Alliance High School
Kenya Certificate of Secondary Education
2016 Pre - Trial Examination

Physics Paper 1
232/1
Time: 2 hours

Instructions to Candidates

This paper consists of two sections- section 1 and section 2

Attempt all questions in the spaces provided

All working must be clearly shown

Non-programmable, silent calculators and mathematical tables may be used

Answers to numerical calculations **must** be expressed in decimal form.

Where necessary take:-

Density of copper = $8940 kgm^{-3}$

Density of tin = $7280 kgm^{-3}$

Specific heat capacity of ice = $2100 Jkg^{-1}K^{-1}$

Specific latent heat of fusion of ice = $334000 Jkg^{-3}$

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

Specific heat capacity of copper = $400 Jkg^{-1}K^{-1}$

Specific latent heat of vaporization of water = $2260000 Jkg^{-1}$

$g = 10ms^{-2}$ or $10 Nkg^{-1}$

Density of water = $1000 kgm^{-3}$

Density of glycerine = $1200 kgm-3$

Question	Maximum Score	Candidate's Score
1-10	25	
11	12	
12	11	
13	10	
14	11	
15	11	
	80	

This paper consists of 8 typed pages

Section 1 (25 marks)

1. The figure below show a section of a vernier calliper that was used to measure the diameter of a marble. If the micrometer screw gauge had a zero error of +0.005cm, state the actual reading of the diameter of the marble. (2 mks)
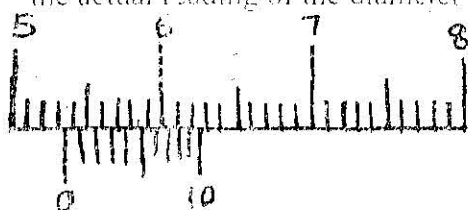
2. State a situation in which a body is accelerating but moving at constant speed. (1 mk)

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3. The figure below show a section of a tape attached to a moving trolley and run through a ticker-timer that is operate on a 50Hz ac supply.

Calculate the average acceleration of the trolley. (3mks)

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4. A non – uniform rod mass 4.5kg balances of when a mass of 300g is suspended at its end and 18cm from the pivot. Determine the position of the centre of gravity. (3 mks)

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Kamau has 10kg of water at a temperature of 16°C and desires to take a bath. Calculate the mass of boiling water that he must mix with the cold water to attain a temperature of 70°C. (3 mks)

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6. Calculate the volume of tin that has the same volume with 500g of glycerine. (3 mks)

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7. Define the term critical speed for a circular track. (1 mk)

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8. Why is it necessary for passengers in bus to wear seat belts at all times when the bus is in motion? (2 mks)

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9. Differentiate between elastic and inelastic collisions. (2 mks)

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10. An alloy is made of 40% by mass copper and 60% by mass tin. Calculate the density of a sample of the alloy of mass 50g. (3 mks)

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11. State the condition that must be fulfilled for a body that is acted on by a number of forces to be in equilibrium. (2 mks)

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Section 2 (55 marks)

12. A piece of ice of mass 500g at a temperature of $-10^{\circ}C$ is place in a container of negligible heat capacity and heated using a 1kW heater until the water vaporizes completely.

    i. The energy required to raise the temperature of ice to $0^{\circ}C$.   (3 mks)

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    ii. The energy required to raise the temperature of the water to $100^{\circ}C$ (3mks)

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    iii. The latent heat of vaporization   (2 mks)

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    iv. The latent heat of fusion of the ice   (2 mks)

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    v. The time taken to completely turn the ice into vapour.   (2 mks)

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    vi. State one assumption made in the working above.   (1 mk)

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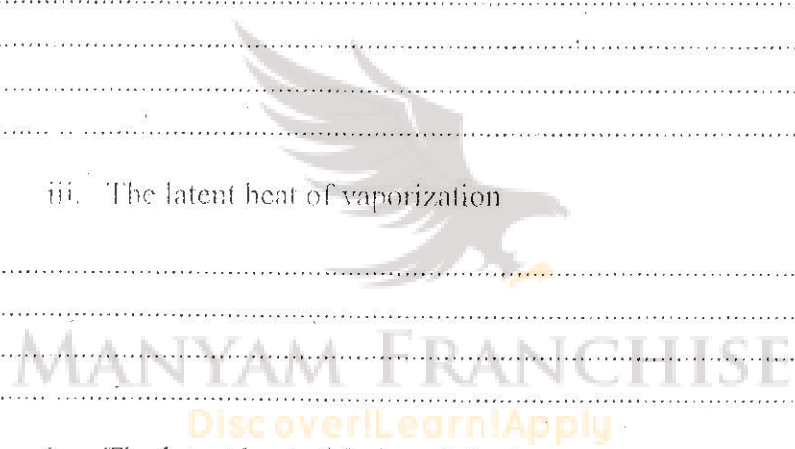
17. The table below shows variation of velocity with time for a body.

Time, t, (s)	0.0	0.5	1.0	2.0	3.0	4.0	5.0
Velocity, v, (ms⁻¹)	0.0	11.0	20.0	34.0	42.0	45.0	46.0

i. Plot a velocity – time graph for the motion (5 mks)
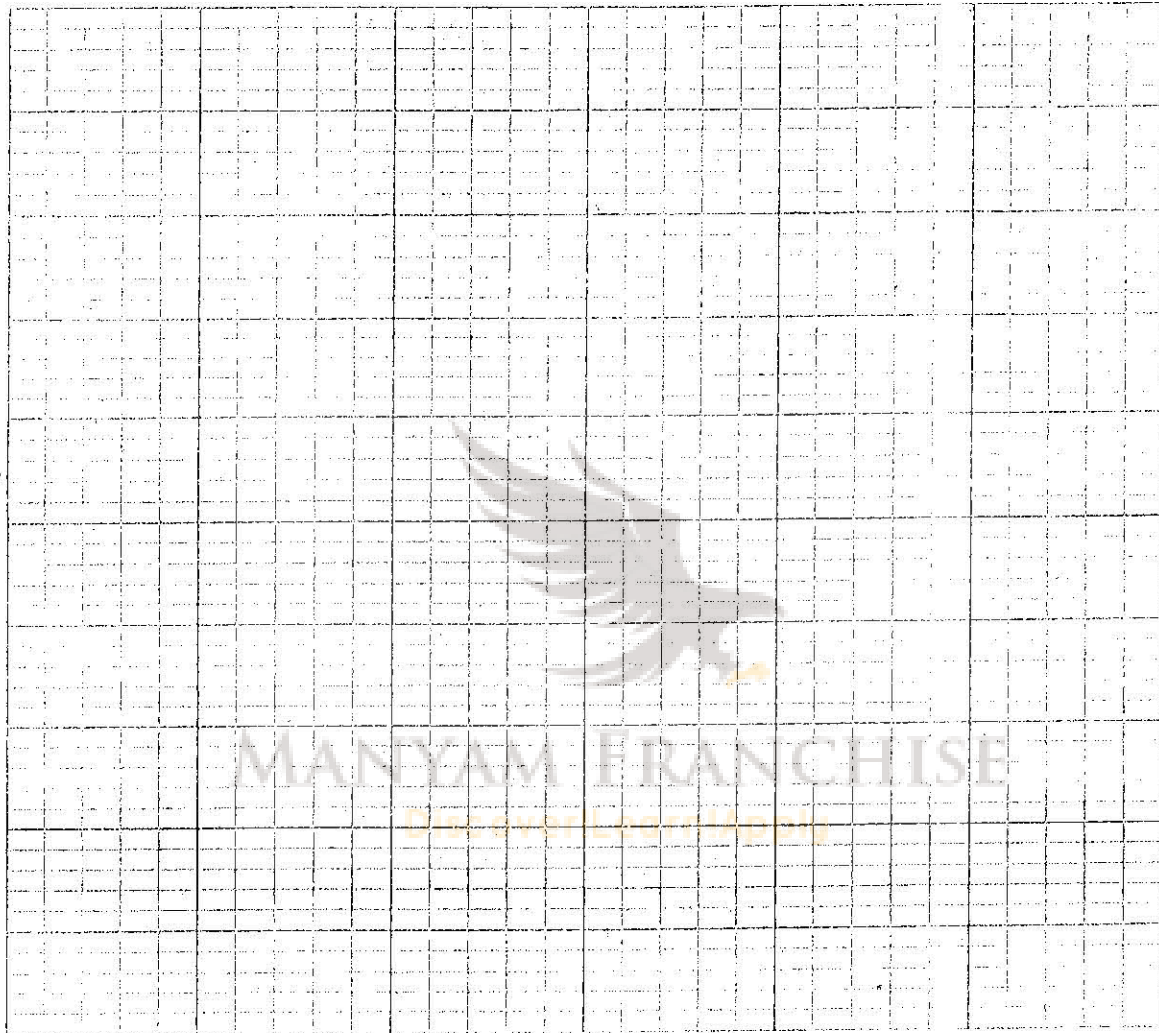
ii. Determine, from the graph, the acceleration at time, t = 4.0s. (3 mks)

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iii. Use your graph to determine the displacement of the body for the first three seconds of the motion. (2 mks)

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14. a. State Newton's first law of motion. (1 mk)

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b. Why is it easier to stop a saloon car than a bus moving at the same velocity? (2 mks)

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c. A bullet of mass 20g moving at $200ms^{-1}$ hits a tree trunk of diameter 2m and emerges on the opposite side at a velocity of $50ms^{-1}$, calculate;-

   i.   The deceleration of bullet as it moves through the trunk. (3 mks)

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   ii.   The retarding force acting on the bullet. (2 mks)

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   iii.   The work done against the motion of the bullet. (2 mks)

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15. a) i. State the law of flotation. (1 mk)

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   ii. Calculate the weight of a metal block that should be placed on a piece of cork of mass 200g so that it is just submerged in water. (3 mks)

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b). A hydraulic jack has a master cylinder piston of area 50mm² and a master cylinder piston of area 200mm². Calculate the maximum load it can raise when a force of 200N is applied on the master cylinder piston. (3 mks)

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c).i. Differentiate between streamline flow and turbulent flow. (2 mks)

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ii. A liquid flows throw a section of a pipe of area 20cm² at 5ms⁻¹. Calculate the speed of the liquid through a section of area 15cm². (3 mks)

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16. a). When is a satellite said to be in orbit parking? (1 mk)
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b). Explain why it is necessary to bank racing tracks at bends. (1 mk)

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). A body of mass 5kg is attached to a string of length 90cm and whirled in a horizontal circle. Calculate the maximum speed at which the body can move given that the maximum tensile force that the string can withstand is 200N. (3 mk

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d). Two cars of equal masses are moving along a level road. One car is fitted with wide tyres and the other with narrow ones. Which of the two cars experiences greater friction and why? (2 mks)

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e). Calculate the critical speed for a light truck of mass 3tons moving round an unbanked bend of radius 70m given that the coefficient of friction between the road and the tyres is 0.1. (3 mks)

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