केवल मूल्यांकनकर्ता के उपयोग हेतु!

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल 32 पृष्ठीय

केवल परीक्षक द्वारा भरा जावे। प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करें।

प्रश्न क्रमांक	पृष्ठ क्रमांक	...ों में)	प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तां
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परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

→ परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे

प्रमाणित किया जाता है कि अन्दर के पृष्ठों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टी एवं अंकों का योग सही है।

निर्धारित मुद्रा : नाम, ...

उप मुख्य परीक्ष... ...T

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योग पूर्व पृष्ठ | पृष्ठ 2 के अंक | कुल अंक

प्रश्न क्र.

Question:01

Answer.

1) Oersted

Ans 2) $R = 2f$

Ans 3) Isobar

Ans 4) Immobile ions

Ans 5) Polarisation

Ans 6) Material of wire

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Question :02

Answer

Ans1) holes.

Ans2) increases

Ans 3) dimagnatic

Ans 4) displacement

Ans 5) objective

Ans 6) conduction band.

Question: 03

Answer.

Ans 1) False

Ans 2) True

Ans 3) False

Ans 4) False

Ans 5) True

प्रश्न क्र.

Question: 04

Answer:

Column A	Answer
1) Mass-energy equivalence relation	Einstein
2) Electrostatic force.	Coulomb
3) Direction of induced current.	Lenz
4) Electromagnetic wave	Maxwell
5) Double-slit experiment of interference	Young
Dual nature of matter	De-Broglie.

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कुल अंक

Question: 05

Answer

Ans 1) Ammeter

Ans 2) 1 (one)

Ans 3) angle of minimum deviation

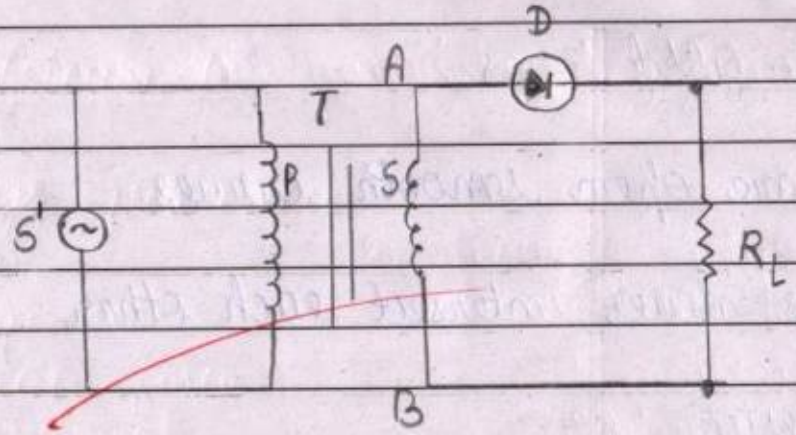
Ans 4) P-type semiconductor

Ans 5) $\frac{q}{80}$ $\frac{1}{60}$

प्रश्न क्र.

Question: 06

Answer



Labelling

S' = AC source
T = Step down transformer
P = Primary coil of step down transformer
S = Secondary coil of step down transformer
D = Junction diode
R_L = Output (load resistance)

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Question: 07
Answer

Characteristics of electric field lines:

1) Electric field lines are open smooth curves.
2) Two electric field lines never intersect each other.

B S E

Question: 08
Answer

Step up Transformer	Step down transformer
1) It increases the voltage.	1) It decreases the voltage.
2) Transformation ratio is greater than 1 $\gamma > 1$	2) Transformation ratio is less than 1 $\gamma < 1$

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Question: 09

Answer:

Ampere's circuital law:

According to this law:

"The line integral of magnetic field through any closed surface is μ_0 times the total current passing through closed surface.

B
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If I current flows through any closed surface & B be the magnetic field intensity then according to this law

$$\oint \vec{B} \cdot d\vec{l} = \mu_0 I$$

where μ_0 = permittivity of free space & its value is $\mu_0 = 4\pi \times 10^{-7}$

Question : 10

Answer

Name of highest frequency electromagnetic wave :- Gamma rays

Uses :

1) It is used in the study of nucleus.
2) Used in treatment of cancer.

Question : 11

Answer

Effect of on velocity :

If a ray of light enters obliquely from an optically rarer medium to an optically denser medium then velocity of light ray "decreases".

Effect on frequency :

If a ray of light enters obliquely from an optically rarer medium to an optically denser medium then frequency of light remain "unchanged".

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Question: 12

Answer

Two features of nuclear force:

1) Nuclear force is a short range force.
2) Nuclear force is a non-central force.
3) Nuclear force is a strong force.

Question: 13

Answer.

Given: $l = 2$ meter

$n = 100$ turns

$I = 10$ A

For a solenoid $B = \mu_0 NI$

$= \mu_0 \times n \times l \times I$

$= 4\pi \times 10^{-7} \times 100 \times 2 \times 10$

$= 4\pi \times 2 \times$

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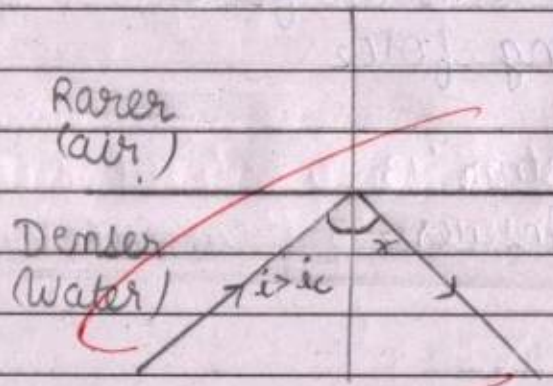
Question: 14
Answer

Total internal reflection:

(i) **Labelled ray diagram:**



(ii) **Defination:**

When the light ray travels from denser to rarer medium and angle of incidence is greater than critical angle then it get reflected back in the same medium following laws of reflection. This is total internal reflection.

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(iii) An Application:

Application of total internal reflection is:
1) Brilliance of diamond
2) Shining of air bubble in water.

Question: 15
Answer.

B
S
E

Photon:

Photon are the quanta of energy. These are small bundle of energy coming from the source and travel with the speed of light.

Characteristics of Photon:

1) Photon is neutral particle

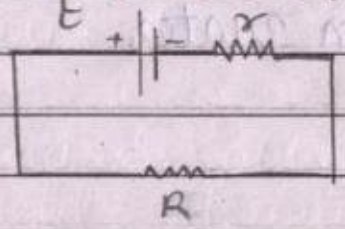
Rest mass of photon is zero (0)

3) Energy of photon $E = h\nu$ where h = Plank's Constant = 6.67×10^{-34} Js
ν = frequency

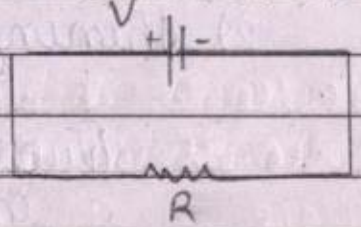
Question: 16

Answer.

When internal resistance is taken in account



When internal resistance is not taken in account



B S E

Let us consider two circuit in which E is EMF, V is terminal voltage, R is external resistance & r is internal resistance.

By ohm's law:

$$\text{Current} = \frac{\text{EMF}}{\text{Total resistance}}$$

$$I = \frac{E}{R+r}$$

$$I(R+r) = E$$

$$IR + Ir = E$$

$$V + Ir = E \quad [\text{By } ① \; V = IR]$$

$$\boxed{V = E - Ir}$$

By ohm's law:

$$\text{Current} = \frac{\text{Voltage}}{\text{Resistance}}$$

$$I = \frac{V}{R}$$

$$V = IR \quad —①$$

This is required relation between EMF, terminal voltage &

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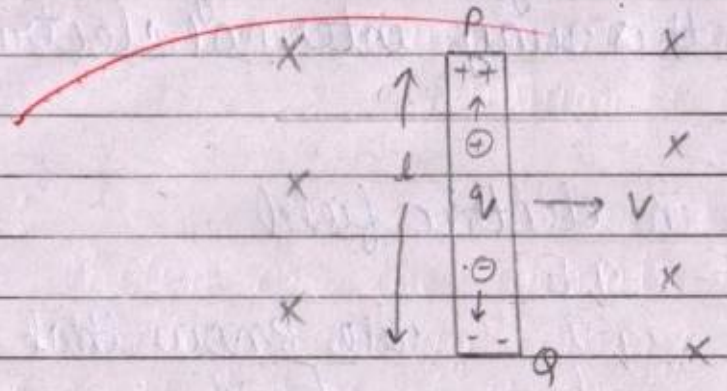
internal resistance.

Question; 17

Answer.



Let us consider a region in which uniform magnetic field is present & it is perpendicularly into the plane of paper. Let us consider a straight conductor of length l moving with velocity v. The direction of motion of conductor is perpendicular to magnetic field.

Force acting on the conductor.

$F = qVB \sin\theta$ [Here B ⊥ V

$F = qVB$ —① $\theta = 90^\circ$ $\sin 90 = 1$

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When the conductor moves with velocity v then charges present inside it also moves. In this way all the positive charge moves toward point P

And all the negative charge moves towards point Q. In this way internal electric field is developed.

Force acting on charge in electric field.

$$F = qE$$

$$F = q\frac{V}{l} \quad \text{—②}$$

We know that

$$E = \frac{V}{l}$$

where V is voltage

By comparing ① & ②

$$qvB = q\frac{V}{l}$$

$$V = Bvl$$

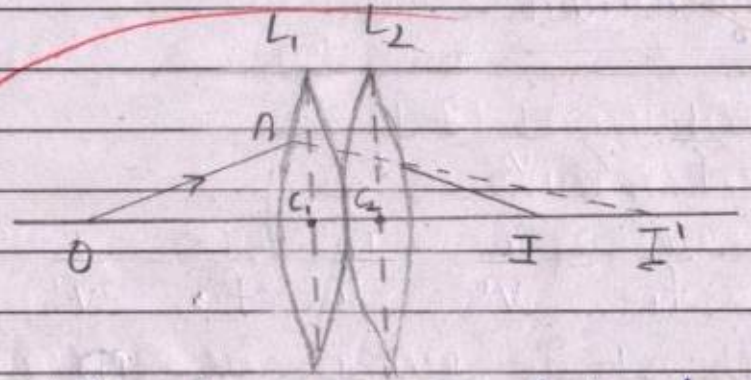
Here potential difference can be written as ~~volt~~ EMF then

[redacted]

This is required expression for motional EMF.

Question: 19

Answer



Let us consider two lens L_1 & L_2 kept at contact with each other. Let f_1 & f_2 be the focal length of lens L_1 & L_2 respectively C_1 & C_2 be the optical centre

Let incident ray OA falls on lens L_1 then the image formed at I' but due to presence of lens L_2, image formed at I.

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B
S
E

For first lens L_1:

O - object
I' - image

$OC_1 = ~~-u~~\ u$

C_1I' ~~OI'~~ $= v'$

By lens formula:

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}.$$

~~$\frac{1}{f_1} = \frac{1}{v'} - \frac{1}{-u}$~~ $\quad \frac{1}{f} = \frac{1}{v'} - \frac{1}{u}$ —— (1)

~~$\frac{1}{f_1} = \frac{1}{v'} + \frac{1}{u}$ —— (1)~~

For lens L_2:

I' → object
I → image

$C_2I' = v'$ [$C_1 \approx C_2$] as the lens is thin

$C_2I = v$

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By lens formula:

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}.$$

$$\frac{1}{f_2} = \frac{1}{v} - \frac{1}{v'} \quad \text{—②}$$

For combination;

$$\frac{1}{F} = \frac{1}{v} - \frac{1}{u} \quad \text{—③}$$

By adding ① & ②

$$\frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{v'} - \frac{1}{u} + \frac{1}{v} - \frac{1}{v'}$$

$$\frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{v} - \frac{1}{u}.$$

$$\frac{1}{f_1} + \frac{1}{f_2} = \frac{1}{F} \quad \left[\text{By ③ } \frac{1}{F} = \frac{1}{v} - \frac{1}{u}\right]$$

$$\frac{1}{F} = \frac{f_2 + f_1}{f_1 f_2}$$

$$F = \frac{f_1 f_2}{f_2 + f_1}$$

Power of combination $P = \frac{1}{F}$

$$\boxed{P = \frac{f_1 + f_2}{f_1 f_2}}$$

This is required expression for power of combination

Question: 19

Answer

Nuclear fusion:

When two light nuclei combine together to form heavier nuclei with release of energy. This nuclear fusion.

Here the mass of combining nuclei is greater than the product nuclei. This loss in mass is converted into energy by mass-energy relation. For this reaction, high temperature & high density is necessary.

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Example:

When two nuclei of deuterium combined together then helium nucleus is formed with release of 24 Mev energy.

$$_{1}^{2}H + _{1}^{2}H \longrightarrow _{2}^{4}He + 24\ Mev$$

$Q = 24\ Mev$.

B S E

Nuclear fission:

When a heavy nucleus is bombarded by slow neutron then it gives two lighter nuclei of comparable molecular mass. This is is nuclear fission. Here large amount of energy is released.

Here the mass of reactant nucleus is greater than product nuclei. This loss in mass is converted into energy.

Example:

When the uranium $^{235}_{92}U$ is bombarded with slow neutron $^{1}_{0}n$ then it converted into unstable $^{236}_{92}U$ then it splits into Barium $^{144}_{56}Ba$ & Krypton $^{92}_{36}Kr$)

$$^{235}_{92}U + ^{1}_{0}n \rightarrow ^{236}_{92}U \longrightarrow ^{144}_{56}Ba + ^{92}_{36}Kr + 200\ Mev.$$

Unstable nucleus

$Q = 200\ Mev.$

Question: 20

Answer:

Given:

$C_1 = 3pF$

$C_2 = 4pF$

$C_3 = 5pF$

Capacitors are connected in parallel then

Resultant capacitance

$$C = C_1 + C_2 + C_3$$
$$= 3pF + 4pF + 5pF$$
$$\boxed{C = 12pF}$$

$$C = 12pF$$
$$= 12 \times 10^{-12} F$$

$V = 120\ V$

We know that $C = \frac{Q}{V}$

$$Q = C \times V$$
$$Q = 12 \times 10^{-12} \times 120$$
$$Q = 1440 \times 10^{-12}$$
$$\boxed{Q = 144 \times 10^{-11}\ C}$$

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Resultant capacitance $C = 12pF = 12 \times 10^{-12} F$

Charge $q = 144 \times 10^{-11} C$

Question: 13

Answer

Given $I = 30 A$

$r = 30 cm$ — Should be in meter

To find $B = ?$

We know that:

$$B = \frac{\mu_0 I}{2\pi R}$$

$$B = \frac{10^{-7} \times 4\pi \times 30}{2\pi \times 30}$$

$$B = 2 \times 10^{-7} \text{ Tesla}.$$