

FORM FOUR CLUSTER KCSE MODEL8

PHYSICS PAPER 2 QUESTION

SECTION A (25 Marks)

1. The reading on a burette is 7.6 cm^3 . Three drops of water each of volume 0.6 cm^3 drops out. Find the new reading.

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2. How does oil reduce friction in moving parts of a machine?

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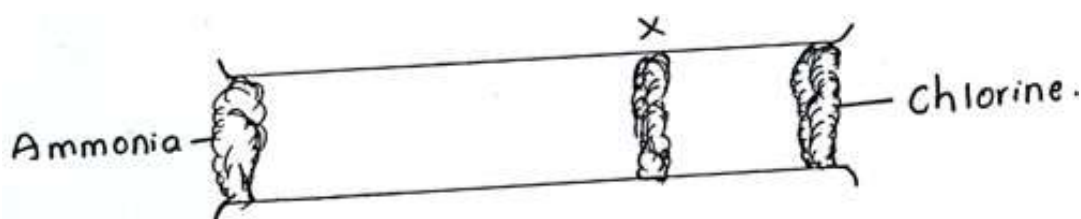
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3. The mass of an object is 50 kg . If its weight is 600 N on a certain planet. Calculate the gravitational field strength of the planet.

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4. Cotton wool is soaked in ammonia solution. Another piece is soaked in chlorine. The two pieces are simultaneously put at the ends of a tube as.



A white cloud forms at point X after three minutes. Explain the factor that leads to the formation of the cloud at X.

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5. Two glasses are stacked into each other as shown in the diagram below.



You are provided with cold water. Explain the theory behind cold water being used to separate the glasses.

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6. Oil is poured onto stagnant water in a mosquito infested area. How does this help in fighting malaria.

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7. A balloon is filled with a gas that expands faster than air at room temperature. The temperature is slowly increased so that it is 150c above the temperature of the room. It is observed that the balloon which was initially on the ground rose and was floating in the air. Explain this rise.

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8. State the pressure law of gases.

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9. An object is slightly tilted and it is noticed that the centre of gravity does not go up or down. State the kind of equilibrium the object is in.

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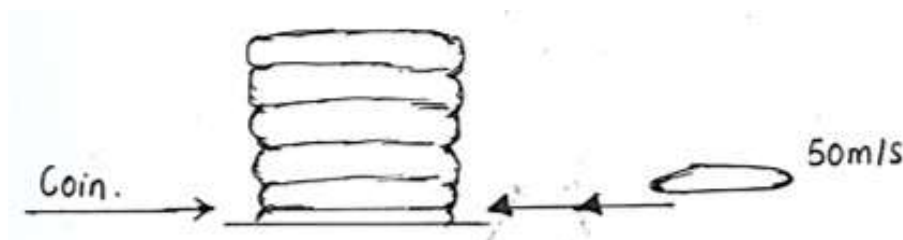
10. State the condition for the working of Hooke's Law.

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11. A tennis ball is thrown vertically up in the house such that it hits the ceiling and bounces back at the same speed. Sketch a velocity –time graph for this movement.

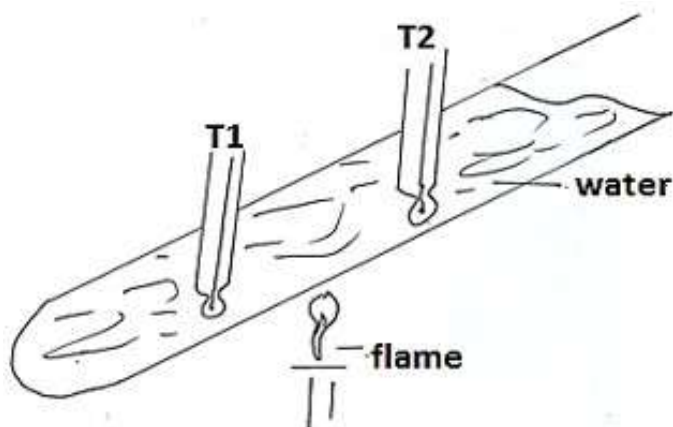
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12. Coins are stacked to form a pile as shown. A coin identical to the coins in the pile moves at 50m/s and horizontally knocks the coin at the base. Explain what happens to the whole pile.



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13. Two thermometers are fixed on a boiling tube as follows.



A flame is placed in between thermometers T_1 and T_2 as shown. Explain the variations in the readings of the two thermometers.

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14. Explain the cause of random motion of smoke particles as observed in Brownian motion experiment using a smoke cell.

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SECTION B: (55 Marks)

Answer question in this section in the spaces provided.

15. a) State what is meant by centripetal acceleration. (1mark)

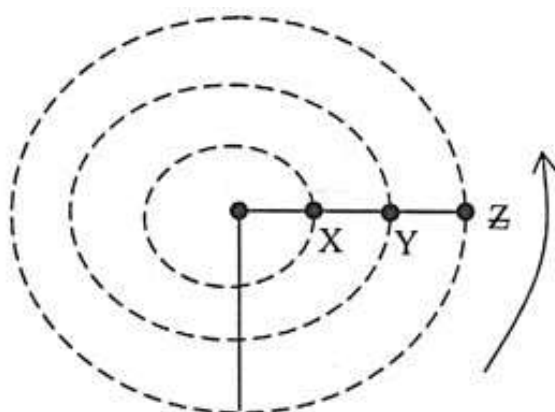
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- b) The figure below shows masses X, Y and Z placed at different points on a turn table. The turn table is rotated at different angular velocities.



i) State two factors that would cause the masses to slide.

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ii) At the time that they start to slide off, state the mass that will have the highest angular velocity, giving a reason for your answer.

c) i) If the centripetal force is 2N and the mass and radius of the path for mass Y are 100g and 0.03m respectively. Calculate the angular velocity of the mass when the system is in equilibrium.

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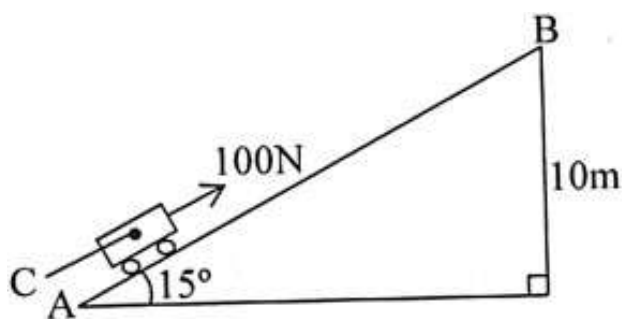
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ii) Indicate on the same diagram the direction of velocity of mass Z at that position.

16. The figure below shows an inclined plane. A trolley of mass 30kg is pulled up a slope by a force of 100N, parallel to the slope. The trolley moves so that the centre of mass C travels from points A to B.



i) What is the work done on the trolley against the gravitational force in moving from A to B? (take acceleration due to gravity, $g = 10 \text{ m/s}^2$)

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ii) Determine the work done by the force in moving the trolley from A to B.
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iii) Determine the efficiency of the system.

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iv) Determine the work done in overcoming the frictional force.

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v) Determine the mechanical advantage of the system.

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17. a) State Archimedes' principle.

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b) A solid Y weighs 40N in air, 30N when in water and 35N in liquid X. Find the density of;

i) Solid Y

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ii) Liquid X

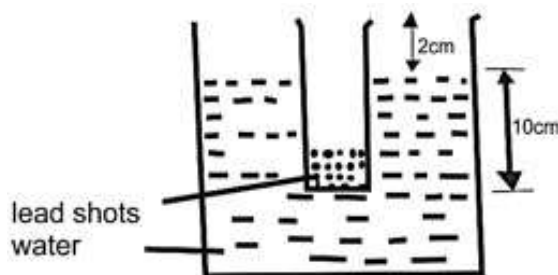
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c) A simple hydrometer is set up with a test – tube of mass 10g and length 12cm with a flat base and partly filled with lead shots. The test tube has a uniform cross-sectional area 2.0cm^2 and 10cm of its length is under water as shown in the figure below.



i) Taking the density of water as 1000kg/m^3 . Calculate the mass of the lead shots in the test tube.

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ii) The mass of the lead shots to be added if it has to displace an equal volume of a liquid of density 1.25g/cm^3

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18. For a body moving with a constant acceleration, a , show that:

i) $v = u + at$ where v and u are the final and initial velocities respectively while t is the time taken.

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ii) $S = ut + \frac{1}{2}at^2$ where S is the distance covered.

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iii) A car of mass 1200kg moving at 90km/h is brought to rest over a distance of 20m. Calculate the braking force.

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b) An object is projected vertically upwards with a velocity of 200m/s. Calculate:
i) Its velocity after 5 seconds

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ii) The distance covered in the first 8 seconds.

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19. a) What is meant by specific latent heat of vaporization of a substance?

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b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100°C was passed into water contained in a well-lagged copper calorimeter. The following measurements

were made:

- Mass of calorimeter = 55g
- Initial mass of water = 75g
- Final mass of calorimeter + water + condensed steam = 133g
- Final temperature of mixture = 300C [Specific heat capacity of water = 4200JKg⁻¹K⁻¹ and specific heat capacity of copper = 390JKg⁻¹K⁻¹] Determine the

i) Mass of condensed steam.

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ii) Heat gained by the calorimeter and water if the initial temperature of the calorimeter + water = 200C.

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iii) Given that L is the specific latent heat of vaporization of steam, I) Write an expression for the heat given out by steam

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II) Determine the value of L. (2marks)

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c) i) In verifying the Charle's law of gases, the volume and the temperature of a gas are varied at constant pressure, State the condition necessary for the law to hold.

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ii) With an aid of a labelled diagram, describe an experiment to verify Charles' law.

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