TERM 2 - 2023

PHYSICS (232)

FORM ONE (1)

MARKING SCHEME

1.The diagram in figure 1 below shows part of a meter rule scale. Write down the reading shown at different points indicated. (3mks)

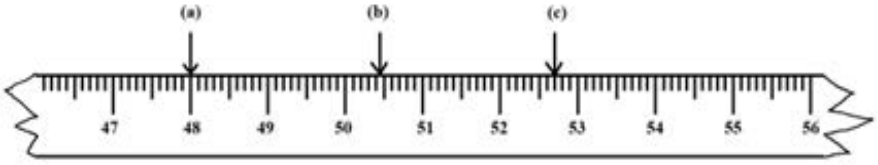

Figure 1

A. 48.0Cm✓

B .50.40Cm✓

C. 52.7cm✓

2. Explain the relationship between physics and Geography. (1mk)

Accurate use of weather instruments like thermometer, wind vane, rain gauges etc. require physics knowledge. ✓

Concepts like heat transfer by convection which explain the formation of convectional rainfall and pressure variation can be best explained in physics✓

3. Explain how you would estimate the circumference of a curved object using a thread and a ruler. (3mks)

Closely wrap the thread ten times around the cylinder. Mark with ink the beginning and end. ✓Remove the thread and measure the length between the ink marks and call it *R*1. Repeat two times, recording readings as *R*2 and *R*3 so as to ensure accuracy of your measurements.✓ Find the average length and divide by 10 to find the circumference of the cylinder.✓

(Accept any other explanation with different number of times and procedure repeated more than one time)

4.The mass of a density bottle of $50cm^3$is 10.0g when empty. Aluminium turning are poured into the bottle and the total mass is 60.0g. Water is then added into the turnings till the bottle is full. If the total mass of the bottle and its contents is 90g, calculate the density of Aluminium. (4mks)

$Mass\ of\ alluminium = 60 - 10 = 50g$✓

$Mass\ of\ water = 90 - 60 = 30g$✓

$Volume\ of\ water = 30cm^3$

$Volume\ of\ Aluminium = 50 - 30 = 20cm^3$✓

$density\ of\ aluminium = \frac{m}{v} = \frac{50}{20} = 2.5\frac{g}{cm^3}$✓

5. State three characteristics of a solid whose volume is to be determined by displacement method. (3mks)

not be soluble in the liquid being used, ✓ not react with the liquid, ✓ sink in the liquid and, ✓ not absorb the liquid✓

6. Name the three different types of forces that act on a block of wood when placed on a table (3mks)

Weight (force of gravity),✓ Reaction force,✓ Frictional force.✓

7. State and explain the factors that affect surface tension. (2mks)

Impurities reduce surface tension of a liquid. Soap (detergent) weakens the cohesive forces between surface liquid molecules and therefore reducing surface tension. ✓

Temperature reduces surface tension of the liquid because it weakens cohesive force of attraction between liquid molecules✓

8. Other than the size of the object to be measured, mention another factor to be considered when choosing an instrument for measuring length. (1mk)

Level of accuracy required✓

Nature of the Length✓

9.A burette shows a liquid level as $20cm^3$. Ten drops of the same liquid each of volume $0.5cm^3$are added. Calculate the new liquid level. (3 mks)

$$Volume\ of\ drops\ added = 10drops\ \times 0.5 = 5cm^3$$

$$Final\ volume = Initial\ volume - volume\ added = 20 - 5 = 15cm^3$$

12. Explain why water forms a concave meniscus when placed in capillary tubes. (1mk)

Water curves upwards at the edge (forms a concave meniscus) because the rise of water up the tube is due to adhesive forces between glass and water molecules being stronger than cohesive force of attraction between water molecules✓

13. A mass of 7.5kg has a weight of 30N on a certain planet. Calculate the acceleration due to gravity on this planet. (3mks)

$w = mg; g = \frac{w}{m}$✓

$$\frac{30N}{7.5Kg} = 4\frac{N}{kg}$$

14. Name two forces that determine the shape of liquid drop on the solid surface (2mks)

-Cohesive and adhesive force✓

-Surface tension✓

15. State the reason why smoke preferred for use in the smoke cell experiment. (1mks)

They are light and bright/visible✓

16. Explain why glass container with thick walls is more likely to crack than the one with a thin wall when a very hot liquid is poured into them. (2mks)

In glass with thick walls the inner walls expand faster than the external walls causing the cracking. ✓While in thin walls the expansion is uniform.✓

17. Figure 2 below shows two corks X and Y fixed on a polished plate and a dark plate with candle wax respectively. The corks are equidistant from the heater. State with reason which cork falls off first when the heater is switched on. (2mks)

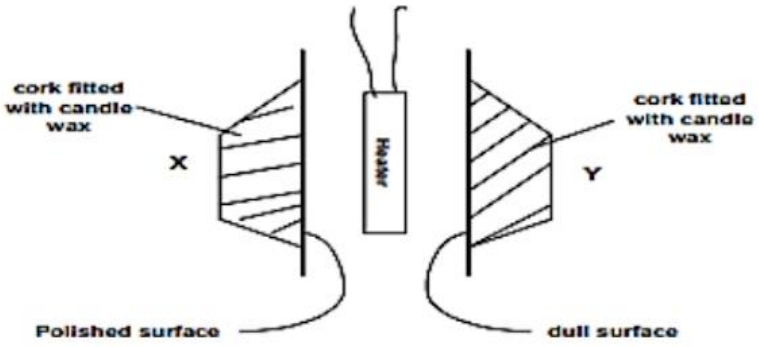

Figure 2

Y will fall of fast.✓

Dull surfaces are good absorbers of heat than polished surfaces.✓

18. Differentiate between cohesive and adhesive forces. (2mks)

Cohesive force refers to the force of attraction between molecules of same kind ✓while adhesive force is the force of attraction between molecules of different kind.✓

19. Explain the cause of random motion of smoke particles as observed in Brownian motion experiment using a smoke cell. (1mk)

They move randomly due to continuous collision with invisible air particles which are in continuous random motion.✓

20. The Figure 2 shows two identical thermometers. Thermometer A has a blackened bulb while thermometer B has a silvery bulb. A candle is placed equidistant between the two thermometers State with a reason the observations made after sometime. (2mks)

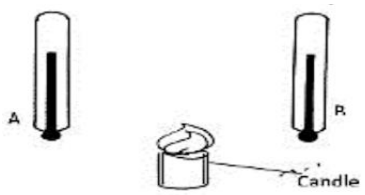

Figure 3

Thermometer A (blackened) records a higher temperature than b(silver).✓

Black surfaces are better absorbers of heat than silver surfaces.✓

21. Give a reason why water is not suitable as a barometric liquid. (1mk)

- Water has relatively low density .✓

22.The height of mercury column in a barometer is found to be 76cm at a certain place. What would be the height on a water barometer in the same place? (Density of water is 1000kg/m3 and density of mercury is $13600\,\frac{kg}{m^3}$. (3mks)

$$pressure\ due\ to\ water = presure\ due\ to\ mercury$$

$$h_w\rho_w g = h_m\rho_m g$$

$h_w \times 1000 \times 10 = 0.76 \times 13600 \times 10$✓

$h_w = \frac{0.76\times13600\times10}{1000\times10} = 10.336m$✓

23. State the reason why thermal conductivity of a metal increases with the increase in the cross-section area of the conductor? (1mk)

The thicker the conductor, the faster the heat flow as more particles per unit area vibrate✓

24. The set up in figure 4 below shows water being heated at the top.

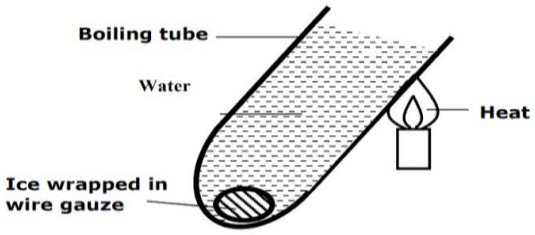

Figure 4

State and explain the observation made. (2 mk)

After sometimes it is observed that water at the top of the tube boils while the ice remained unmelted.✓ Water is a poor conductor of heat. Glass used for making test tube is also a poor conductor of heat✓

25.The set-up shown in the figure 5 below is used to investigate the rate of diffusion of two gases. B and C are cotton wools soaked in hydrochloric acid and ammonia solution respectively.

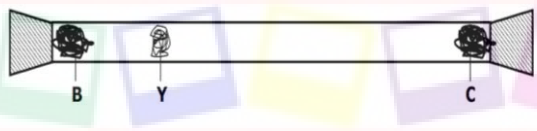

Figure 5

A white deposit Y is formed between B and C. Compare the densities of the two gasses. (1mk)

hydrochloric acid gas has a higher density than ammonia gas.✓

(or Ammonia is less dense than hydrochloric acid gas)

26.Figure 6 below shows a force pump. Briefly describe the working of the pump. (3mks)

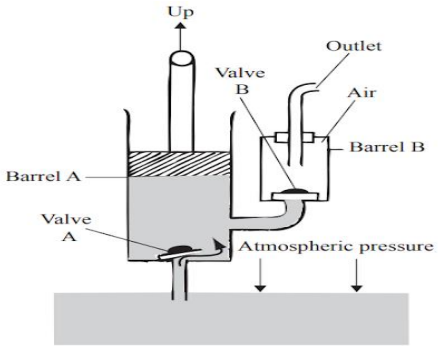

Figure 6

During upstroke The pressure above the valve A decreases causing it to open, while valve B closes due to the pressure of air and water above it. ✓

The atmospheric pressure pushes water into barrel A.✓

During downstroke Pressure above valve A closes due to increased pressure in barrel A. Valve B opens to allow water into barrel B, and the water eventually flows out through the outlet✓

#END#