PHYSICS PAPER 232/1 K.C.S.E 1999

What is the reading on the vernier catipers shown in figure 1? 1.



Figure 2 shows forces f1 and F1 and F2 acting on a meter rule such that it is in equilibrium. 2.



state how the position of the centre of gravity of a body in stable equilibrium changes to that in the rest position when the body is slightly tilted and then released.

A vacuum pump was used to pump out air from the glass tube immersed in liquids as shown in figure3. To vacuum Yump



After sometime the level of paranum rose to position A. Mark 1, the corresponding position for the water level. Give a reason for your answer.

5. Fig. 4 shows a capillary tube placed in though of mercury.

for hore

Ć

4.



Give a reason why the level of mercury in the capillary tube is lower than in the beaker.

Figure 5 shows a bimetallic strip at room temperature. Brass expands more than invar when heated 6. Brass equally.

```
Invar
                                                       Fig- 5
```

Sketch the bimetallic strip after being cooled several degrees below room temperature.

- 7. In an experiment to study the atoms of gold, a beam of α - particles was directed onto a thin sheet of gold. The following observations were made:
 - Majority of the particles went straight through undeflected (i)
 - "A few particles deflected through varying angles up to 180. (ii)
- 8. Figure 6 shows a ray of light incident on plane mirror at point O.

Fi4.6

The mirror is rotated clockwise through an angle 30^0 about an axis perpendicular to the paper. Determine the angle through which the reflected ray rotated.

for more Figure 7 shows a sharp pin fixed on a cap of leaf electroscope. The electroscope is highly charged 9. and then left for sometime. Sharp pin



Explain why the leaf collapses

\$^{fee}

10. Determine the ammeter reading when a p.d of 3.0 volts is applied across Pq in figure 8.



- A wire fixed at one end extends by 4mm when a load of 20N is suspended from the other end. 11. Determine the load that would cause an extension of 1.5 mm on the wire (assume elastic limit is not exceeded)
- How can it be shown that the strength of a magnet is concentrated at the poles? 12.



Determine the power output of the machine after 40 seconds.

17. Figure 12 shows how displacement varies with time as a wave passes a fixed point.



- 18 Two tuning forks of frequencies 256Hz and 258 Hz are sounded simultaneously and then placed close to each other, calculate the beat frequency.
- 19. When a current of 2.0 flows in a resistor for 10 minutes, 15,000 joules of electrical energy is displaced. Determine the voltage the resistor.

- Pers. com A substance of mass 2kg and specific heat capacity 400 Jkg K initially at 81^oC is immersed in 20. water at 20° C. If the final temperature is 21° C. Determine the mass of water. (The specific heat capacity of water is 4200j/kgK). Give your answer to 1 decimal place.
- A galvanometer of internal desistance 50 Ω gives a full-scale deflection when a current of 10mA 21. passes through it. Determine the value of the resistance required to convert the galvanometer to a voltmeter with full-scale deflection of 5 volts.
- 22. A microscope is focused on a mark on horizontal surface. A rectangular glass block 30mm thick is place on the mark. The microscope is then adjusted dd10mm upwards; to bring the mark back to focus, determine the refractive index of the glass.
- 23. State the every transformation when fast moving electrons are suddenly stopped by a target in an X- ray tube.
- 24. A but is fired horizontally at a target. Neglecting air resistance give a reason why the horizontal acceleration of the bullet is zero.
- Figure 13 shows a section of a pipe PQ. A constant pressure difference maintains a streamline flow 25. Free of a liquid in the pipe. for hore



If the cross-sectional area A₁ at P is less than A₂ at Q, state how the liquid velocity. V₂ at Q compares with velocity V_1 at P.

26. The figure 14 is a resistor-capacitor circuit. At time t=0, the switch is closed at A for sometime, and then opened. The switch is them closed at B for sometime.



On the axis provided, sketch the graph of voltage V across the capacitor against time t(t1 and t2 represents times for opening at A and closing at B respectively).



- Determine the pressure required to compress a gas in a cylinder initially at 20° C and at a pressure 27. 1.03×10^{-5} to one-eight of its original volume.
- 28. Arrange the following in order of increasing frequencies –Gamma radiation, radio waves, infrared, and X –rays.
- A concrete block of volume w is totally immersed in seawater of density p. Write an expression 29. for the up thrust on the block..
- It is observed that when ultraviolet light is shone onto a clean zinc plate connected to the cap of 30. negatively charged leaf electroscope, the leaf collapse. Explain this observation.
- 31. Figure 15 shows two masses 0.1kg and 0.2kg connected by a string through a hole on a smooth horizontal surface.



The 0.1kg mass rotates in a horizontal circle of radius 3cm. Calculate the angular velocity of the mass when the system is in equilibrium. Use acceleration due to gravity g = 10ms-2

16

- 32. Sketch a diagram to show the position of an object, when a converging lens is used as an magnifying glass.
- 33. Figure 16 shows a wire XY at right angles to a magnetic field. XY is part of circuit containing a galvanometer. X



34.

cor



, and C. A radioactive nuclide of atc L'number of the new nuclide. \bigwedge radioactive nuclide of atomic number z emits a beta particle and gamma rays. State the atomic