NAME…… INDEX NO……

SCHOOL…… CANDIDATES SIGNATURE……

DATE……

232/1

PHYSICS (THEORY)
PAPER 1
JULY/AUGUST 2014
TIME: 2 HOURS

KAMUKUNJI DISTRICT KCSE EVALUATION TEST - 2014

INSTRUCTIONS TO CANDIDATES

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

-Sign and write the date of the examination in the spaces provided above.

-Answer all the questions in the spaces provided.

-All working must be clearly shown.

-Mathematical tables and electronic calculators may be used

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 12	25	
	13	13	
	14	12	
B	15	11	
	16	11	
	17	8	

TOTAL SCORE		80	

SECTION A (25 MARKS)

1) The weight of an object on earth is 20N. If the object weighs 18N in another planet, determine the gravitational field strength at the planet. (Take g=10N/Kg) (2mks)

2) Distinguish between latent heat of fusion and specific latent heat of fusion of a substance (1mk)

3) A mass of 8Kg is whirled round in a horizontal circle using a rope that is 80cm long , if it takes $2^1/_2$ circles in 1 second , calculate the tension the rope experiences. (3mks)

4) Dust particles in air appear to move randomly, explain this observation. (2mks)

5) Figure 1(a) shows a solid cylinder in stable equilibrium. Sketch in fig 1(b) a cylinder in neutral equilibrium (1mk)

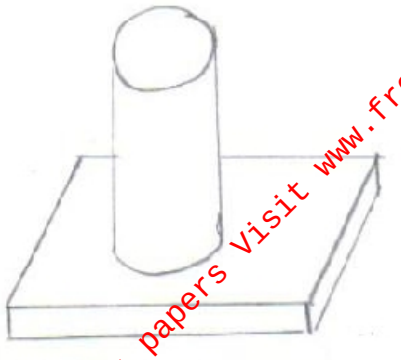


Figure 1(a)

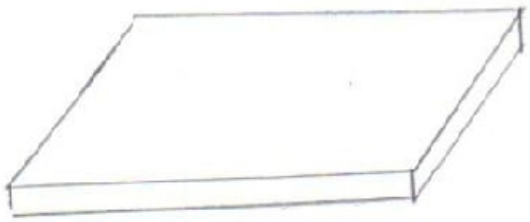


Figure 1(b)

6) Figure 2 shows a manometer attached to a gas supply. If the atmospheric pressure is 103,360 Pa, calculate the pressure of the gas supply. (Take density of mercury=13,600Kgm^{-3}) (3mks)

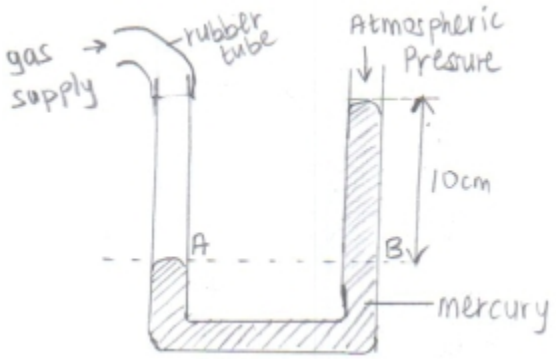


Figure 2

7) Figure 3 shows a pulley system used to raise a load of 150N

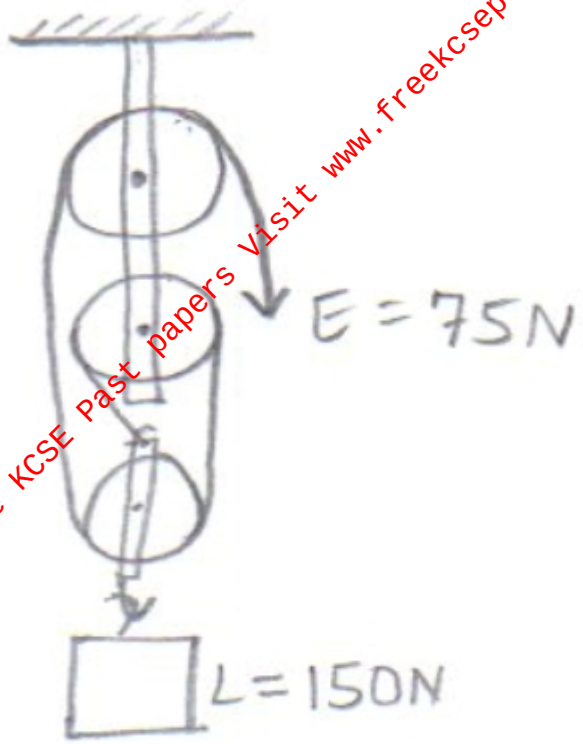


Figure 3

(a) State the velocity ratio of the system (1mk)

(b) Determine the mechanical advantage of the system. (2mks)

8) Complete figures 4(a) and 4(b) by showing the levels of the liquids in the glass tubes. (2mks)

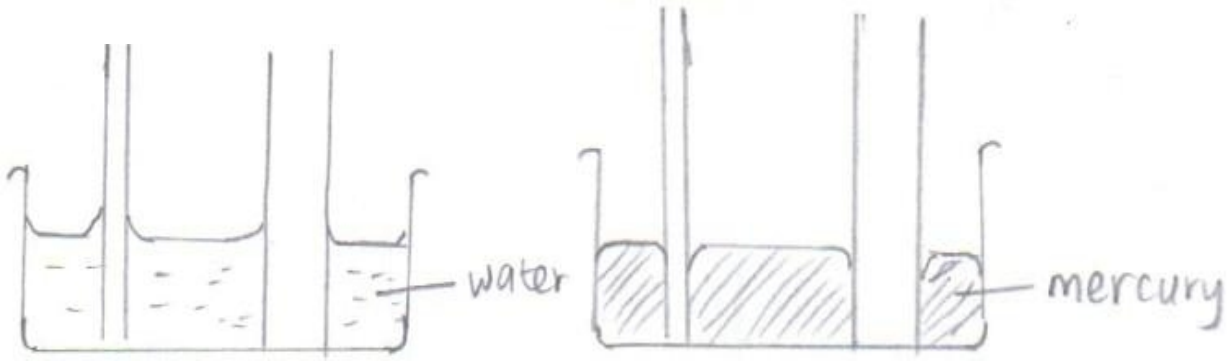


Figure 4(a) Figure 4(b)

9) A pipe of radius 2mm is connected to another pipe of radius 6mm. If water flows in the narrower pipe at a speed of $3ms^{-1}$, determine the speed of water in the wider pipe. (3mks).

10) A spring extends by 4cm when a load of 10N is suspended from it. Six similar springs are used in the system shown in figure 5. Determine the total extension. (3mks)

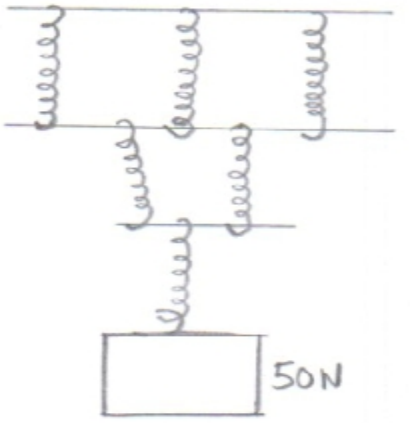


Figure 5

11) Explain how heat loss by radiation is minimized in a vacuum flask. (1mk)

12) Figure 6 shows a bimetallic strip at room temperature.

Figure 6

Draw the shape of the strip when dipped in ice at -20^0 C (1mk)

SECTION B (55 MARKS)

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

b) The specific latent heat of fusion for ice is 334J/g. Explain what this means. (1mk)

……
……
……

c) The specific heat capacity of pure water is 4200J/kg/K while that of sea water is 3900J/kg/K. Which of the two liquids is the most appropriate to be used in cooling systems .Give a reason. (2mks)

……
……
……
……
……

d) A refrigerator can convert 400g of water at 20^0C to ice at -10^0C in 3 hours. Find the rate of heat extraction from the water in joules per second. (4mks)

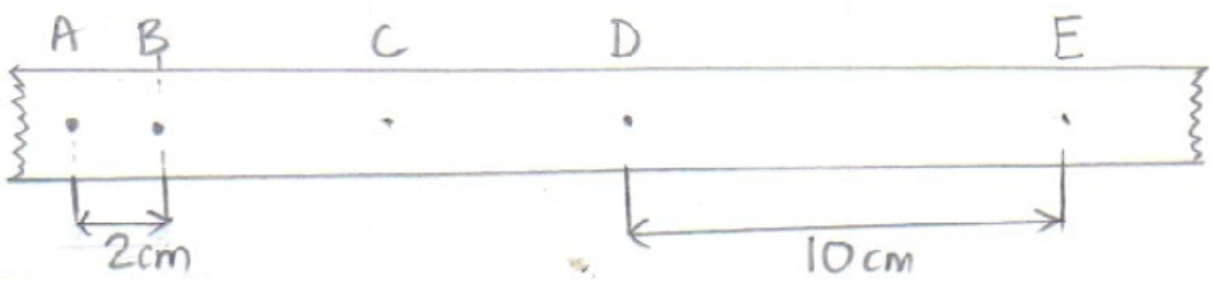
(Take: specific heat capacity of water =4200J/kg/K, specific latent heat of fusion of ice=334000J/kg, specific heat capacity of ice=2100J/kg/K)

e) A bath contains 100kg of water at 60^0C. Hot and cold taps are then turned on to deliver 20 kg per minute each at temperature 70^0C and 10^0C respectively. How long will it be before the temperature in the bath drops to 45^0C? (3mks)

f) State two differences between boiling and evaporation (2mks)

14) a) What basic physical quantity can be measured using a simple pendulum ? (1mk)

b) The figure below shows a tape made from a ticker tape timer. The frequency of the ticker timer was 100Hz.



Determine:

i) The time taken for one tick interval (1mk)

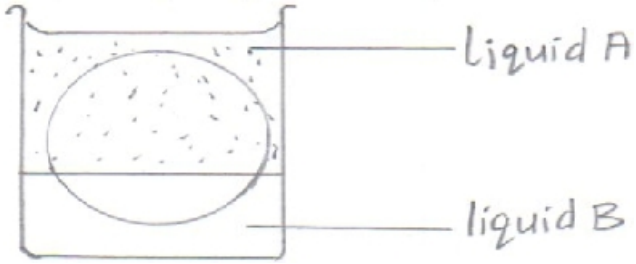
ii) Velocities between points AB and DE (4mks)

iii) Acceleration of the body (3mks)

c) A girl dropped a stone from the top of a tower 45m tall and a boy projected another stone vertically upwards at $25ms^{-1}$ at the same time. Determine the time taken for the two stones to meet. (3mks)

15) a) State the law of floatation. (1mk)

b) The figure represents a sphere $0.012m^3$ volume and mass 5kg floating between two liquids A and B such that $^2/_3$ of its volume is in liquid A. Density of liquid B is $800kgm^{-3}$



Determine:

i) Weight of liquid B displaced. (2mks)

ii) Weight of liquid A displaced. (1mk)

iii) Density of liquid A in (2mks)

c) The sphere is now anchored at the base of the container such that $^1/_4$ of its volume is in liquid A. Find the tension in the string. (3mks)

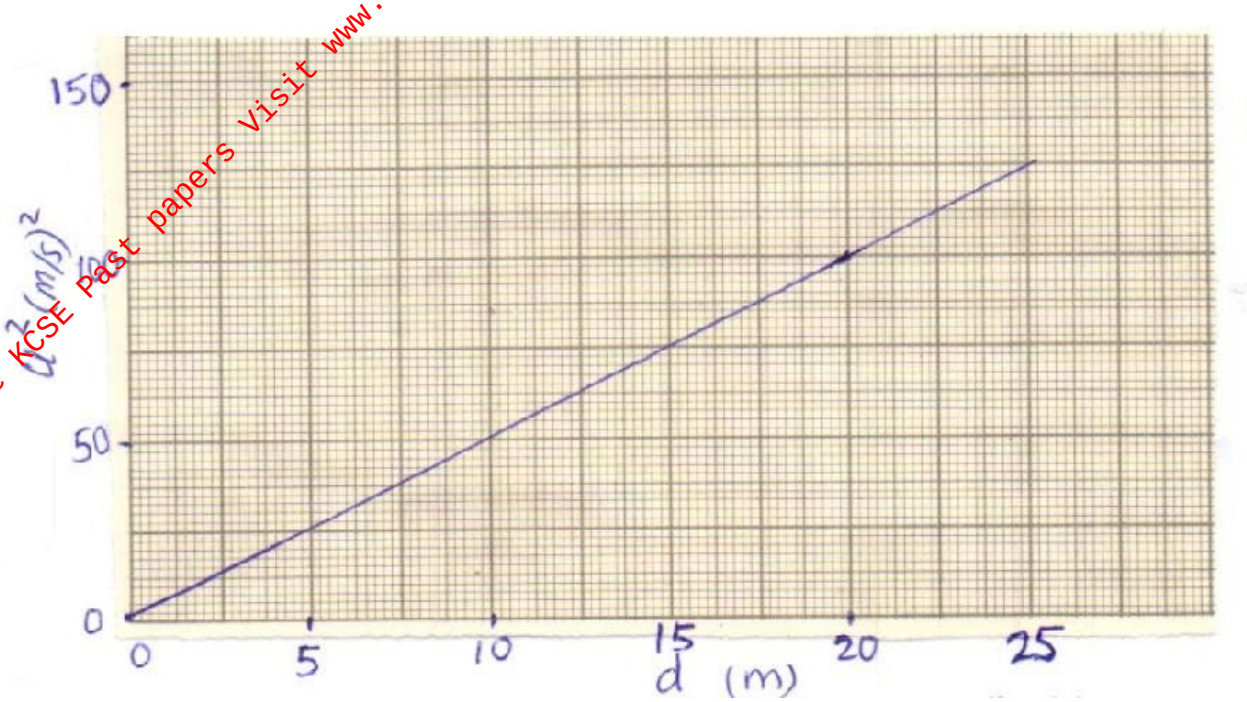
d) Explain why a hydrometer has the following:

i) Lead shots in the bulb. (1mk)

ii) Narrow stem (1mk)

16) a) State any **one** law of the Newton's laws of motion. (1mk)

b) A wooden block resting on a horizontal bench is given an initial velocity, u, so that it slides on the bench surface for a distance, d, before coming to stop. The values of d were measured and recorded for various values of initial velocity. Figure 8 shows the graph of u^2 against d.



i) Calculate the slope, s, of the graph. (3mks)

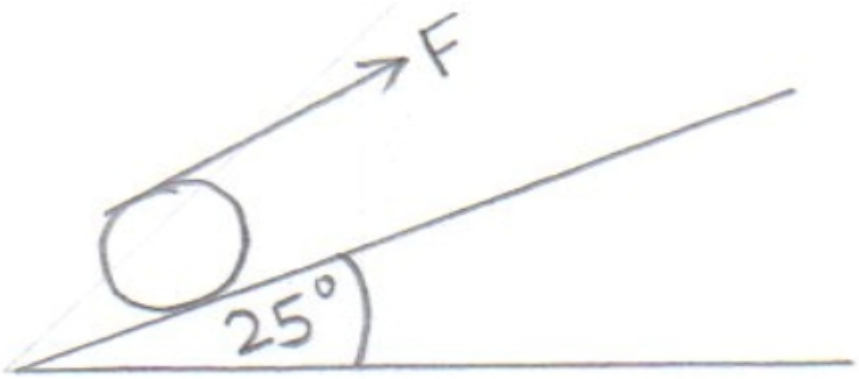
ii) Given that $u^2=20kd$, where k is a constant for the bench surface, determine the value of k from the graph. (2mks)

iii) State how the value of k would be affected by a change in the roughness of the bench surface.

(1mk)

c) A car of mass 800kg starts from rest and accelerates at $1.2ms^{-2}$. Determine its momentum after it has moved 400m from the starting point. (4mks)

17) The figure below shows a drum of mass 90 kg being rolled up a plane at 25^0 to the horizontal. The force F applied is 420N and the distance moved by the drum along the plane is 5.2m.



Determine:

i) Work input of the inclined plane. (3mks)

ii) Work output of the inclined plane. (3mks)

iii) Efficiency of the inclined plane (2mks)