Name ……………………………………………………… **Index Number**…………………………………..

232/1

PHYSICS

Paper 1

(THEORY)

march/April 2011

2 hours

Candidate's signature ………………………

Date ……………………………………………………

MOKASA JOINT EVALUATION EXAMINATION

Kenya Certificate of Secondary Education

PHYSICS

Paper 1

(THEORY)

2 hours

INSTRUCTIONS TO THE CANDIDATES:

- Write your **name and index number** in the spaces provided above.

- Answer *all* the questions both in section **A** and **B** in the spaces provided below each question

- All workings *must* be clearly shown; marks may be awarded for correct steps even if the answers are wrong.

- Mathematical tables and silent electronic calculators may be used.

For Examiners' Use Only

| SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
Section A	1-10	25	
Section B	11-16	55	
	TOTAL	**80**	

1. Figure 1 shown below is part of a micrometer screw gauge found to have a zero error of - 0.04 mm
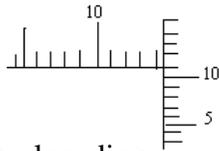
   Determine the actual reading

2. A piece of metal weigh 3.0 N in air and 2.0 N when totally immersed in water. Calculate the volume of the metal. (Density of water = 1.0 gcm^{-3}) (2 mks)

3. Water flows through a pipe of varying cross –sectional area. The water enters one end of the pipe of cross – sectional are $5cm^2$ at 0.3 ms $^{-1}$.it flows into the end of a different cross – sectional area at 1ms $^{-1}$. Determine the cross sectional area at this end (2mks)

4. Two identical helical springs are connected in series. When a 50 g mass is hung at one end of the springs it produces an extension of 2.5 cm. Determine the extension produced by the same mass when the springs are connected   in parallel (3mks)

5. A faulty mercury thermometer reads $40^{o}c$ and $120^{o}c$ when placed in pure ice and steam from boiling water respectively. Determine the actual temperature when this thermometer reads 50 ^{o}c. (3mks)

6. Two cans of equal size ,one polished and shiny on the outside and one is black and dull on the outside contain   equal amounts of hot water. Each can is covered with a lid carrying a thermometer. The water cools as it is stirred gently and temperature for each recorded every minute. Which can cools down more quickly. Give a reason for your answer (2mks)

7. When a force of 6.0 N is applied to a block of mass 2.0kg it moves along a table at constant velocity.

   (i) What is the force of friction?   (1mk)

   (ii) When the force is increased to 10.0N, what is the resultant force. (1mk)

8. (i) Define specific heat capacity of a substance (1mk)

   (ii) A 2KW electric heater supplies energy to 1.5 kg of iron kettle containing 3 kg of water. Find the time taken to raise the temperature of the water by 60oc (assume no heat loss to the surrounding) specific heat capacity of water is 4200J kg $^{-1}$ k $^{-1}$ and that of iron = 460J kg $^{-1}$ k $^{-1}$ (2mks)

9. In fig 2 above the area of piston A is 1.5 cm and area of B = 75 cm^2. An effort of 400N is applied to the lever at its end as shown. Determine the load that can be supported by this effort. (3mks)


Fig 2
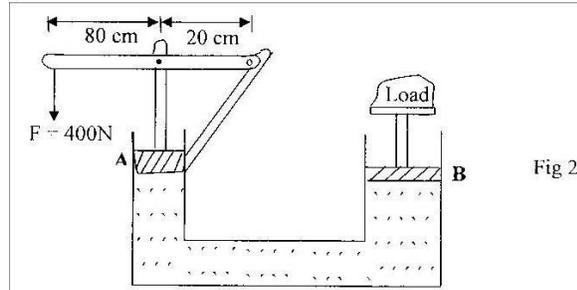
10. A glass tube of uniform cross – section area 0.75cm^2 is sealed at one end and contains 40cm^2 air at atmosphere pressure (75.5 cm Hg). The tube held with its open end downwards, is pushed below the surface of mercury. Calculate the change in atmospheric pressure which would be necessary to equalize inside and outside the tube, the open end of the tube being 2.0 cm below the surface of mercury. (3mks)

SECTION B (55 MARKS)

11. a) Define the term 'moment' of force'   (1mk)

    b) The diagram shows a simple machine for lifting water from a river
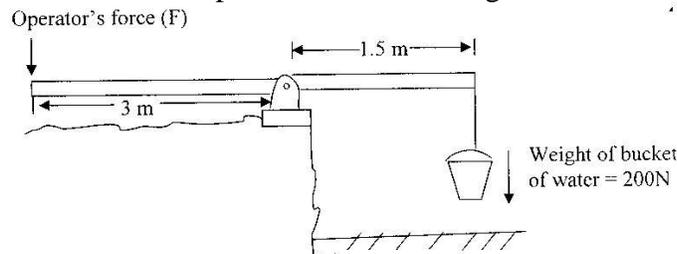
    (i) Calculate the turning effect of the bucket of water. (2mks)
    (ii) Calculate the minimum downward force the operator must use to draw the water from the river.
    c) A 20m uniform plank AB of mass 20kg is put on a wedge such that it does not balance of 3m, 7m and 1.85m respectively from A. how far must the wedge be placed from A for the arrangement to balance horizontally. (4mks)

12. In a down hill race a man skis a total distance of 3000m. The vertical height the man drops is 800m.

Fig 3.
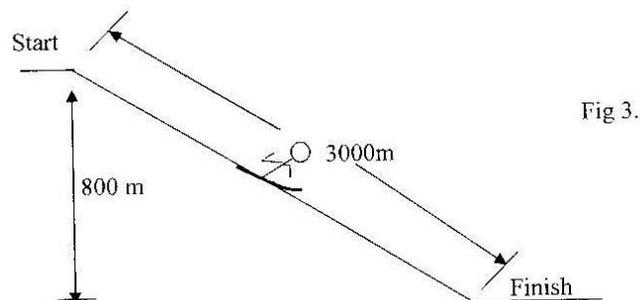
a) Show and label three forces acting on the man as he skis down the slope (3mks)
b) The average frictional force pushing against the man is 210N. calculate the total work done against friction as he skis down the slope (3mks)
c) Calculate
   (i) The K.E of the skier as he passes the finish. (1mk)
   (ii) The velocity of skier at the finish (3mks)

13. (a) Define impulse and state its SI units. (2mks)
    (b) A policeman fires a bullet of mass 20g from a gun of mass 2kg, if the bullet emerges at a velocity of 300m/s from the muzzle, calculate the force the gun exerts on the policeman. (4mks)

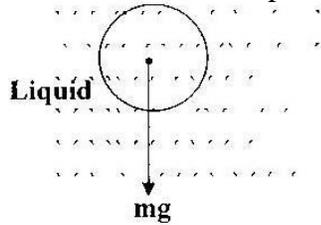   (c) The diagram below shows a spherical object falling through a fluid

    Liquid   Fig 4.

    mg
    (i) on the diagram bellow shows two other forces acting on the object (2mks)
    (d) If a graph of velocity against time for the object above is plotted for various fluids, the
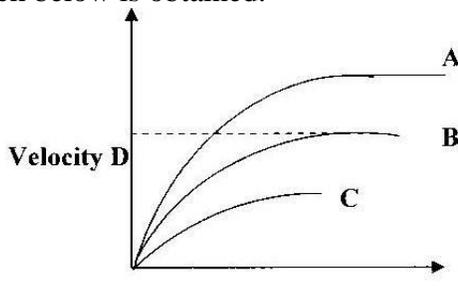
    sketch below is obtained.

    A

    B

    Velocity D

    C   Fig 5

    (i) Name the part D (1mk)
    (ii) Arrange the fluids A,B, & C in order of decreasing density (1mk)
    (iii)State one factor that affects the resultant force of the body above as it falls through the fluid. (1mk)
14. (a) A ball is projected vertically upwards with a velocity of 20m/s from the ground.
    (i) Sketch a velocity- time graph for the motion until it reaches the maximum (1mk)
    (ii) Determine the time it takes to reach the maximum height. (2mks)
    (b) The tape in the figure 6 below was produced by a ticker timer operating on a 100Hz **a.c** main
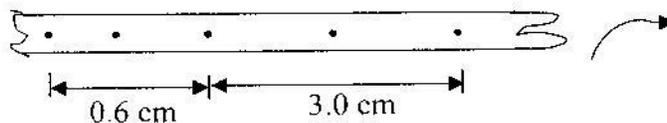
    Fig 6

    0.6 cm   3.0 cm

    What is the acceleration of the tape (4mks)

4

c) A boy kicks a ball horizontally towards a wall, the ball hits the wall and bounces back at two thirds of its initial velocity, sketch a velocity time graph to represent the motion of the ball (Neglect air resistance) (3mk)

15. (a) Define the time radian (1 mk)

   b) The centrifuge is one of the applications of uniform circular motion, briefly explain how it works. (3mks)

   c) A vehicle of mass 1000kg is moving round a bend of radius 15 m at a speed of 10m/s

      (i) What is the frictional force necessary to prevent skidding ?(2mks)

      (ii) Calculate the coefficient of friction between the tires and the road required to supply this force (2mks)

16. (a) What is diffusion? (1mk)

   (b) A smoke cell contains a mixture of trapped air and smoke. The cell is brightly lit and viewed through a microscope. State and explain what is observed (2mks)

   (c) A beaker is filled completely with water. A spoon full of common salt is added slowly. The salt dissolves and the water does not overflow.

      (i) State why the salt is added slowly. (1mk)
      (ii) Why doesn't the water overflow (1mk)

   d) In the figure bellow, ammonia gas and an acid gas diffuse and react to form a white deposit on the walls of along glass tube as shown.

Fig. 7
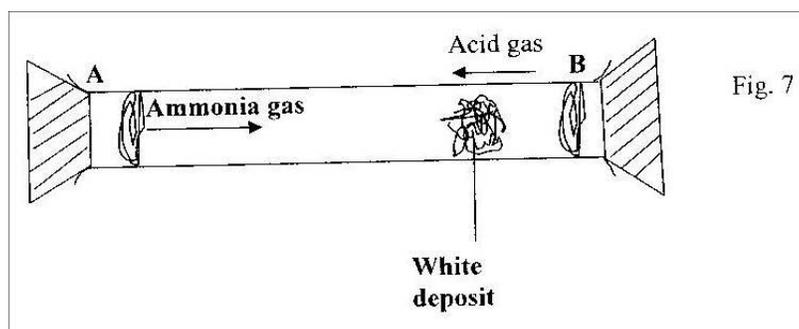
      (i) What conclusion can be made from this result of this experiment? (1mk)

      (ii) How does the size and mass of a gas affect the rate of diffusion? (1mk)

      (iii) The experiment is performed at a lower temperature. Would you expect it to take longer or shorter time to form the white deposit? Explain your answer (2mks)