Name .....Class.....Adm No.. .....

Index No..... Date.....

232/1

PHYSICS
Paper 1
MAY 2015
2 Hours

ALLIANCE HIGH SCHOOL
PRE- TRIAL EXAMINATION
PHYSICS PAPER 1
2 hours

Instructions:
Write your name and index numbers in the spaces provided above
This paper consists of TWO sections: A and B.
Answer ALL the questions in section A and B in the spaces provided
ALL working MUST BE clearly shown.

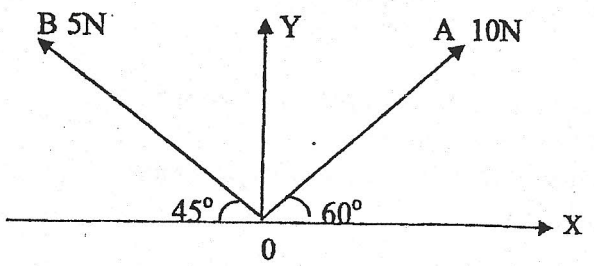
FOR EXAMINER'S USE ONLY

Section A	Question 1 -14	Maximum Score 25	Candidate's Score
B	15	12	
	16	11	
	17	15	
	18	9	
	19	8	
Total Score		**80**	

SECTION A (25 mks)

1. A metal block of steel measuring 20cm by 12cm by 10cm has a mass of 9.5kg. Determine the relative density of steel. (3mks)

2. Two coplanar forces A and B act at a point 0 as shown in figure 1 below. Calculate the component of the resultant force along OX. (3mks)



3. Define the absolute zero temperature. (1mk)

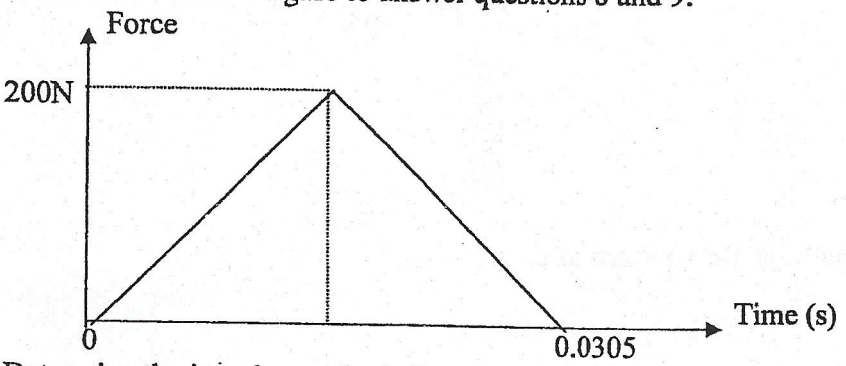
4. Wafula noted that a metal bench felt colder to touch than a wooden bench in the same room in morning. Explain this observation. (1mk)

5. State two conditions required for an object to be in equilibrium under the action of a system of force. (2mks)

6. When is a body said to be moving with uniform acceleration? (1mk)

7. Explain how the sensitivity and accuracy of a liquid in glass thermometer may be improved. (2mks)

The graph in figure 2 below shows a force acting on a tennis ball of mass 120g during a return shot. Use the figure to answer questions 8 and 9.



8. Determine the impulse on the ball. (2mks)

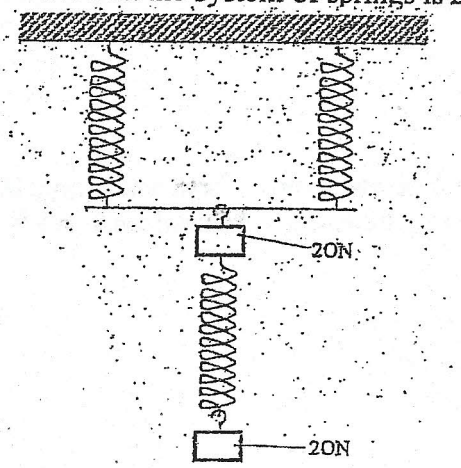
9. If the ball reaches the player with velocity of 22m/s moving to the left, find the velocity of the return shot to the right. (3mks)

10. Distinguish between conduction and radiation both modes of heat transfer. (1mk)

11. Water flows steadily through a horizontal pipe with a varying cross-sectional area. When the velocity at a point is 15m/s, the pressure is 300N/m^2. Determine the pressure at a point where the velocity is 1.2m/s. (2mks)

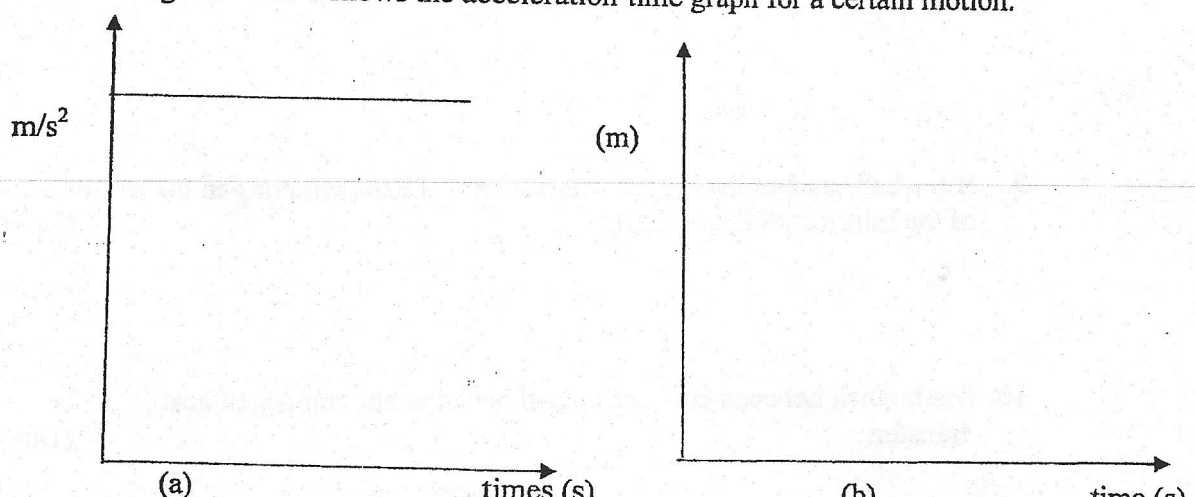
12. Tangus observed birds flapping their wings on a wet day. Explain. (1mk)

13. The three springs shown in figure 3 are identical and have negligible weight. The extension produced on the system of springs is 20cm.



Determine the constant of each spring. (2mks)

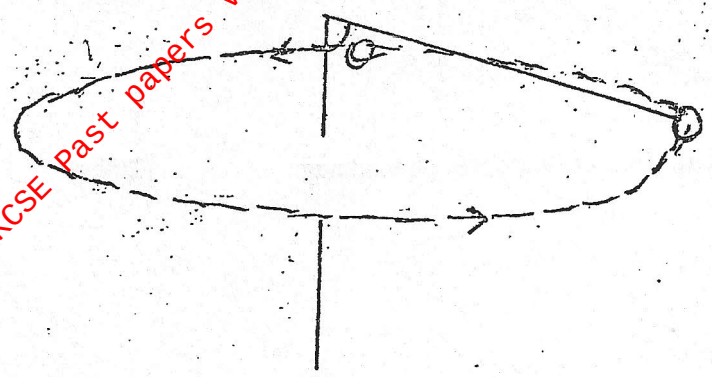
14. Figure 4 below shows the acceleration-time graph for a certain motion.



On the axis provided in Figure 4(b) sketch the displacement-time graph for the same motion. (1mk)

SECTION B (55MKS)

15. A boy ties a string to a rubber bung and then whirls it so that it moves in a horizontal circle at constant speed.



(a)(i) On the same diagram draw and label arrows representing the forces acting on the bung. Assume air resistance is negligible. (2 mks)

(ii) Explain why the string is not horizontal. (1mk)

(iii) Give the direction of the resultant force on the bung and state its effect on the motion of the bung. (2mks)

(b) The mass of the bung is 0.060kg, the length of the string from the boys hand to the bung is 0.4m and θ is 75^0.

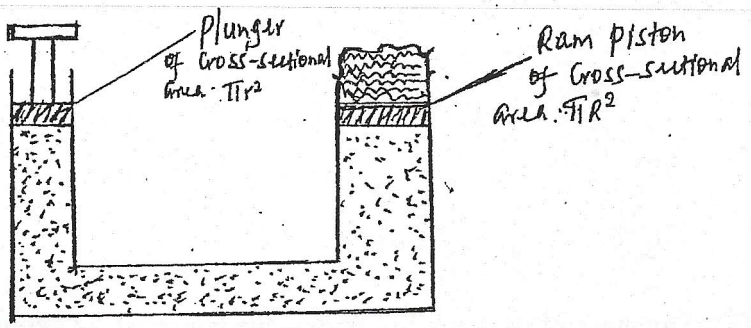
(i) Determine the tension in the string. (3mks)

(ii) Calculate the resultant force on the bung. (2mks)

(iii) Find the speed of the bung. (2mks)

16. (a) Define the term velocity ratio of a machine. (1mk.)

(b) Figure 6 shows part of a hydraulic press. The plunger is the position where effort is applied while the Ram piston is the position where load is applied. The plunger has cross-section area a, m^2 while the Ram piston has cross-section area A m^2.



Show that velocity ratio (V.R) of the press is given by $V.R = \frac{R^2}{r^2}$ (4 mks)

c) A machine of velocity ratio 45, overcomes a load of 4.5×10^3 N when an effort of 135N is applied.

Determine:

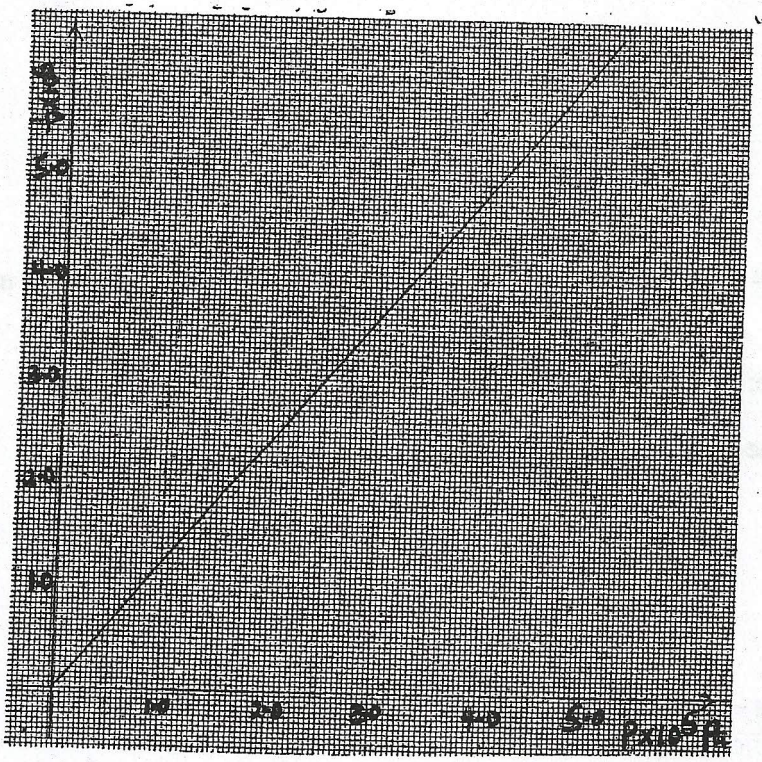
i) The mechanical advantage of the machine. (2 mks)

ii) The efficiency of the machine (2 mks)

iii) The percentage of work that goes to waste. (1 mk)

17. a) State what is meant by an ideal gas. (1 mk)

b) The pressure acting on a gas in a container was changed steadily while the temperature of the gas was maintained constant. The value of volume V of the gas was measured for various values of pressure. The graph in figure 7 shows the relation between the reciprocal of volume W and pressure P.



i) Suggest how the temperature of the gas could be kept constant. (1 mk)

ii) Given that the ration between the volume V and pressure P and the volume V of the gas is given by $PV = \frac{1}{K}$ (4 mks)

iii) What physical quantity does K represent. (1 mk)

iv) State one precaution you would take when performing such an experiment. (1 mk)

c. i) Define specific latent heat of vaporization. (1 mk)

ii) State two factors that will lower the freezing point of ice. (2mks)

iii) A hot water tank for a house contains 140kg of water at 15°C. The tank itself has a heat capacity of 6000JKg^{-1}. Find how long it will take an immersion heater to raise the temperature of the water to 50°C if the tank is well insulated and the power of the heater is 2200W. (4 mks)

. a) Distinguish between elastic and inelastic collision. (1 mk)

(b) A bullet of mass 10g traveling horizontally at a speed of 100m/s embeds itself in a block of wood of mass 990g suspended from a light inextensible string so that it can swing freely. Find

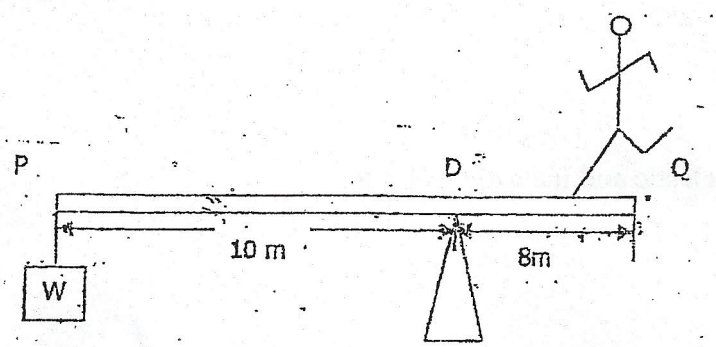
(i) the velocity of the bullet and block immediately after collision. (2mks)

(ii) the height through which the block rises. (3mks)

(c) (i) State stoke's law and express it mathematically. (2mks)

(iii)For a spherical object falling through a viscous fluid, state one factor that affects the force acting on it. (1mk)

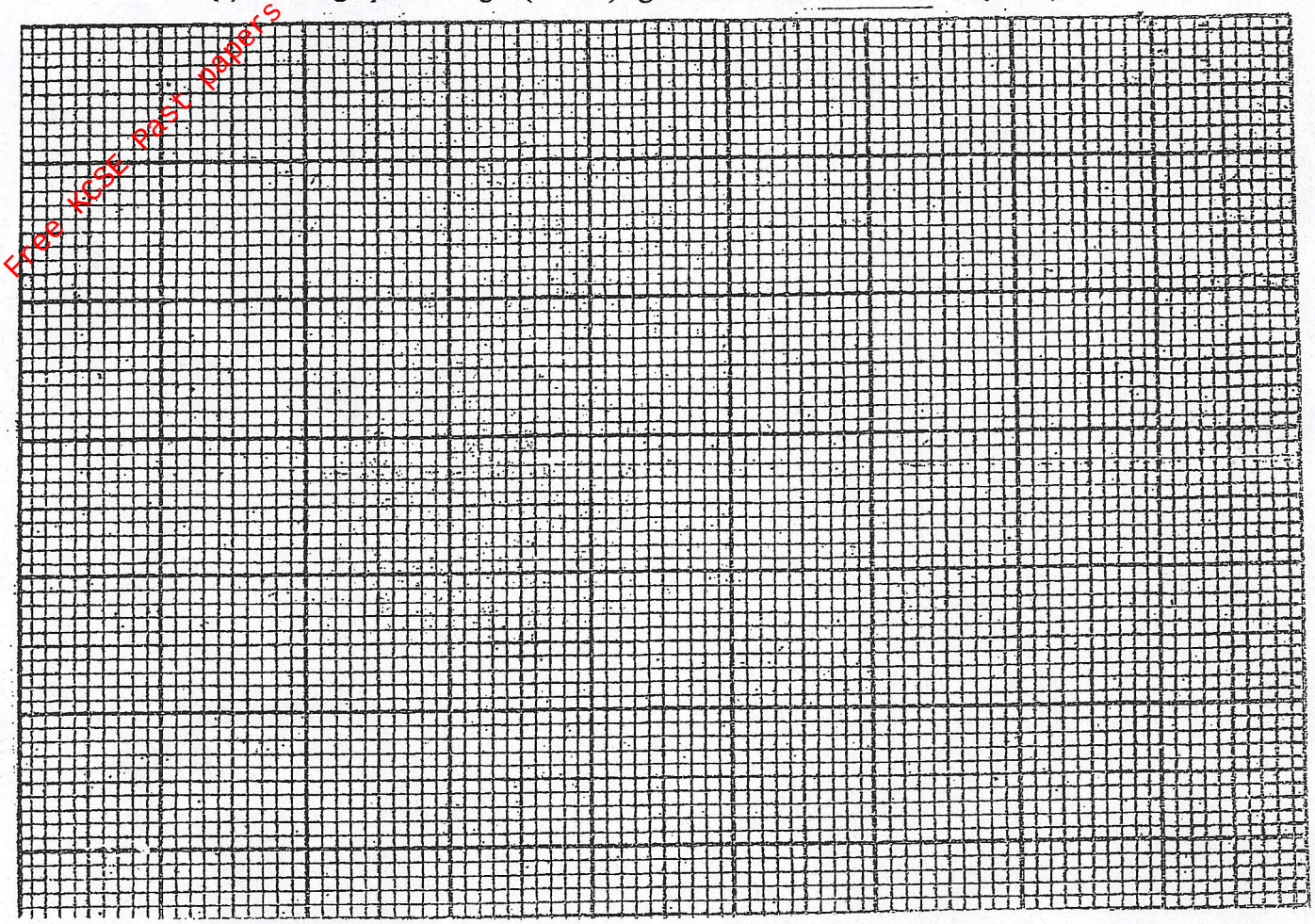
19. A long heavy uniform plank PQ of length 18m is pivoted at a point 8m from Q. A weight W is attached at P to support a man of mass 100kg at Q. The weight is adjusted as the man starts walking equilibrium as shown in figure 8.



The table below was recorded for value of W and distance towards D.

Weight W (N)	380	280	180	80	30
Distance (m)	8.0	6.0	4.0	2.0	1.0

(a) Plot a graph of weight (y-axis) against distance. (4mks)



(b) Use the graph to get the weight of the plank. (3mks)

(c) State a reason why the graph does not pass through the origin.(1mk)