## PHYSICS PAPER 232/1 K.C.S.E 1998 MARKING SCHEME

1. Accuracy of measuring tape is 10 m or $0.1 \mathrm{~cm} \pm 5 \mathrm{~cm}$ or 0.05 m .
2. Length of post is $1.5(1.50 \times 1.55)$ Range $=\mathrm{N} 3=$
3. Quantity of heat equation 20x $(42-26) \times \mathrm{C}=10^{3} \times 15 \times 60$

$$
\begin{equation*}
\mathrm{C}=2.8 \times 103 \mathrm{JKg}^{-1} \mathrm{~K}= \tag{2812.5OR2813}
\end{equation*}
$$

4. Detecting imperfection in metal structures/block/flaws
5. addition of soap solution to pure water reduces the strength of the skin total was holding pin from sinking and so it sinks. Surface tension supports the pin. Addition of soap reduces tension/weakens/broken.
6. 


8. $\quad \mathrm{I}_{\mathrm{P}}=\mathrm{N}_{3}=\quad \mathrm{N}=20000 \times 3=2000$
$\mathrm{I}_{\mathrm{s}}=\mathrm{N}_{\mathrm{P}} \quad 30$
9. surface area of water . Nature of surface of the container/colour/texture /material/ (ambient temperatures).
10 Evaporation and cell reaction cause loss of water. Distilled water does not introduce impurities to the cell.
11. $\mathrm{E}=\mathrm{IR}+\mathrm{h}$
$\frac{\mathrm{I}=\mathrm{E}}{\mathrm{R}+\mathrm{r}}=$

$$
\underline{2.0}
$$

$$
2.0 \times 0.5 \quad=0.8 \mathrm{~A}
$$

12. $\underline{50}=(\mathrm{I})^{\mathrm{n}} \mathrm{n}=3$ (half-lives)
$400 \quad(2)^{\mathrm{n}}$
Half -life $\underline{72}=24 \mathrm{~min}$.
13. High resistance voltmeter takes less current/low current recording low current.
14. Domains/Dipoles initially organized are disorganized by mechanical forces.
15. As the rod approaches the cap, negative charges/electrons on the cap are repelled towards the rod. The leaf collapses since the positive charges on it are neutralized attraction. As the rod gets even closer to the cap moved more negative charges/electrons charges are repelled to the leaf, causing it to diverge.
16. Length of the rod; diameter/cross sectional area of the rod/thickness nature/type of rod material/conductivity.
17. $\mathrm{R}=\mathrm{P}^{1 / 4} \mathrm{I}=\frac{2.0 \times 10^{6} \times 0.5}{4.9 \times 20^{7}}=2 \mathrm{~m}$ OR $=2.041$ or 2.0408

18 Some energy is lost due to friction/air friction acts on the pendulum/air dumping on the apparatus air resistance.
19. In TV (CRT) deflection is by magnetic field, while in CRO deflection is by electric field. X-Y plates.
ATV (CRT)has two time bases while a CRO has only one.
In CRT it produced 625 lines per second while CRO is 25 lines per second.
20. Heating/ cooking/communication/eye/photographic film or plate/LDR/photocell.
21. Diode is forward-biased, no current flows

Current flows when the switch is closed but when terminals are reversed, no current flows
22. Angle of inclination/nature of surface/length of inclination Height of inclination/frictioal force between the surface.
23. layers of the crystal material are arranged according to faces/ plans/ flat surfaces. Cleavage is only possible parallel to those faces/places/flat surfaces.
24. Principles of moment.
$200 \times 1.5 \mathrm{R} \times 0.5,0.5 \mathrm{f}=1 \times 20 \times 10$ or $0.5, \mathrm{R}=600 . \mathrm{R}=\mathrm{F}+200=400 \mathrm{~N}$ take moments about O
$\mathrm{F}=600-200=400 \mathrm{~N}$
$\mathrm{F}=400 \mathrm{~N}$
25.


26 Addition of impurities with higher boiling points/presence of impurities. Water heated under a higher pressure than atmospheric/below sea level.
27. Moon covers the sun/obstruction of sun by the moon Both heat and light have same velocity/both are electromagnet waves.
28. Overtones/harmonics
29. Since F=MV2/V the sharper the corner (as B) the small the value of $R$ hence the greater the F . (M\& V constant).
30. Gas through the nozzle gains velocity. Hence its pressure reduces above the nozzle. The higher atmospheric pressure pushes air into the gas stream.
31. When mereury is heated (during a fire); it expands and makes contact, completing the circuit to ring the bell.
32. There will be no variation of intensity of light/ uniform intensity/no bands/one
33. Is the one which cannot form on a screen Is formed by rays which are not real Is formed by extending rays. Formed by apparent rays.
34. Component of weight down the slope $=50 \sin 30^{\circ}=25 \mathrm{~N}$

Total force parallel to slope $=(29+25) \mathrm{N} 54 \mathrm{~N}$.

## PHYSICS PAPER 232/2 K.C.S.E 1998 MARKING SCHEME

1. iii) Scale, axes label, unit-plotting 8-10-2

5-7-1 Curve (smooth)
iv) As the number of turns is increased, alignment of domain with field increases. After 35-36
turns, all domains are aligned, so that magnet is saturated.
Sketch - curve above 1 to some saturation, and from origin.

b) When switch is closed electromagnet attracts soft iron. This causes T to close and so circuit 2 is put on.
2.


Adjust position of R tube and detector for Mass intensity (sound Some Jonas, Conn Sound)

bi) Volume of block $=4 \times 4 \times 16=256 \mathrm{~cm} 3$

$$
\text { Mass of block }=154 \mathrm{gm}
$$

$$
\mathrm{D}=\mathrm{m}=154=0.6 \mathrm{~g} / \mathrm{cm}^{3} \text { deny } 1 / 2 \mathrm{mk} \text { if not to d.p }
$$

$$
\nabla \overline{256}
$$

ii) Volume of liquid $3 / 4$ of $256=192 \mathrm{~cm} 3$

$$
\text { Density of liquid }=\frac{154}{192}=0.8 \mathrm{~g} / \mathrm{cm} 3
$$

3. a i) The bullet will land on the track It has some horizontal (inertia) velocity as the track.
(ii) (Use $\mathrm{g}=10 \mathrm{~ms}-2\}$

$$
\begin{array}{ll}
S=u t+1 / 2 \text { at } 2 & \\
\text { For freefall } u=0 t=\sqrt{ } 2 h / g & T=6 \mathrm{sec} \\
\text { Horizontal distance }=v x t & =6 \times 50=300 \mathrm{~m}
\end{array}
$$

$$
\mathrm{V} 2=\mathrm{U} 2+2 \mathrm{as} \quad \mathrm{OR} \mathrm{v}=2 \mathrm{U}+\text { at } \mathrm{OR} 1 / 2 \mathrm{Mu} 2=\mathrm{mgh}
$$

From above $u=30 \mathrm{~m} / \mathrm{s}$
S $=$ ut $+1 / 2$ at 2
T=ut $+1 / 2$ at 2
$\mathrm{T}=6 \quad \mathrm{D}=\mathrm{vxt} \quad=50 \times 6 \quad=300 \mathrm{~cm}$
(bi)
Measure pressure with Bourdon gauge
Measure the length of air (reg volume at tone).
(ii)

Tabulation values of $p$ and length of air column (volume)
Plot graph of I/V vs P OR L vs I/P
Graph is a straight line.
Hence pa I/v
Tabulate P and V (I) Calculate PV or PL
$\mathrm{PV}(1)=\mathrm{PL}$
4.

b) Fig. 4 shows a photocell.

ii) When light rays strike cathode C surface electrons gain photon (energy) hence the cathode.
iii) Draw a simple circuit including the photocell to show the direction


ii) Since $\sin i$ is common and $r<r e$ then $\sin r v<\sin r e$
b) $\quad n \operatorname{Sin} C=1$ OR $\operatorname{Sin} C 1 / n$ $\sin C=1 / 1.4 \quad C=45.600(45.58)$ or $45.35 \mathrm{~min} / 45.36$

## SECTION II

6 a) When $T$ and $Y$ are connected $C$ is charged by $E$, until $C$ achieves same p.d. across it as for E C max p.d is achieved when T and Y are connected after first process. C acts, as source of e.m.f and discharges through $r$ unit no more current flow or current is zero.
b) $\quad$ Current $=d Q$ draw target at 30. Substitution $I=3.6 \mu \mathrm{~A} \pm 0.2 \mathrm{~A}$.

7a) 2 complete rays, 2 with arrow at one end image (inverted real) (continuous tie) locating F size $2.4 \pm 0 \mathrm{~cm}$
b)

| $\mathrm{U}(\mathrm{cm})$ | 20 | 25 | 30 | 40 | 50 | 70 |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- |
| $\mathrm{~V}(\mathrm{~cm})$ | 20 | 16.7 | 15 | 13.3 | 12.5 | 11.6 |
| $\underline{1}$ | 0.50 | 0.040 | 0.033 | 0.025 | 0.020 | 0.014 |
| $\mathrm{~V}\left(\mathrm{~cm}^{-1}\right)$ |  |  |  |  |  |  |
| $\underline{1}$ | 0.50 | 0.060 | 0.067 | 0.075 | 0.080 | 0.086 |
| $\mathrm{~V}\left(\mathrm{~cm}^{-1}\right)$ |  |  |  |  |  |  |

ii) $\quad 1 / \mathrm{f}=1 / \mathrm{u}+1 / \mathrm{v}$ Intercept ${ }^{1 / \mathrm{f}}$
$0.1=1 / \mathrm{f} \quad \therefore \mathrm{f}=10 \mathrm{~cm}$

