

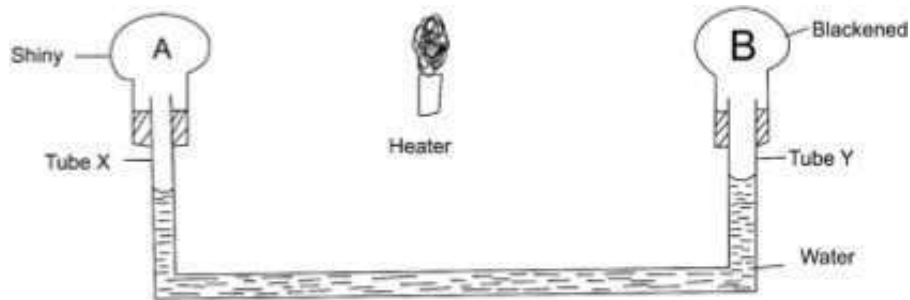
FORM FOUR CLUSTER KCSE MODEL6

PHYSICS PAPER 1 QUESTIONS

SECTION A (25 Marks)

Answer all questions

1. The figure below shows an electric heater placed midway between two flasks A and B. Flask A is shiny on the outside and flask B is blackened on the outside.



State and explain the observation made when the heater is turned on.

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2. Water flows at a velocity of 48cm s^{-1} through a drainage pipe of uniform cross-sectional area at a point where the diameter of the pipe is 4.2cm . Calculate the diameter of the pipe at a section where the velocity becomes 32cm s^{-1} .

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3. What is Brownian motion?

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4. The barometric height at sea level is 76cmHg while at a point on a highland it is 71cmHg . Determine the altitude of the highland. (take density of mercury = 13600kg m^{-3} ; density of air = 1.25kg m^{-3})

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5. Distinguish between solid state and liquid state in terms of intermolecular distance and intermolecular forces.

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6. When a vessel of mass 50g is filled with water, the total mass is 125g . When the vessel is filled with liquid L, the total mass is 110g . Calculate the total mass of the vessel when filled with equal volumes of water and liquid L. (take density of water = 1g cm^{-3})

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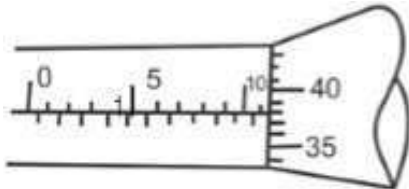
7. State the function of the constriction in a clinical thermometer.

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An unloaded spring has a length of 15cm and when supporting a load of 24N its length is 12cm. What load is on the spring when its length is 10cm?

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8. The figure below shows the scale of a micrometer screw gauge



Determine the reading shown.

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9. The water level in a burette is 35.5ml. 50 drops of water each of volume 0.2cm³ are removed from the burette.

Determine the final reading of the burette.

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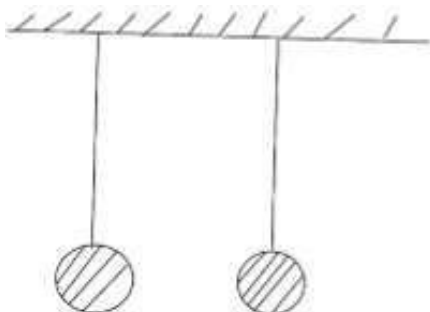
10. State ONE factor that would affect the surface tension of pure water.

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11. The level of a liquid in a glass thermometer slightly rises before falling when placed in ice-cold water. Explain.

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12. The figure below shows two light balls suspended from threads a short distance apart.



A stream of air is blown between the balls in the horizontal direction. State and explain the observation

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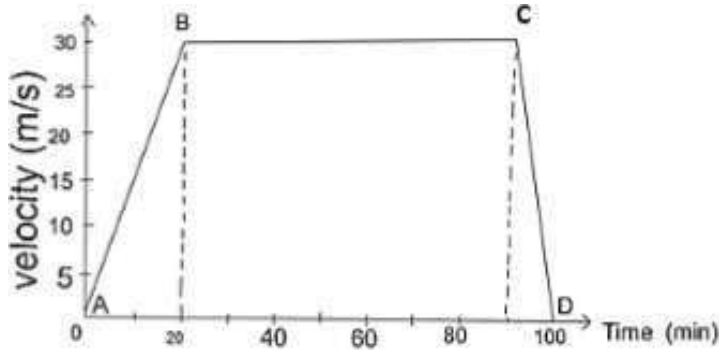
SECTION B (55 Marks)

Answer all questions

a) Define the term velocity.

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b) The following shows the velocity –time graph for the journey of a car in 100 minutes.



i) Determine the acceleration on the car between A and B and between C and D. (2marks)

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ii) Determine the distance covered by the car during the journey. (2marks)

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iii) Determine the average velocity of the car. (2marks)

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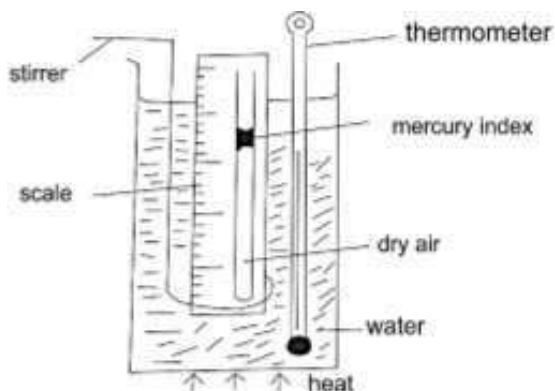
c) A ball rolls off a platform of height 1.8m at a horizontal speed of 15ms⁻¹. How far off the edge of the platform does it land? (4marks)

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13. a) Using the kinetic theory of gases, explain how a rise in temperature of a gas causes a rise in pressure of the gas if volume is kept constant.

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b) The figure below shows a set up that may be used to verify Charles's law.



i. State the measurements that should be taken in the experiment. (2marks)

ii. Explain the measurements taken in (i) above may be used to verify Charles's law. (4marks)

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iii. What is the purpose of the water bath? (1mark)

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c) A certain mass of hydrogen gas occupies a volume of 1.6m^3 at a pressure of $1.5 \times 10^5 \text{ pa}$ and a temperature 120°C . Determine its volume when the temperature is 0°C at a pressure of $1.0 \times 10^5 \text{ pa}$. (3marks)

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14. . a) State Archimedes' principle. (1mark)

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b) A cylinder of length 5cm and uniform cross-sectional area 30.4cm^2 is suspended from a spring balance and totally immersed in water. If the density of the material of the cylinder is 2.25g/cm^3 , determine; (Take $g = 10\text{N/kg}$, density of water = 1000kg/m^3)

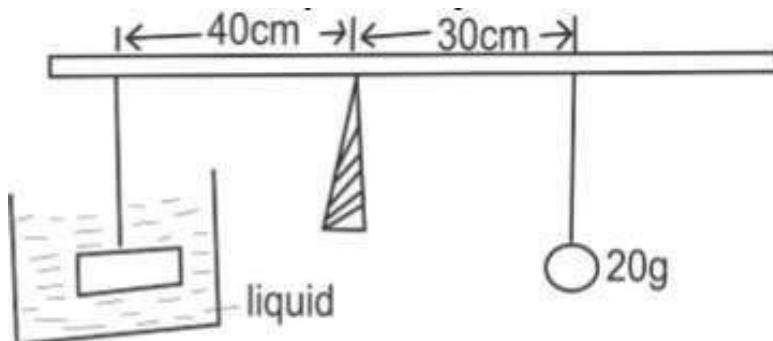
i) The up thrust on the cylinder. (4marks)

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ii) The reading on the spring balance. (3marks)

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c) The figure below shows a block of mass 25g and density 2g/cm^3 submerged in a certain liquid and suspended from a uniform horizontal beam by means of a thread. A mass of 20g is suspended from the beam as shown such that the system is in equilibrium.



i) Determine the up thrust force acting on the block in the liquid. (3marks)

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ii) Calculate the density of the liquid. (3marks)

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15. a) In circular motion, there is acceleration, yet the speed is constant. Explain. (1mark)

b) A solid having a mass of 2.5kg is moving in uniform circular path in a vertical plane having a radius of 2m. It is whirled with a frequency of 3 cycles per second.

Calculate:

i) The tension in the supporting string when the solid is at the topmost part of the cycle. (3marks)

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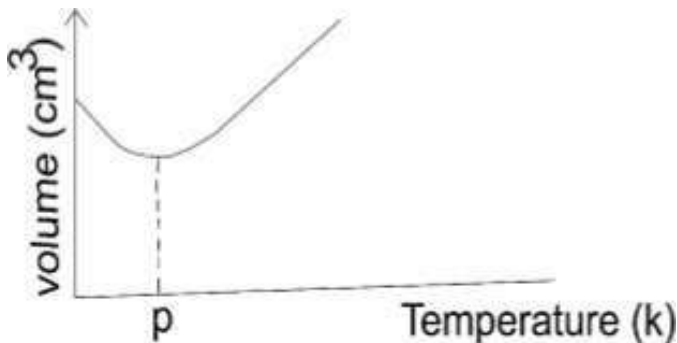
ii) The tension when the solid is at the bottom of the cycle. (2marks)

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c) A cord 4.5m long has a breaking strength of 800N. One end of the cord is fixed and a 4kg mass attached to the free end moves in a horizontal circular path on a frictionless level surface. What is the maximum speed if the cord is not to break? (3marks)

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16. a) The figure below shows variation of volume of water and temperature as water is heated from 00C to 400C.



i) State the value of P. (1mark)

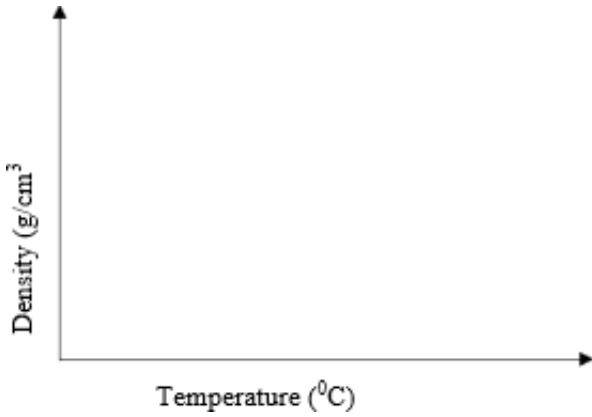
ii) On the axes provided below, sketch the graph of density of water against temperature from 00 C to 100C. (1mark)

b) A heater rated 300W was used to heat water from 00C to 400C. If the heating took 5minutes, Determine:

i) The heat supplied by the heater. (3marks)

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ii) The mass of the water. (Take specific heat capacity of water = 4200Jkg⁻¹k⁻¹. (3marks)



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b) A heater rated 300W was used to heat water from 00C to 400C. If the heating took 5minutes,

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ii) The mass of the water. (Take specific heat capacity of water = 4200Jkg⁻¹k⁻¹. (3marks)

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