State the reason for this. (1mk)

11. The figure below shows a U- tube manometer containing oil density 900kgm^{-3}. One end is connected to a gas tap.

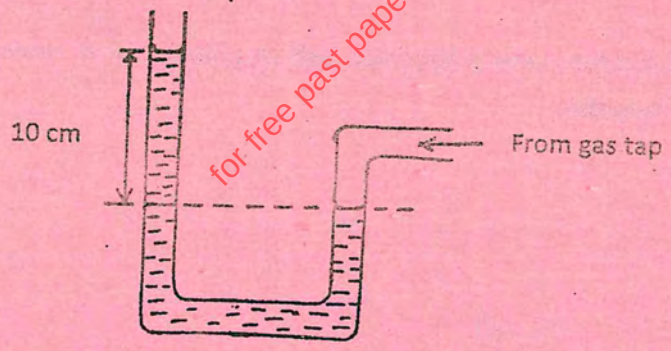

Fig 4

Given that the atmospheric pressure is 1.0x 10^5 Pa, determine the pressure of the gas.
mks)

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12. Explain why brakes fail in a hydraulic braking system when air gets into the system.
(2 marks)

13. State why it is necessary to leave an air space in a closed glass bottle of water when it is to be kept in a refrigerator.
(1 mark)

SECTION B (55 MARKS)

14. a) The system in the figure below is at equilibrium.

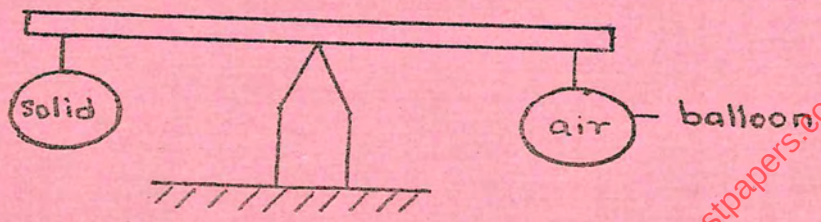

Fig 5

State and **explain** what may be observed as temperature of surrounding is increased.
(2 marks)

b) The diagram below shows a hydrometer used to measure relative densities of liquids over the range 0.8 and 1.0.

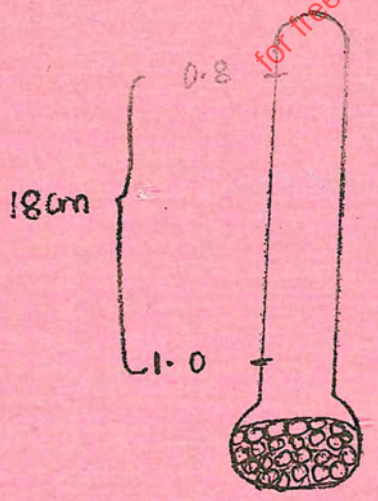

Fig 6

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If the area of cross-section of the stem is 0.5 cm^2 and the distance between the 0.8 and 1.0 division is 18 cm, determine

i) the volume of the hydrometer below the 1.0 division. (5 mks)

ii) The position of the 0.9 graduation. (5 mks)

b) A balloon of volume 100 m^3 and mass 2 kg is filled with helium of density 0.18 kg/m^3. The surrounding air has a density of 1.28 kg/m^3. Calculate the maximum mass which the balloon can lift at the ground. (3 mks)

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15. a) The diagram below shows a coin resting on the surface of a paper.

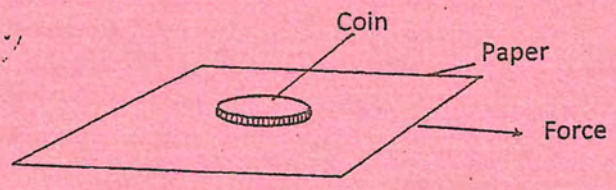
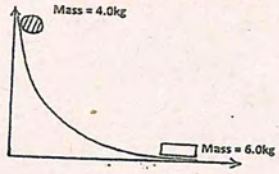


Fig 7

State , with reason, what happens to the coin when the paper is pulled sharply in the direction shown by the arrow.
(2mks)

b) State the energy transformation takes place when a car battery is used to light a bulb.
(2mks)

c) A body of mass 4.0kg held at a vertical height of 500cm is released to travel a long a frictionless curved path as shown below



The 4.0kg mass strikes another body of mass 6.0kg at rest immediately it reaches the horizontal. The bodies stick together and move in the same direction. Determine the velocity of the bodies immediately after collision
(4mks)

d) i) A matatu whose mass is 2500kg is lifted using a screw jack of 10mm pitch. If the handle is 30cm from the screw, find the force applied (neglect friction)
(4mks)

ii) The figure below shows an inclined plane and a load of mass 15kg pulled by an effort of 100 N

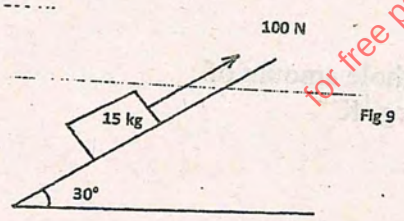


Fig 9

Find the efficiency of the machine.
(4mks)

16. a) A body is whirled in a horizontal circle at a frequency of 5Hz. Determine its angular velocity.
(3mks)

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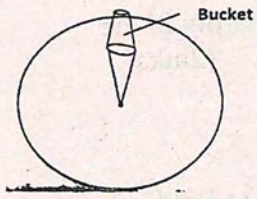
b) the figure below shows a bucket filled with water of mass 5kg tied on a string 3.6m long and rotated in a vertical circle with constant speed V m/s



Calculate the minimum speed the bucket should be rotated at so as to pass position A without the water spilling (Take g = 10ms^{-2}) (3mks)

c) The table below gives centripetal force F acting on a body moving in a circle of radius 2m for different speeds v of the body

Force f(N)	0.4	1.6	3.6	6.4	10.0	14.4
Speed V (ms^{-1}	1.0	2.0	3.0	4.0	5.0	6.0
V^2						

i) Complete the table above (1mk)

ii) Plot a graph against V^2

iii) Use your graph to determine the mass of the body. (3mks)

17. a) Explain why water kept in a porous pot on a hot day remain cooler that that contained in a metallic vessel (1mk)

b) i) An immersion heater takes 30 minutes to heat 20kg of water from 25^0 C to 60^{0}C Calculate the time taken by the same heater to heat the same mass of kerosene through the same temperature change assuming no heat is lost to the surroundings. (4mks)

Specific heat capacity of water= 4200 Jkg^{-1}K^{-1}

Specific heat capacity of kerosene = 2200 Jkg^{-1}K^{-1}

ii) Calculate the time the same heater would take to vaporize the whole amount of water. (Specific latent heat of vaporization of water = 2.26 x 10^6 Jkg^{-1}K^{-1}

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