

$I_{total} = I_1 + I_2 + I_3$

$V = V_1 = V_2 = V_3$

For first resistor. For second

$I_1 = \frac{V}{R_1}$ $I_2 = \frac{V}{R_2}$

Combining both

$I + I = V\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$

$\frac{I}{V} = \frac{1}{R_{eq}}$

$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$

Use for rough work

Q. No. 2 Part (i) Answer:

Given Data:

Mass $m = 2 kg$

Specific heat $c = 420\ j\ kg^{-2}\ k^{-2}$

Total Temperature: $\Delta T = T_F - T_i$

$= 45^\circ C - 40^\circ C$

$= 5^\circ C$

To Find,

$Q = ?$

Solution:

$Q = mc\Delta T$ Formula: $c = \frac{Q}{}$

$Q = (2 kg) \times (420\ j\ kg^{-1} k^{-1})(5^\circ C)$. $m\Delta T$

$Q = 4200$ joules $Q = mc\Delta T$

$Q = 4200\ j$

The heat required to raise the temperature of substance is 4200 joules.

Q. No. 2 Part (ii) Answer:

*. Functions of diode.

(1) Act as a switch: The diode Act as a switch in electronic circuits and allow a current to flow only in one direction.

(2) LED ✱ benefit: LED as Light Emitting diode Act as a bulb or lamp in electronic circuit and convert electric energy into light.

Q. No. 2 Part (iii) Answer.

Given data:

total emf :?

E_1 = Voltage = V = 1.5 V.

$E_2 = 1.5V$, $E_3 = 1.5V$

Solution: in series.	in parallel
In series $E_{total} = E_1 + E_2$ Formula.	In parallel the Total EmF = $E_1 = E_2 = E_3$
$\therefore E_{total} = E_1 + E_2 + E_3$	$\therefore E_{total} = E_1 = E_2 = E_2$
$E_{total} = 1.5V + 1.5V + 1.5V$	$E_{total} = 1.5V = 1.5V = 1.5V$
$= 4.5V$	$E_{total} = 1.5V$
In series the total Emf is about 4.5 volt.	In parallel the Total EMF of Three cells is 1.5 V.

Q. No. 2 Part (iv) Answer:

Given data:

Speed of light in medium = $V = 2 \times 10^8$ m/s

Defination: The measure of bending light Ray when passes from one medium to another medium.

Mathematically:

$$n = \frac{C}{V}$$

Solution: $n = \frac{C}{V}$ | $V = 2 \times 10^8$ m/s, $C = 3 \times 10^8$ m/s

$$n = \frac{3 \times 10^8 \text{ m/s}}{2 \times 10^8 \text{ m/s}} = 1.5$$

Q. No. 2 Part (v) Answer:

Given data:

Voltage = V = 220V

Current = I = 2A.

To Find:

P = ?

Solution:

Formula: $P = VI$

$P = VI$

$P = 220\text{V} \times 2\text{ A}$

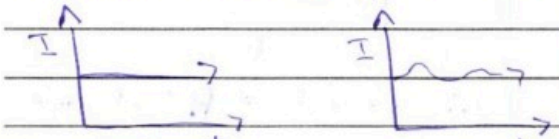
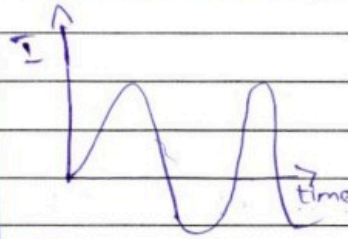
$P = 440\text{ V/A}$

$P = 440$ watt

The power consumed by appliance is about 440 watt.

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Q. No. 2 Part (vi) Answer 6.

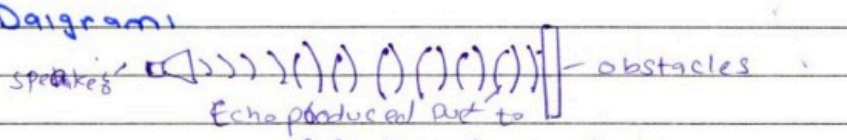
DC current	AC current
1) The Direct current is uni directional and move forward in one direction	The Alternating current is a bi-directional move forward one half cycle and backward other half cycle.
(2) Graphic difference. Current time graph of DC.  Steady DC varying DC	(2) Current time graph of AC 
Source: Battery, Dc generator	Source: AC generator.

Q. No. 2 Part (vii) Answer:

Echo: The bouncing back of sound waves when strike some polished or rough objects due to phenomenon of Reflection is called Echo.

production of Echo: The production of Echo is depend on Reflection of sound wave and because is is produce due to Reflection of Sound waves.

Daigram:



Echo produced due to Reflection of sound waves.

Q. No. 2 Part (viii) Answer.

ohmis Law: ohm's Law stated that at a constant Temperature The voltage or potential different is directly proportional to the appliedcurrent.

Mathematically:

$V \propto I$ T = constant.

$V = IR$

To remove sign of proportionality we apply R which is Resistance (proportionality constant)

$V = IR$ Given: $I = 2A$ $R = 10\ \Omega$

Solution: $V = IR$

$V = 10\ \Omega \times 2\ A = 20$ Volt.

Q. No. 2 Part (ix) Answer:

To Find: $f = ?$ $M = ?$

Given data: $q = 6$, $p = 2$, $I = 6$ $O = 2$

Solution

Formula:

$$\frac{1}{f} = \frac{1}{p} + \frac{1}{q}$$

$$\frac{1}{f} = \frac{1}{2} + \frac{1}{6}$$

$$\frac{1}{f} = 0.666$$

$$\frac{1}{0.666} = F$$

$F = 1.5$

Focal length $F = 1.5$

Solution

Formula.

$M = \frac{I}{O}$

$M = \frac{6}{2}$

$M = 3$

Magnification = 3.

Q. No. 2 Part (x) Answer.

Real image	virtual image
(1) It can be seen on screen	(1) It cannot seen on screen
(2) It is invested	(2) It is erect
(3) It is only formed by convex lense	(3) It is formed by convex, concave and mirror.
(4) Forms on opposite side of object	(4) formed on same side of object.
(4) Can Seen on screen	(5) can be seen on mirror.

Q. No. 2 Part (xi) Answer.

Boiling	Evaporation
(1) It occurs at boiling point	(1) It occurs at any temperature
(2) Occurs inside the liquid.	(2) Occurs at the surface of a liquid.
(3) Requires high temperature	(3) Does not Requires high temperature.
(4) Forms bubbles in Liquid.	(4) Bubbles are not Forms in Liquid.

Q. No. 3 (Page 1)

Answer:

a)

(i) Nuclear Fusion: When two or small nuclei combine and join to form comparatively Large nuclei such type of reaction is called nuclear fusion.

It occurs in stars like Sun because it requires high temperature.

* The Nuclear Fusion required temperature because the Small nuclei does not collide with each other at normal temperature So there fore this reaction requires very high temperature nearly because to temperature in stars.

b) Given data:

Mass $m = 55.56\ kg$

To Find = Energy $E = ?$

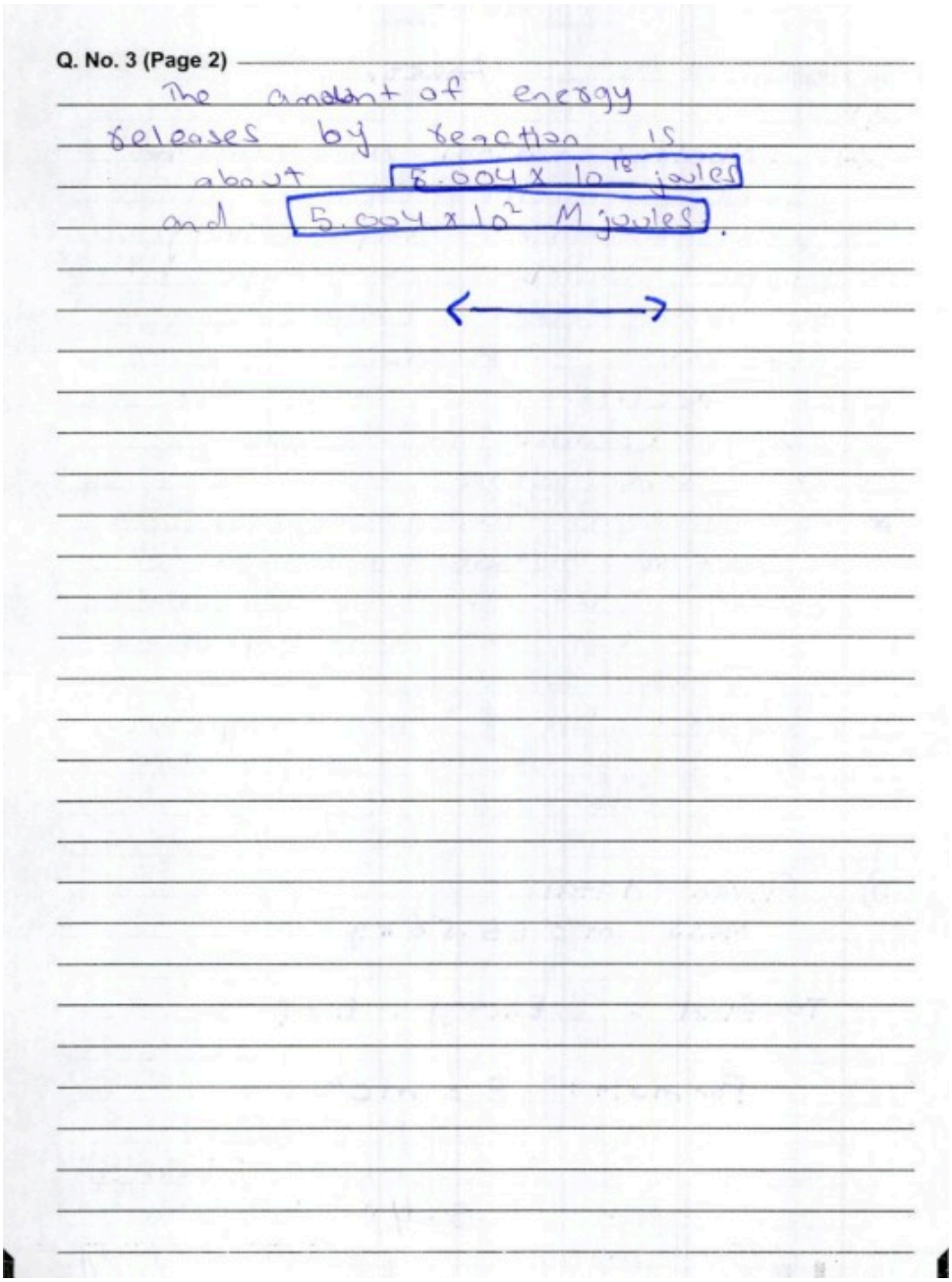
Formula: $E = mc^2$

$E = (55.56\ kg) \times (3 \times 10^8)^2$

$E = (55.56\ kg) \times (9 \times 10^{16})$

$E = 5.004 \times 10^{18}$ joules

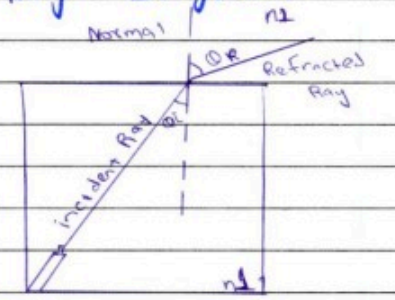
In kilojuleses. 5.004×10^{15} kJ


Q. No. 3 (Page 2)
The amount of energy
releases by reaction is
about 5.004 x 10^18 joules
and 5.004 x 10^2 M joules.

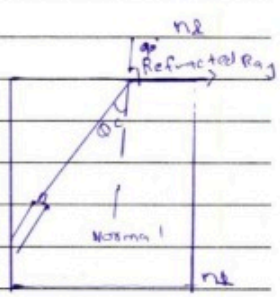
Q. No. 4 (Page 1) Answer.

Total internal Reflection: When light passes from one medium to another medium it bend when the angle of Refraction with normal become equal to 90° the light does not move into another affect moves along the boundary of two medium and Reflection of light occurs which is known as Total internal reflection. and Angle of incident is known as critical angle. θ_c

Ray Diagram:

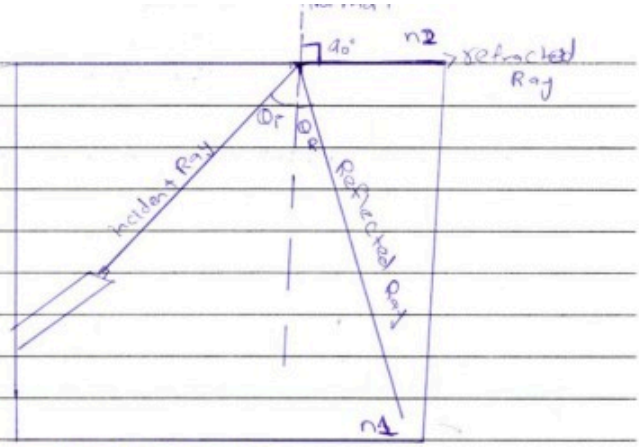


Refraction of life. light bend when passes from one medium to another



Formation of Critical angle. Angle of Refraction equal to 90° greater known as Critical Angle.

Q. No. 4 (Page 2)



Total internal Reflection: light reflect back by striking with boundry of a medium.

(b): $n = \frac{1}{\sin(C)}$

From this given Mathematical form we conclude that The Reflextive index and critical angle is reciprocal of each other and inversly Propotional to each others when one medium is air of vaccum

$n \propto \frac{1}{\sin(C)}$ or $\sin(C) = \frac{1}{n}$ $(C) = \sin^{-1}\left(\frac{1}{n}\right)$

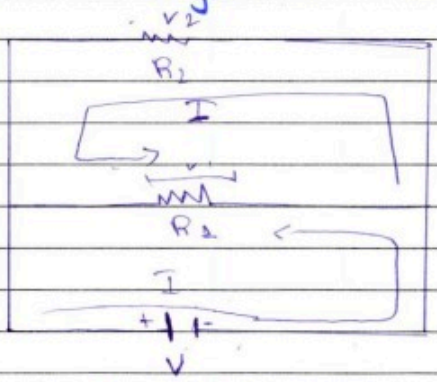
form $C = \sin^{-1}\left(\frac{1}{n}\right)$.

Therefore when we increase Refractive index the critical angle decreases and when we decreased Critical Angle Refractive index increased.

For finding we have to take sin inverse of 1

Q. No. 5 (Page 1) Answer:

Circuit Diagram:



In parrall combination voltage remain constant but current is distributed.

$V_{equ} = V_1 = V_2 = V_3$ but $I_{total} = I_1 + I_2 + I_3$

$V_{total} = V_1 = V_2 = V_3$

For First Resistor

$V = I_1 R_1 \rightarrow (i)$

$I_1 = \frac{V}{R_1} \rightarrow (ii)$

For second Resistor

$V = I_2 R_2 \rightarrow (i)$

$I_2 = \frac{V}{R_2} \rightarrow (iii)$

For total current

$I_{total} = I_1 + I_2 \rightarrow (iv)$

put ~~Combining~~ combining (ii) and (iii) in (iv) we got.

$I_{total} = V\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$

$I_{total} = I_1 + I_2$

Q. No. 5 (Page 2)

$$I_{total} = V\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$$

$$\frac{I}{V} = \frac{1}{R_1} + \frac{1}{R_2} \rightarrow (i)$$

As we know.

$$\frac{I}{V} = \frac{1}{R_{eqv}}$$ put putting it in (i) we got.

$$\boxed{\frac{1}{R_{eqv}} = \frac{1}{R_1} + \frac{1}{R_2}}$$

(b) Given data:

$R_1 = 6\ \Omega$

$R_2 = 3\ \Omega$

Solution:

Formula:

$$\frac{1}{R_{eqv}} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_{eqv}} = \frac{1}{6} + \frac{1}{3}$$

$$\frac{1}{R_{eqv}} = 0.5$$

$$\boxed{R_{eqv} = \frac{1}{0.5} = 2\ \Omega}$$

The $\frac{1}{R_{eqv}} = 0.5\ \Omega$ and $R_{eqv} = 2\ \Omega$

Q. No. 6 (Page 1)

(a) ~~I~~ X (when current passes from var)

Principle of transformer:

(a) Transformer works on the principle of Electromagnetic induction with states that when a conductor passes through a varying magnetic field it produced induced EMF. In transformer when current and induced current is also produces. It is used for increasing or decreasing voltage transformer works on AC not DC current.

(b) **working of transformer:** When a AC voltage or current passes from primary coil of transformer a varying magnetic field is produced which is retrieved by secondary coil by a iron core which convert it into secondry voltage. The voltage on a secondary coil depend on primary voltage, number of no of turns on primary coil and number of turns on secondary coils.

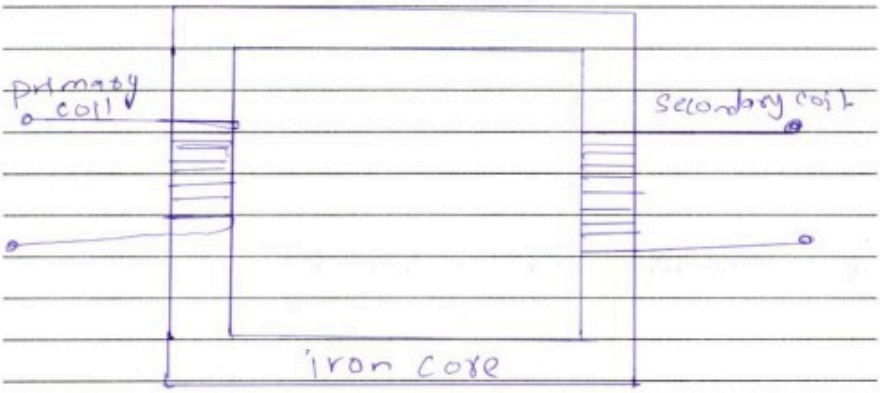
The general equation for AC transformers are:-

Q. No. 6 (Page 2)

$$\frac{V_S}{V_P} = \frac{N_S}{N_P}$$

(C) Construction of transformer:

(*) It is consist of primary coil, secondary coil and iron core.



The primary coil provides a primary voltage and secondary coil provides a secondary voltage. iron core connect primary coil with secondary coil.