COLLINS@L.M.V.C 2024

S.4 Physics SET TWO

Instructions:

** Attempt any 5 questions in the paper*

**Start each question on a fresh page.*

**Tidy work is desired*

Duration: *2hours*

NAME…….....STREAM……..

QUESTION ONE (12Scores)

(a) Its known that a stone can move more f**reely** in air than in liquid. Using your knowledge of states of matter, explain why that happens.

(b) Faisal constructed the latrine for his tenants but People from the neighborhood are complaining about the bad smell from the latrine.

Support

Why do you think people who are not inside or near the latrine are getting the smell?

(c). People also reported that on cold days the situation is worse than on hot days. They are wondering why this is so. Give a reason why this is like that.

(d).Which advice do you give to Mr. Faisal?

(e). Give two applications of the above mechanism that makes the smell of the latrine to be in the neighborhood in rest life?

QUESTION TWO(12 Scores)

(a). Pieces of pure ice at -4ºC were placed in a container and heated to a temperature of 98ºC.

(b). Sketch a graph of change volume of ice/water against Temperature.

(ii). Explain the shape of your graph

(iii). What does the shape of the graph between to show and how is it important?

(c). What do you understand by a thermometric liquid and why is mercury preferred to other thermometric liquids.

(d). Before the thermometer is calibrated to measure temperature accurately, it is first used when it's uncalibrated. Winnie was using uncalibrated thermometer to measure the temperature of his brother and the following are the results she got.

Body in which the thermometer is placed	Length of the mercury in the glass (mm)
In steam	138
In pure melting ice	38
In arm pits of his brother	75

What is the temperature of her Brother in Kelvin?

QUESTION THREE(12Scores)

(a) On a certain sunny day, an uber driver saw a pool of water ahead on a tarmac road as he was driving. To his surprise, the pool disappeared as he approached it. Explain the uber diver's surprise.

(b). On reaching Africana hotel, the passenger wanted to use the hotel's swimming pool which appeared to be about 1.5 m deep when its actual depth was 2.0 m.

(i). Explain why the swimming pool appeared shallower than it actually is.

(ii). Explain what would happen to the depth of the pool if water was replaced with paraffin.

(c). A lady entered a shop selling Ugandan flag wrap, during the day when no light was on and observed them as shown in photo.

Though they agreed on price, when she came back in evening to complete order she observed a change in cloth colours and refused to pay. In the evening the shop had turned on the Blue lights. What colours did she observe and try to advise the lady to accept that the wrap was not interchanged with something else.

QUESTION FOUR(12Scores)

(a). A girl travelling with her parents on a boat carried a ball and a phone to take selfies along the journey. On their way, water waves disturbed the boat and all she had in her hands dropped in water. The girl lost her phone but realized that the ball was still on top of water. This scene left the girl and her parents wondering the magic with the ball. As they continued, they looked in the air and saw two men seated in a bucket connected to a balloon with burning flame carrying them in space. The boy was confused and wondered how the two men would land safely on the ground though his parents couldn't explain anything to him.

Take;

Density of water= 1000 kg/m^3

Acceleration due to gravity= 10 m/s^2

Mass of the bullet= 200 kg

Mass of the phone= 500 g

Mass of the ball= 10 g

Volume of the phone= 50 cm^3

Volume of the ball = 20 cm^3

Volume of the boat= 3000 cm^3

Task

As a physics learner, help the boy understand what happened while on the boat and also explain to him why the two heavy men were being carried by just a balloon with burning air.

QUESTION FIVE(12Scores)

Two people stood in the middle of two cliffs at an un known distance between them. The woman calls the boy and she hears herself 5 seconds later and the boy hears the second sound after 4 seconds. The two discovered that their sound was clearer at night than during the day. These scenarios left them confused disturbed without understanding the magic in the hall.

(a). What is the scientific name given to this second sound.

(b). Help the two people understand why the sound was clearer at night.

(c). Determine the distance between the two people given the speed of sound is 320m/s in air.

(d). State atleast three applications of this phenomenon.

QUESTION SIX(12Scores)

In a certain town, it is a must for drivers to be tested with their vehicles for road-worthiness. On a certain day, a car started from rest and accelerated to 40 m/s in 10 seconds. The driver maintained that velocity for 20 seconds and suddenly decelerated to rest in 6 seconds causing him to crush into windscreen. As a result, the car tyres wore out on the tarmac causing a lot of heat on the ground.

Task

You have been tasked to write a report to explain the scene. In your report include motion graph. Find the rate at which the car's velocity reduces and explain why driver crushed into the wind screen. Advise by stating whether the drivers average speed exceeded the speed limit of 8 m/s and how he would prevent the crushing.

_____Always do your best though success is not guaranteed _____

Physics Department

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