**PAVEMENT FORM 4 TRIAL 2 EXAMINATION 2021/2022**

**Kenya certificate of secondary education (K.C.S.E)**

**MARKING SCHEME PHYSICS**

**2**

1. angle =180-(90+20)= 70o
2. (a) Long sightedness

**1**

(b) Introducing a concave lens

**1**

1. The plain sheet of paper absorbs some light while the mirror doesn’t. it reflects all the light.

**1**

1. Rectilinear propagation of light.

**1**

1. $m=2$

 $2=\frac{v}{u }\rightarrow v=2u$

**1**

$$u=15 cm$$

$$v=-30 cm since the image is upright$$

 $\frac{1}{f}=\frac{1}{u}+\frac{1}{v}$

 $\frac{1}{f}=\frac{1}{15}-\frac{1}{30}$

**1**

 $\frac{1}{f}=\frac{2-1}{30}=\frac{1}{30}$

 $f=30cm$

**1**

**1**

**1**

**1**

1. $ $Has a higher emf per cell than nickel-iron accumulator.
2. $P=VI$

$$40=240I$$

$$I=\frac{1}{6}A $$

$$R=\frac{V}{I}=\frac{240}{\frac{1}{6}}$$

$$R=1440Ω $$

1. Prevents the risk of electric shock in case of faulty connection of electrical current.

**1**

1. The positively charged rod *attracts the negatives and “repels” the positives*.

**1**

When earthed, *electrons flow from the earth and neutralize the positive charges*.

**1**

The electroscope acquires negative charge.

**1**

1. - The angle at which the conductor cuts the magnetic field.

**1** *for one correct*

* The length of the conduct
1.

|  |  |  |
| --- | --- | --- |
| **Type of radiation** | **Detector** | **Use******$ any correct$ |
| Microwave | Crystal detector, solid state diodes | *- Radar**- point to point communication links**- wireless networks**- remote sensing* |
| *Infra red***1** | Thermopile, blackened bulb thermometer | Warmth sensation |



1. The negative charges induce positive charges on water by repelling the negative charges. This causes the stream to be attracted towards the rod

**1**

**1**

1. .**a)** Whenever there is change of magnetic flux an emf is induced whose magnitude is proportional to the rate of change of flux **✓1**

 **b) i)** $\frac{Vs}{Vp}$ =$\frac{Ns}{Np}$**✓1**

 $ \frac{60}{1200} =\frac{Vs}{240}$**✓1**

 $Vs=12V$**✓1**

    **ii)** Power Input = Power Output

 VI = Power Output **✓1**

  240 × 0.5 = 12 × I **✓1**

 I = 10A **✓1**

  iii) - by laminating the core **✓1**

**c)** E = Pt

 E = 1.5 × 30 = 45kwh **✓1**

 Cost = (45 × 8)sh **✓1**

 $ = Shs 360$ **✓1**

 **d)**

 **✓1** *for correct arrow directions*

1. (i) $R=\frac{2×4}{6}+1$ **✓1**

$$=1.333+1$$

$= 2.333Ω$**✓1**

 $I=\frac{12}{2.333}$

 $= 5.144A$**✓1**

 (ii) $V=IR$

 =$1.333×5.144$ **✓1**

 = 6.857 V**✓1**

(iii) $I =\frac{6.857}{4}$**✓1**

 $= 1.7143A$ **✓1**

(b) (i)



(ii) $V=-Ir+E$**1**

$ E= V intercept$**1**

$ = 9.6 V$ ($\pm 0.1$) **1**

 (iii) $Internal resistance = gradient$

 = $\frac{9.6-0}{0.-5.4}$**1**

 $=1.778Ω$ ($\pm 0.2$) **1**

1. (a) - The angle of incidence must exceed the critical angle **1**
* Light must travel from optically denser to a rarer medium. **1**

(b) (i) $n =\frac{\sin(30)}{\sin(18)}$**1**

 $= 1.6180$**1**

(ii) $\sin(c)=\frac{1}{n}$ **1**

$\sin(c)= \frac{1}{1.618}$**1**

$c=38.17^{o} $**1**



**1**

**1**

**1**

$ \frac{\sin(60)}{\sin(r)}=1.6180$ **1**

$\sin(r )=\frac{\sin(60)}{1.6180}$**1**

$ r=32.36^{o} $**1**

1. (a) (i) $Q=CV$**1**

$=0.3×4.5$**1**

$=1.35μC$**1**

(ii) $C= C1 +C2$ **1**

$0.3+0.5 =0.8μF $**1**

 (b) (i) the reading of the voltmeter increases from zero to attain a maximum of 4.5V**1**

 (ii) the reading increases to 4.5V then decreases to a lower value. **1**

 (ii) C1 is charged by the battery Pd increases until the capacitor is fully charged. **1**

 (c) (i) deflects then reduces to zero**1**

(ii) electrons flow from plate A of the capacitor towards the positive terminal of the battery. **1**

 (d) (i) 0V**1**

 (ii) 5V**1**

1. **(a)** Transverse-vibration of wave particles is perpendicular to the direction of wave motion**✓**

Longitudinal- displacement of the wave particles is perpendicular to the direction of the wave motion**✓**

**(b)** $f=\frac{1}{T}$ **✓1**

 =$ \frac{1}{2}$

 $ =0.5Hz$**✓1**

  **(c)** $\frac{330}{512}$**✓1**

$ =0.6445m$**✓1**

 d = $0.6445×2.5=1.6113$m**✓1**

 **(d)**

  