Name: ..... Class: .....

232/1

Physics

Paper 1

Mini-Mock 2014

Kenya Certificate of Secondary Education

Physics Paper 1

2 Hours

- Write your name and class in the spaces provided above.
- The paper contains two sections A and B.
- Answer all questions in the spaces provided in the booklet.
- Non-programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.
- Take density of water = 1000 kg/m^3

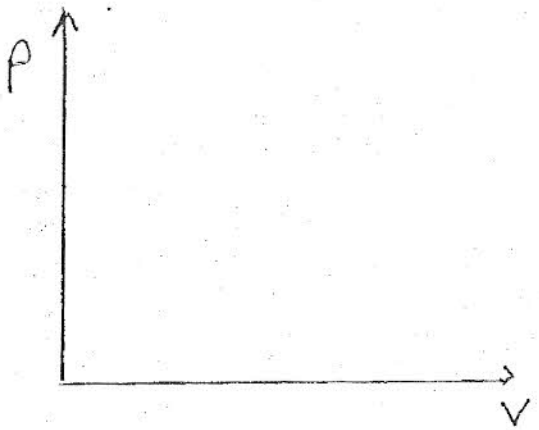
For Examiner's Use Only

Section	Question	Max. score	Candidates score
A	1 – 11	25	
B	12 – 16	55	
		Grand Total	

SECTION I (25 MARKS)

1(a) On the axis provided plot a graph of pressure P against volume for a fixed mass of an ideal gas.

{1 mark}

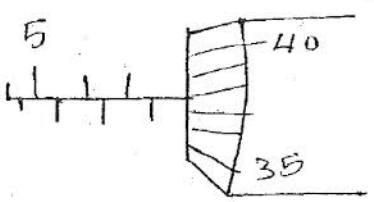


b) What does the area under the graph in 1(a) above represent?

{1 mark}

2. State the reading shown on the instrument below if it has a zero error of +0.02.

{2 marks}



3. Give the reasons why racing cars are more stable than passenger cars.

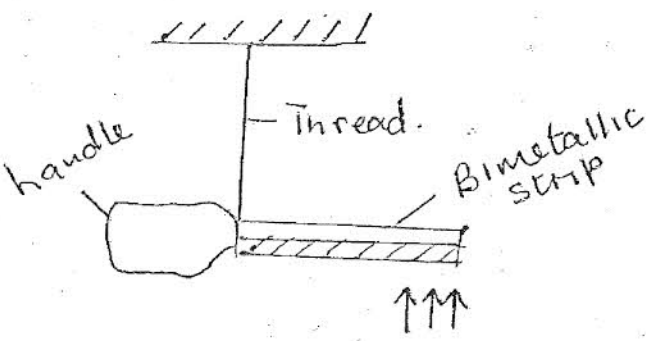
{2 marks}

4. An object of mass 80g floats in water when half submerged. Calculate its density.
{2 marks}

5. Describe briefly the piece of evidence which indicates that there is attractive forces between molecules.
{2 marks}

6. A turntable of a record player makes 45 revolutions per minute. Calculate the linear velocity at a point 12 cm from the centre.
{3 marks}

7. The figure below shows bimetallic strip with a wooden handle suspended horizontally using a thin thread.



The strip is heated at the point shown. State and explain the observation made.
{2 marks}

8. A pipe of radius 9 mm is connected to another pipe of radius 12 mm. If water flows in the wider pipe at a speed of 2 ms^{-1}. What is the speed in the narrow pipe?
{2 marks}

9. A car starts from rest and accelerates at 2 m/s^2 for 10 s. It continues with the attained velocity to cover a distance of 200 m. It accelerates at 2 m/s to attain a velocity of 40 ms^{-1} and finally decelerates at 4 m/s^2 to rest.

a) Sketch the Velocity – Time graph for the journey.
{2 marks}

b) Determine the average velocity of the car.
{2 marks}

10. A 2.0 KW immersion heater is used to heat 4 litres of water from 20°C to 100°C. Given that 30% of the heat is lost to the surrounding, calculate the time needed for the heating process. {3 marks}

11. State Hookes law.
{1 mark}

SECTION B: (55 MARKS)

12. A lead ball is placed on the surface of a viscous oil and released.

a) i) State the three forces acting on the ball as it falls through the oil.
{1½ marks}

ii) State which force varies during the fall and explain why it varies.
{1½ marks}

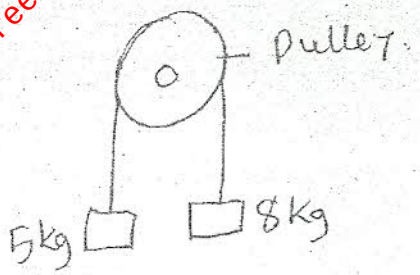
b) i) Sketch a graph showing the variation of velocity of the ball with time from the moment it
was released.
{2 marks}

ii) Draw a second graph showing the variation if water replaced the oil.
{1 mark}

c) Describe the energy changes which are taking place during the fall.
{1 mark}

d) i) A car of mass 1500 kg is moving at 30 m/s. Calculate the force needed to reduce the speed
to 12 m/s over a distance of 21 m.
{2 marks}

ii) Two mass of 8 kg and 5 kg are tied to a string over a pulley as shown below. Calculate the
tension in the string as the masses move.
{3 marks}



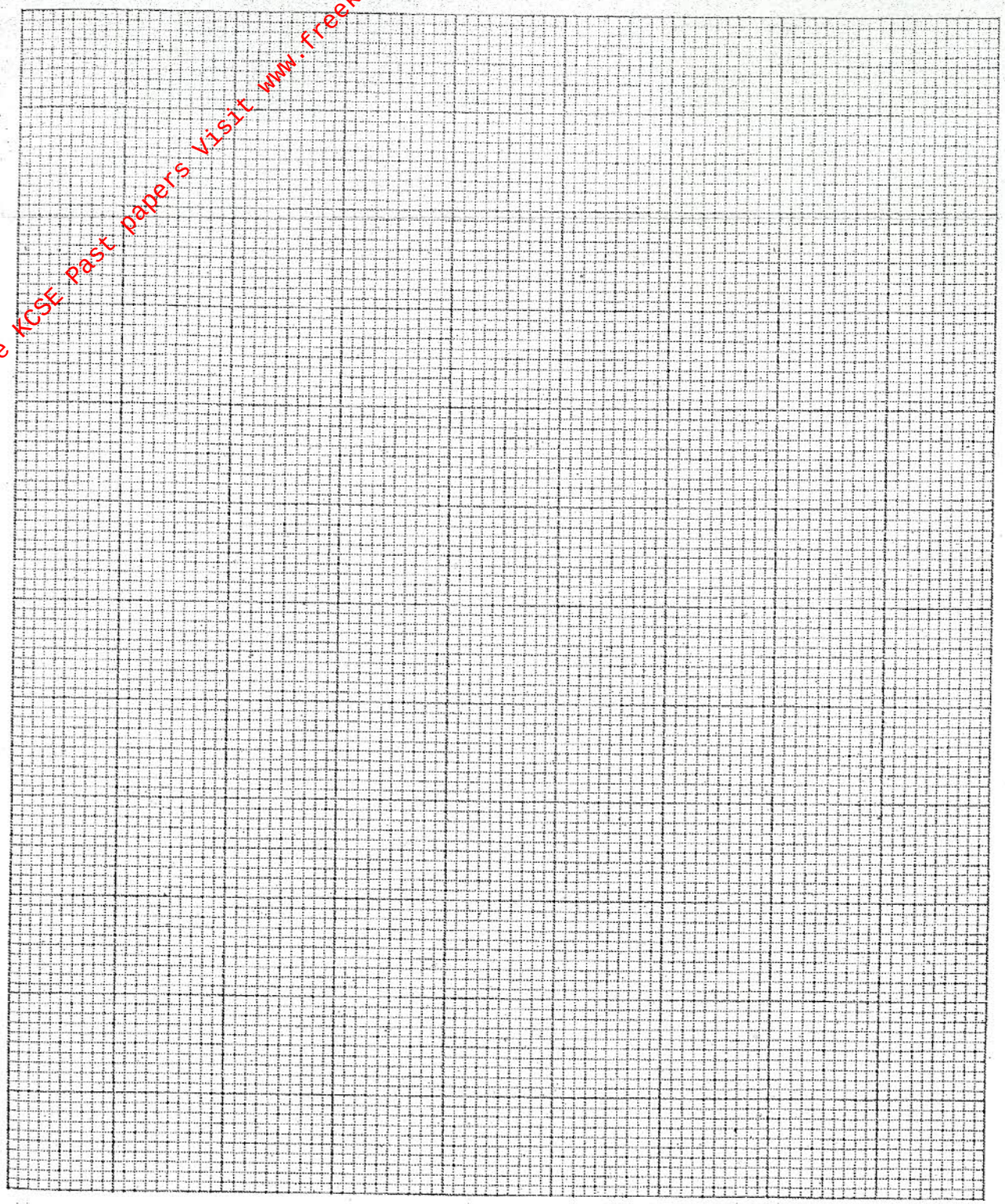
13. An experiment was carried out to investigate the efficiency of block and tackle pulley system with

five pulleys. The following result was obtained.

Load (N)	50	100	200	300	400	500	600
Effort (N)	30	45	65	85	105	125	165

a) Plot a graph of Effort against Load.

{5 marks}



b) Hence find

i) the Effort,
{1 mark}

ii) the Mechanical Advantage,
{1 mark}

iii) The efficiency corresponding to a load of 450N.
{1 mark}

c) A man uses the above system to lift a body of mass 55 kg which rises with a velocity of 0.1 m/s. Determine the power developed by the man.
{2 marks}

d) Sketch and explain the shape of a graph of Efficiency against Load of a pulley system.
{2 marks}

14(a) Distinguish between Heat capacity and Specific heat capacity.
{2 marks}

b) 90g of water at 98°C was added to 120g of brine in a copper calorimeter of mass 50g at a temperature of 17°C. The final temperature of the mixture was 56°C. Calculate the

specific heat capacity of brine if that for water is 4200 J/kg K and of copper is 380 J/kg K.
{4 marks}

c) i) State what is meant by the kinetic theory of matter.
{1 mark}

ii) Employ the kinetic theory of matter to explain cooling by evaporation.
{2 marks}

d) Describe briefly with two reasons, two ways (other than direct heating) by which a quantity of liquid may be made to evaporate quickly.
{2 marks}

15(a) State Archimedes Principle.
{1 mark}

b) i) The figure below shows a uniform metre balanced by a rectangular glass block of dimensions 12 cm x 6 cm x 2 cm and density 2.5 g/cm^3 that is totally immersed in water.

ii) A hydrometer weighing 9.8g floats in a liquid of density 0.87 g/cm^3. Determine the volume of the immersed part.
{1 mark}

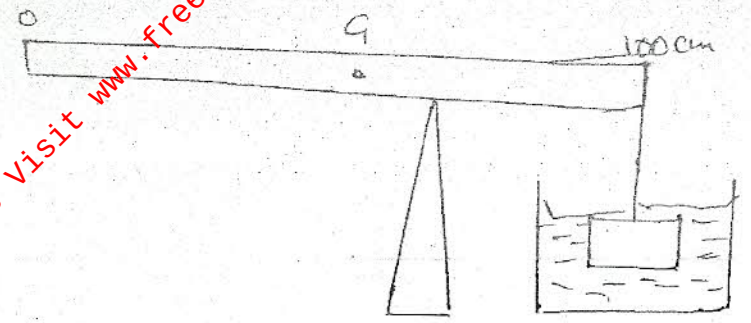
c) A cube of wood of volume 0.2 m^3 and density 650 kg/m^3 floats in a liquid of density 750 kg/m^3.

i) What fraction of the volume of the liquid would be immersed in the liquid?
{2 marks}

ii) What force must be applied to the cube so that the top surface of the cube is on the same level as the liquid surface?
{2 marks}

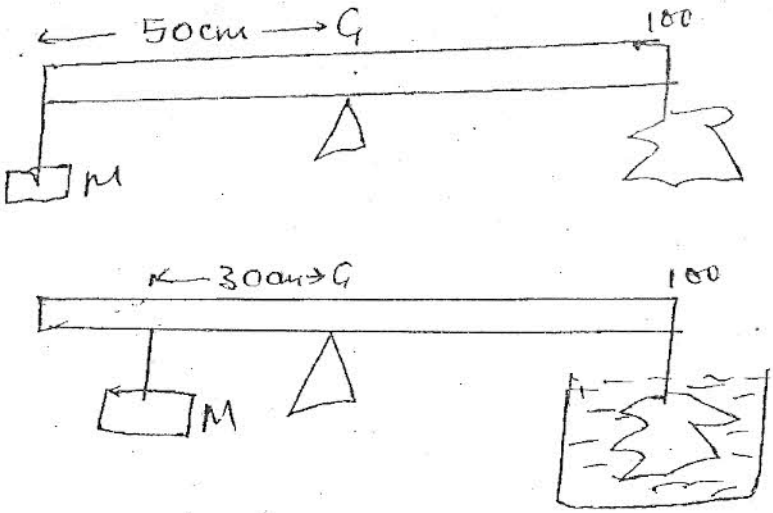
16(a) Calculate the angular velocity of the tip of the hour hand of a clock.
{2 marks}

b) Explain why a body moving with uniform speed in a circle is hard to accelerate.
{1 mark}



Find the position of the pivot if the mass of the metre rule is 84g.
{2 marks}

ii) The data shown in the figures below (a) and (b) were collected by a student who attempted to find the relative density of a solid by the Principle of moments.



The solid and the mass m are the same throughout the experiment. Calculate the relative density of the solid.
{2 marks}

b) i) State the law of floatation.
{1 mark}

c) A wooden block of mass 800g is placed at a distance of 12 cm from the centre of the turntable. When the turntable is rotated at a constant angular velocity the block begins to slide off the table. If the frictional force between the block and the turntable is 0.9N, determine

i) the linear speed of the block.
{2 marks}

ii) the angular velocity of the turntable.
{1½ marks}

iii) the force required to hold the block at the same place if the angular velocity is increased by 1.25 rad s^{-1}.
{2 marks}