



माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

वर्ष 2019

24 पृष्ठीय

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय	विषय कोड	परीक्षा का माध्यम
English	210	English
के निशान से मिलाकर लगावे		
उत्तर पुस्तिका का रोल क्रमांक	319-	0291650
को में	परीक्षार्थी का रोल नम्बर	
	- 2 9 1 8 2 6 5 2 6 -	
ब्दों में	- Two nine one eight two six five two six -	

संविष्टान्त

1	2	3	4	5	6	7	8
एक	एक	दो	तीन	चार	छ	आठ	

क :- पूरक उत्तर पुस्तिकाओं की संख्या अंकों में 02 शब्दों में TWO

ख :- परीक्षार्थी का कक्ष क्रमांक 06

ग :- परीक्षा का दिनांक 14 03 2019

परीक्षा का नाम एवं परीक्षा केंद्र क्रमांक की मुद्रा

गार सेकेण्डी परीक्षा केंद्र क्रमांक 182001

पर्यवेक्षक का नाम एवं हस्ताक्षर : आरती तिवारी

केंद्राध्यक्ष / सहायक केंद्राध्यक्ष के हस्ताक्षर

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

प्रमाणित किया जाता है कि मूल्यांकन के समय पूरक उत्तर पुस्तिकाओं की संख्या उपरोक्तानुसार सही पाई होतो क्राफ्ट स्टीकर क्षतिग्रस्त नहीं पाया गया तथा अन्दर के पृष्ठों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टी एवं अंकों का योग सही है।

निर्धारित मुद्रा : नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदांकित संस्था के नाम की मुद्रा लगाए।

उप मुख्य परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा : परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा

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केवल परीक्षक द्वारा भरा जावे।

प्रश्न क्रमांक के सम्मुख प्राप्तियों की प्रविष्टी करे।

प्रश्न क्रमांक	पृष्ठ क्रमांक	पंक (अंकों में)
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भरा जावे

केंद्राध्यक्ष / सहायक केंद्राध्यक्ष एवं परीक्षक द्वारा भरा जावे

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे

2



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Answer no. - 01

(1) its material

(2) Uncharged

(3) 9×10^{13} Joule

(4) Immobile ions

(5) They require antenna of large length for transmission.

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Answer no. - 02

(1) [AT]

(2) transverse

(3) matter

(4) decreases

(5) electrons

3

$$\boxed{} + \boxed{} = \boxed{}$$

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Answer no. - 03

- (1) Kirchhoff's 2nd law - Law of conservation of energy
- (2) Moving coil galvanometer - Magnetic effect of current
- (3) Light of violet colour - Maximum deviation by prism
- (4) Light of red colour - Maximum speed in glass
- (5) Minimum energy for - Work function
electron transmission

Answer no. - 04

- (1) $- 1.6 \times 10^{-19}$ coulomb
- (2) Soft iron core
- (3) Henry
- (4) $4000 \text{ A}^\circ - 7800 \text{ A}^\circ$
- (5) Transducer - Transducer is a device which transform one physical variation into another physical variation.
e.g. Microphone

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Answer no. - 05 (i)

X-rays : X-rays was discovered by Rontzen. Its frequency is $10^{16} - 10^{18}$ Hz and wavelength is $10^{-8} - 10^{-10}$ m. These are electromagnetic wave and affect photographic plate.

Uses : (1) In the study of crystalline structure.

(2) In the treatment of cancer or tumor.

E
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Answer no. - 06

Given :- frequency $\nu = 6 \times 10^{14}$ Hz

Find :- Energy of photon $E = h\nu$

$$E = h\nu$$

$$E = 6.63 \times 10^{-34} \times 6 \times 10^{14}$$

$$E = 39.78 \times 10^{-20}$$

$$E = \frac{39.78}{39.78} \times 10^{-20} \text{ joule} \\ \text{1} \text{ eV}$$

5

$$\boxed{} + \boxed{} = \boxed{}$$

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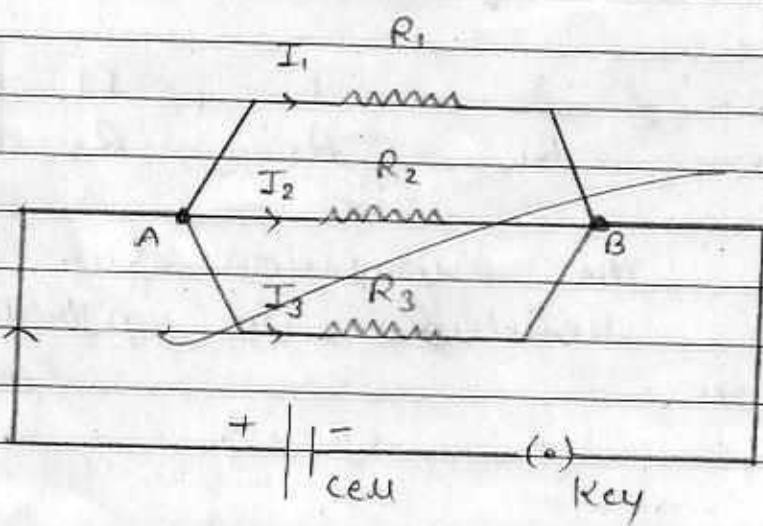
Answer no. - 07 (i)

Sky wave propagation : The waves of frequency less than 30 MHz travels from denser medium into rarer medium having angle of incidence greater than critical angle then total internal reflection takes place and waves after reflection, waves approaches on distict places on earth's surface, is called sky wave propagation.

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Answer no. - 08 (i)

Equivalent resistance in parallel
Circuit diagram :



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योग पूर्व पृष्ठ

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In parallel combination, voltage is same at points A and B

Diagram shows three resistors ^{having resistance} R_1 , R_2 , and R_3 are connected in parallel. Voltage V across the each resistor.

In parallel, current I is divided so, by ohm's law,

$$I_1 = \frac{V}{R_1}, I_2 = \frac{V}{R_2}, I_3 = \frac{V}{R_3}$$

B
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Total current -

$$I = I_1 + I_2 + I_3$$

$$\frac{V}{R_p} = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3}$$

If R_p is equivalent resistance -

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

This is the expression for equivalent resistance in parallel combination.

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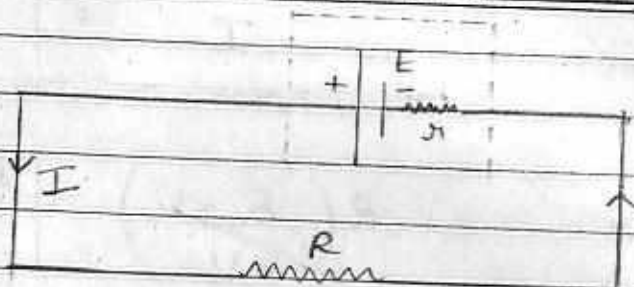


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Answer no. - 09 (ii)



As diagram shows,

A circuit having resistance R , internal resistance r , current I and potential difference V and Electromotive force E

Work done in carrying unit charge in external circuit $V = IR$

Work done in carrying unit charge in internal circuit $= Ir$

Total work done in carrying unit charge in whole circuit

$$E = IR + Ir$$

$$E = V + Ir$$

$$E - V = Ir$$

B
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योग पूर्व पृष्ठ



पृष्ठ 8 के अंक



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$$R_1 = \frac{E - V}{I} \dots (1)$$

OR

$$R_1 = R \left(\frac{E - V}{V} \right) \quad \because V = IR \dots (2)$$

OR

$$R_1 = R \left(\frac{E}{V} - 1 \right) \dots (3)$$

B
S
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Equation (1) (2) and (3) are the relationship between internal resistance (R_1), Electromotive force (E) and Terminal voltage (V).

Answer no. - 10 (ii)

Given:-

Radius of curvature of double convex lens

$$R_1 = 10 \text{ cm.}$$

$$R_2 = -15 \text{ cm.}$$

$$\text{focal length } f = 12 \text{ cm.}$$

Find :- Refractive index of glass (μ)

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Applying lens maker formula;

$$\frac{1}{f} = (\mu - 1) \left[\frac{1}{R_1} - \frac{1}{R_2} \right]$$

$$\frac{1}{12} = (\mu - 1) \left[\frac{1}{10} - \frac{1}{(-15)} \right]$$

~~$$\frac{1}{12} = (\mu - 1) \left[\frac{1}{10} + \frac{1}{15} \right]$$~~

$$\frac{1}{12} = (\mu - 1) \left[\frac{3 + 2}{30} \right]$$

$$\frac{1}{12} = (\mu - 1) \left[\frac{5}{30} \right]$$

$$\frac{6}{12} = \mu - 1$$

~~$$\frac{1}{2} + 1 = \mu$$~~

~~$$\Rightarrow \mu = \frac{3}{2}$$~~

$$\Rightarrow \mu = 1.5 \quad \text{Answer}$$

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Answer no. - 11 (i)

Biot - Savart law :- According to Biot -

Savart, Small magnetic field due to small current element of current carrying conductor is -

$$dB \propto I \text{ (Current flowing in conductor)}$$

$$dB \propto dl \text{ (Small element)}$$

$$dB \propto \sin\theta \text{ (angle b/w } \vec{dl} \text{ and } \vec{r})$$

$$dB \propto \frac{1}{r^2} \text{ (distance of point P)}$$

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Collectively,

$$dB \propto \frac{I dl \sin\theta}{r^2}$$

$$dB = K \frac{I dl \sin\theta}{r^2}$$

In C.G.S, $K = 1$ then,

$$dB = \frac{I dl \sin\theta}{r^2}$$

11

योग पूर्व पृष्ठ

पृष्ठ II के अंक

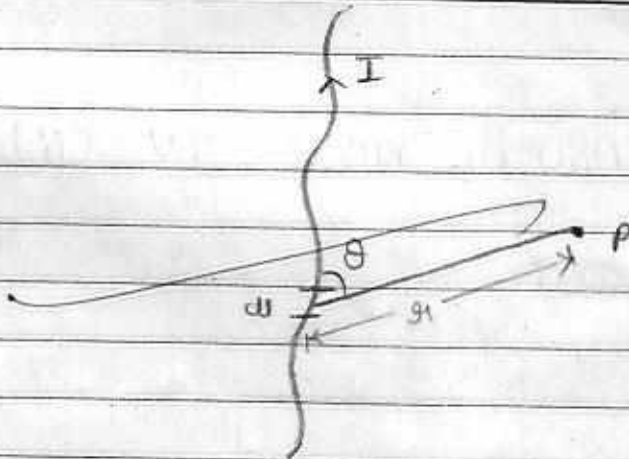
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In SI system, $\mu_0 = \frac{4\pi}{10^7}$ then,

$$dB = \frac{\mu_0 I dl \sin\theta}{4\pi r^2} \dots (1)$$



Defination of Ampere :- from eq. (1)

$$dB = \frac{\mu_0 I dl \sin\theta}{4\pi r^2}$$

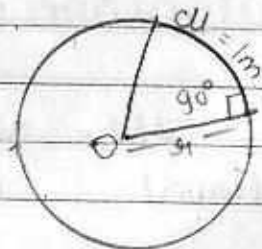
If, $dB = 10^{-7}$ Tesla

$\mu_0 = 4\pi \times 10^{-7}$ Henry \times meter / ampere

$\sin\theta = 90^\circ$

$r = 1 \text{ m}, dl = 1 \text{ m}$

then, $I = 1$ Ampere



12



पृष्ठ 12 के अंक



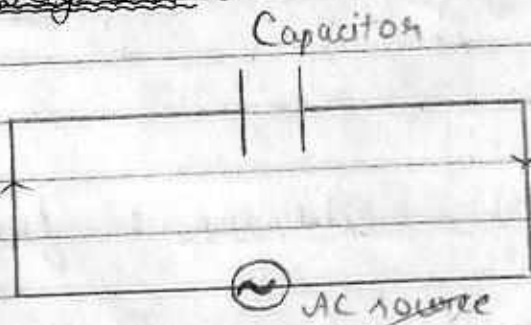
प्रश्न क्र.

" If 10^{-7} Tesla magnetic field is produced by 1 m wire in a circle of radius 1m in vacuum at perpendicular, then current in " small element is 1 Ampere.

Answer no. - 12 (ii)

B
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Circuit diagram :-



$$V = V_0 \sin \omega t$$

Diagram shows, an AC circuit having only capacitor. Instantaneous value of voltage is

$$V = V_0 \sin \omega t$$

Instantaneous current : If dq charge is flowing in the capc circuit in dt time interval then,

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पृष्ठ 13 के अंक

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q = CV

dq/dt = d(CV)/dt { on differentiating

I = d(CV_0 sin wt)/dt

I = CV_0 d sin wt/dt

I = CV_0 (w cos wt) { ∵ d sin θ = cos θ dt

I = wCV_0 cos wt

I = wV_0C sin(π/2 + wt) ... (1)

for maximum current, sin(π/2 + wt) = 1

I_0 = wCV_0 (2)

putting in eq (1)

I = I_0 sin(wt + π/2)

..... (3)

Phase difference :-

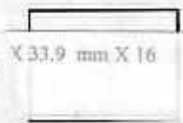
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$$= \omega t \frac{\pi}{2} - \left(\omega t + \frac{\pi}{2} \right)$$

$$= \omega t \frac{\pi}{2} - \omega t - \frac{\pi}{2}$$

$$= - \frac{\pi}{2}$$

i.e. Voltage lags by current in phase difference $\pi/2$.

B
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Capacitive reactance :- from eq. (2)

$$I = I_0 \sin(\omega t + \pi/2)$$

$$I_0 = \omega C V_0 \sin(\omega t + \phi)$$

$$\frac{I}{\omega C} = \frac{V_0}{I_0}$$

$$\frac{1}{\omega C} = X_c$$

$$\text{OR} \quad X_c = \frac{1}{\omega C}$$

X_c is capacitive reactance

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योग पूर्व पृष्ठ



पृष्ठ 15 के अंक



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प्रश्न क्र.

Answer no - 13 (i)

The equation which represents the relationship between u (distance of object), v (distance of image) and f (focal length) is called lens formula.

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

B
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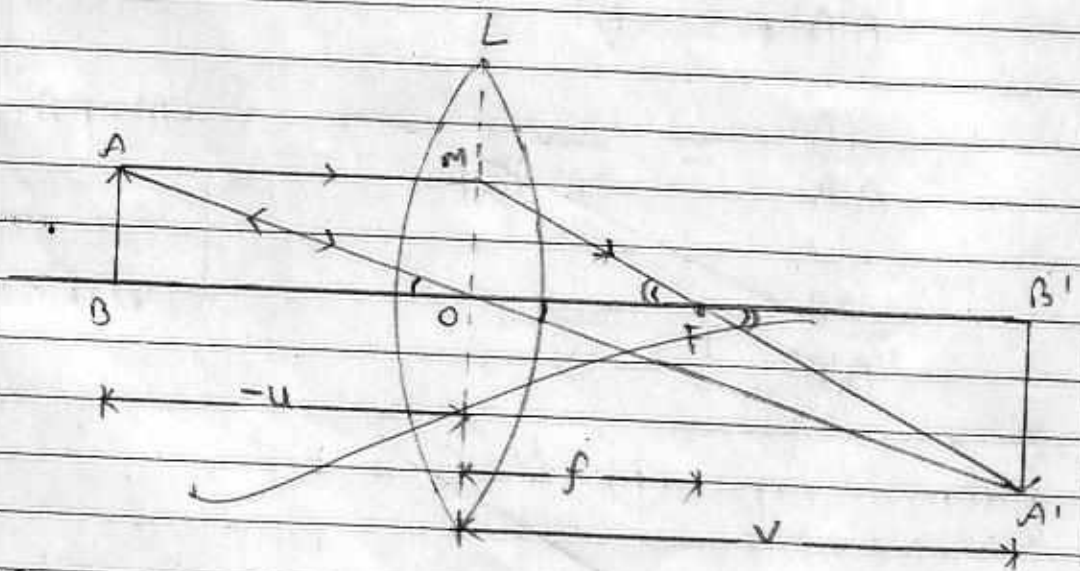


Diagram shows,

A convex lens L having optical center O . AB is object and forms image $A'B'$.

Distance of object from O (OB) = $-u$

Distance of image from O (OB') = v

Distance of focus from O (OF) = f

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In diagram,

$$\Delta AOB \sim \Delta A'OB'$$

$$\therefore \frac{AB}{A'B'} = \frac{OB}{OB'} = \frac{-u}{v} \dots (1)$$

$$\Delta OMF \sim \Delta A'B'F$$

$$\therefore \frac{OM}{A'B'} = \frac{OF}{B'F}$$

B
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$$\frac{AB}{A'B'} = \frac{f}{OB' - OF} \quad \left\{ \because OM = AB \right\}$$

$$\frac{AB}{A'B'} = \frac{f}{v - f} \dots (2)$$

from eq. (1) & (2)

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

$$-uv + uf = vf$$

On dividing by uvf on both sides

$$\frac{-uv}{uvf} + \frac{uf}{uvf} = \frac{vf}{uvf}$$

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$$\left[\quad \right] + \left[\quad \right] = \left[\quad \right]$$

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

OR

$\frac{1}{f}$	$=$	$\frac{1}{v}$	$-$	$\frac{1}{u}$
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Hence proved

Answer no - 14 (i)

B
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Huygen's principle of Secondary wavelets

According to which -

- (1) A Light source emit ^{waves} light in all possible directions which travel with same velocity in one medium.
- (2) An imaginary surface on which disturbances produced by waves on reaching simultaneously, is called Primary wavefront.
- (3) Each particle present on primary wavefront ~~work~~ works as fresh light source which

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योग पूर्व पृष्ठ

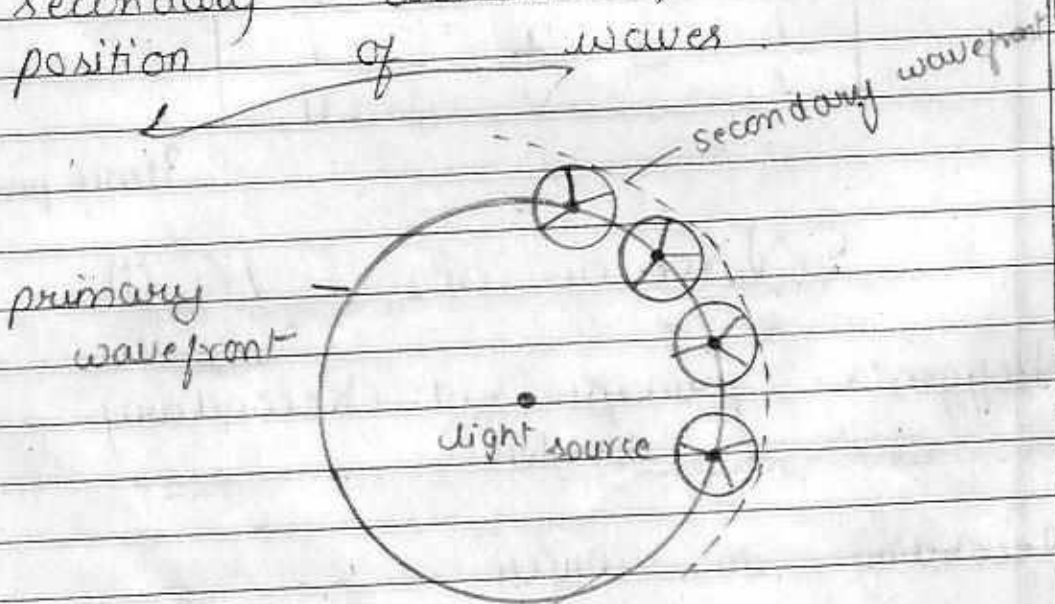
पृष्ठ 18 क अंक



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emits waves are called Secondary wavelets.

(4) On drawing tangent on secondary wavelets, show new position of waves.



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Application - Huygen's secondary wavelets theory explain reflection and refraction.

'Marconi' extended Huygen's theory and explain polarization for transverse waves.



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Answer no - 15 (i)

Bohr's atom model

Bohr explain atom model with the help of Max Planck Quantum Theory According to which -

- (1) Electrons are revolving around the nucleus in certain circular paths called 'Orbits'.
- (2) Revolving in special orbit, electron neither emit energy nor absorb. It means, Electrons revolving in orbits according to their energy level.
- (3) On jumping from higher energy level to a lower energy level, electrons emit energy difference of both energy level.
- (4) On jumping from lower energy level into higher energy level, electrons absorb energy difference of both energy level.



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(5) Electrons revolving around the nucleus, will emit or absorb some quantized value of energy.

(6) Angular momentum of electron revolving in circular path path of radius r is whole multiple of $\frac{h}{2\pi}$ i.e. $mvr = \frac{nh}{2\pi}$

B
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Merits :

- (1) Explanation of hydrogen spectrum.

- (2) Calculation of Rydberg's constant.

- (3) In the explanation of stability of atom.

Demerits :

- (1) $mvr = \frac{nh}{2\pi}$, could not be explained.

- (2) It could not explain a spectrum of hydrogen having more than one electron.

- (3) It could not explain Zeeman and Stark effect.

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प्रश्न क्र.

Answer no. - 06 (ii)

Gauss Law

"The total electric flux over a closed circuit surface in vacuum is \pm/ϵ_0 times to the total charge contained inside conductor."

Mathematically,

$$\phi = \oint_s \vec{E} \cdot d\vec{s} = \frac{Q}{\epsilon_0}$$

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Proof :-

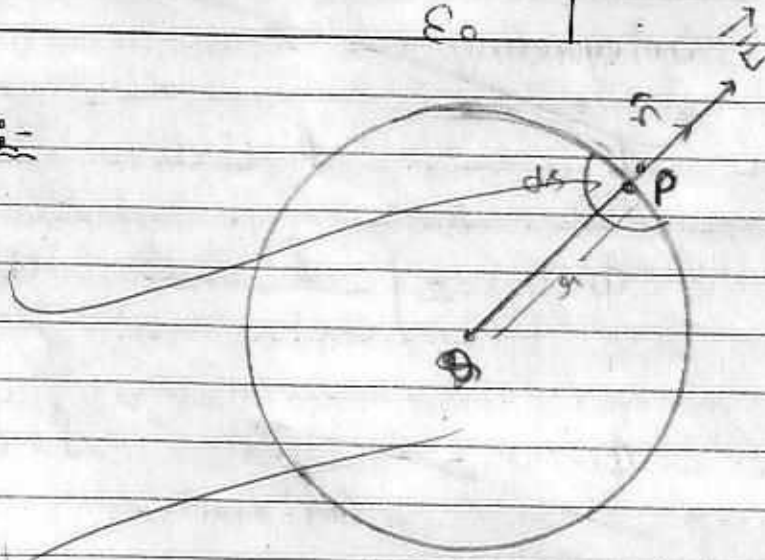


Diagram shows,

A closed sphere in which Q is present inside sphere. A small element ds is selected on surface which is at a distance r from charge Q.



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Electric field intensity at point P on the surface is

$$E = \frac{1}{4\pi\epsilon_0} \frac{Q}{r^2} \dots (1)$$

Small electric flux linked with small area is

$$d\phi = E ds \cos \theta$$
$$d\phi = E ds \quad \{ \because \theta = 0^\circ$$

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On integrating -

~~$$\phi = \oint E ds$$~~

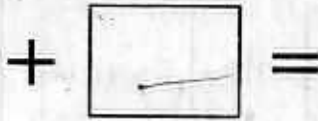
$$\phi = \int \frac{1}{4\pi\epsilon_0} \frac{Q}{r^2} ds$$

~~$$\phi = \frac{Q}{4\pi\epsilon_0 r^2} \int ds$$~~

$$\phi = \frac{Q}{4\pi\epsilon_0 r^2} \times 4\pi r^2$$

$$\phi = \frac{Q}{\epsilon_0}$$

23



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प्रश्न क्र.

04

$$\oint \vec{E} \cdot d\vec{a} = \frac{Q}{\epsilon_0}$$

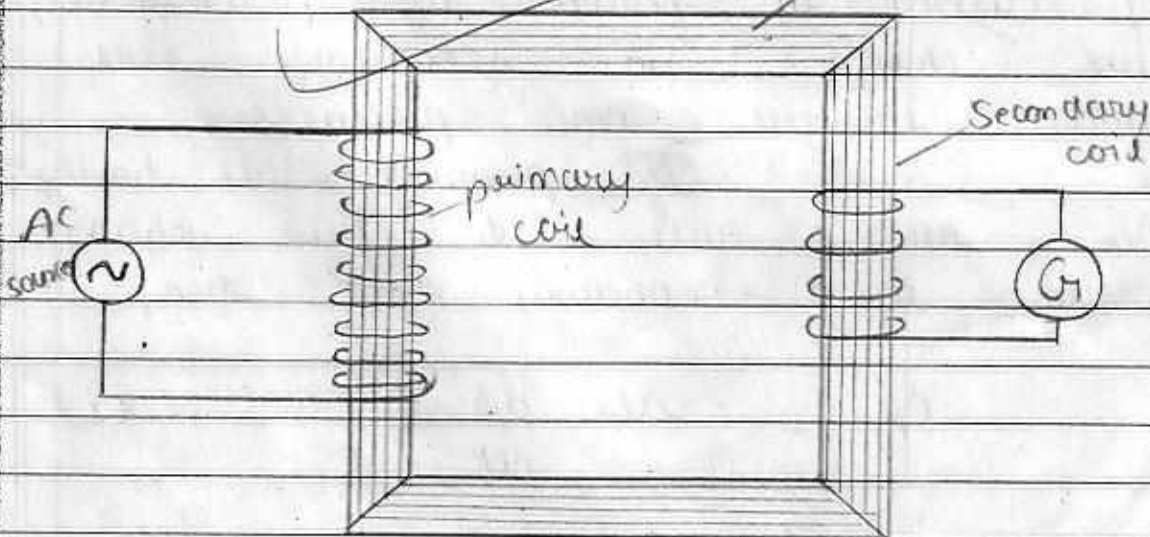
\therefore proves Gauss's theorem

Answer no. - 17 (ii)

Transformer

Transformer is a device which can increase or decrease alternating voltage.

(i) Labelled diagram - soft iron core





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Diagram shows, Step down transformer which consists of four parts -

- (i) Soft iron core.
- (ii) Coil is made on winding Cu wire on soft iron core.
- (iii) AC source is applied in primary coil and flux change occur in secondary coil producing induced current.

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(ii) Principle : Transformer is based on the principle of mutual induction.

(iii) Formula of transformer ratio :-
alternating

If a current is flown in primary coil, flux change in secondary coil and induced emf produces =

If primary coil having N_p turns and ϕ flux change occur in secondary coil then,

$$E_p = - N_p \frac{d\phi}{dt} \dots (1)$$



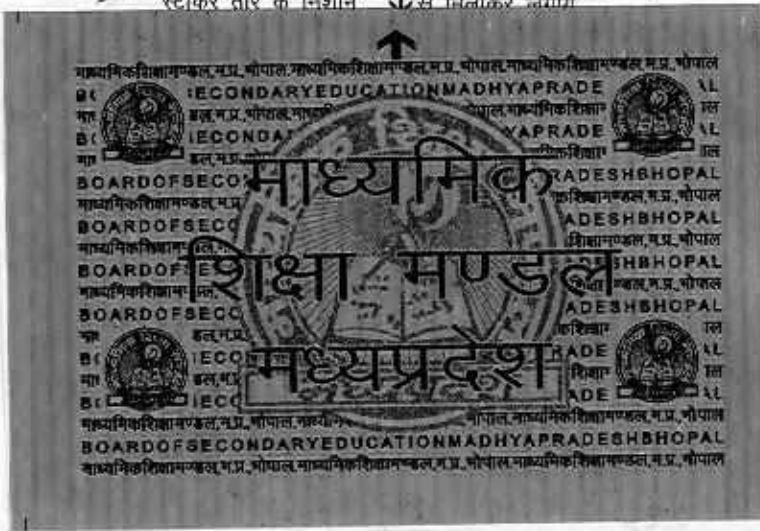
परीक्षार्थी द्वारा भरा जावे ↓
 परीक्षा का विषय : विषय कोड : परीक्षा का माध्यम : परीक्षा का दिनांक

Physics : 2 : 1 : 0 : English

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स्टीकर तीर के निशान ↓ से चिनाकर लगायें

परीक्षार्थी द्वारा भरा जावे →



परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मूद्रा
बि. हाई स्कूल परीक्षा

पर्यवेक्षक का नाम एवं हस्ताक्षर
आरती तिवारी
(Signature)
 14/03/19

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर
(Signature)

मुख्य उत्तर पुस्तिका के अंतिम पृष्ठ क्रमांक..... तक कुल प्राप्तांक

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Due to soft iron core, total flux is also linked with secondary coil having N_s turns then induced emf -

$$e_s = -N_s \frac{d\phi}{dt} \dots (2)$$

On dividing eq (2) by eq (1)

$$\frac{e_s}{e_p} = \frac{+N_s \frac{d\phi}{dt}}{+N_p \frac{d\phi}{dt}}$$

$$\frac{e_s}{e_p} = \frac{N_s}{N_p} \dots (3)$$

In transformer power does not change then -

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$$V e_p I_p = e_s I_s$$

$$\frac{I_p}{I_s} = \frac{e_s}{e_p} \dots (2)$$

from eq (3) & (4)

e_s	$=$	N_s	$=$	I_p
e_p		N_p		I_s

OR

**B
S
E**

Transformation ratio, $\frac{N_s}{N_p} = \frac{e_s}{e_p} = \frac{I_p}{I_s}$

(iv) Two reasons of energy loss -

(a) Flux loss - Total flux of primary coil does not linked with secondary coil so, flux leakage occurs.

Treatment - Using soft iron core

(b) Heat loss : Copper wire having its own resistance due to which energy loss in form of heat.

Treatment - Thick Cu wire is used



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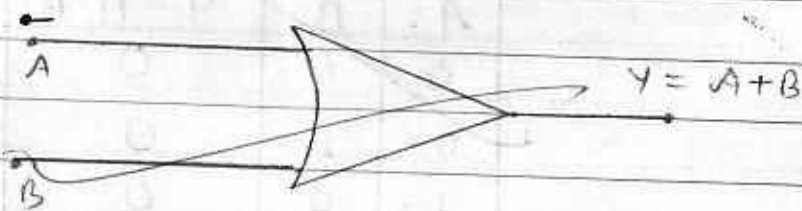
Answer no. 18 (i)

Logic gates : Logical circuits in which logical relationship exists between inputs and outputs are called Logic gates.

1. OR Gate

OR gate having two inputs and one output.

Symbol



Truth table

A	B	$Y = A + B$
0	0	0
0	1	1
1	0	1
1	1	1

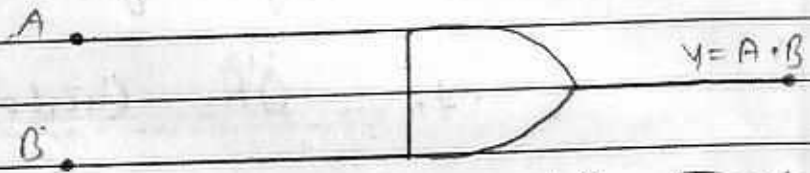


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(2) AND Gate

AND gate having two inputs and one output.

Symbol :-



A and B = Inputs
Y = Output

Truth table :-

A	B	$Y = A \cdot B$
0	0	0
0	1	0
1	0	0
1	1	1

**B
S
E**



माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

वर्ष 2019

4 पृष्ठीय

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय

विषय कोड

परीक्षा का माध्यम

परीक्षा का दिनांक

Physics

2

1

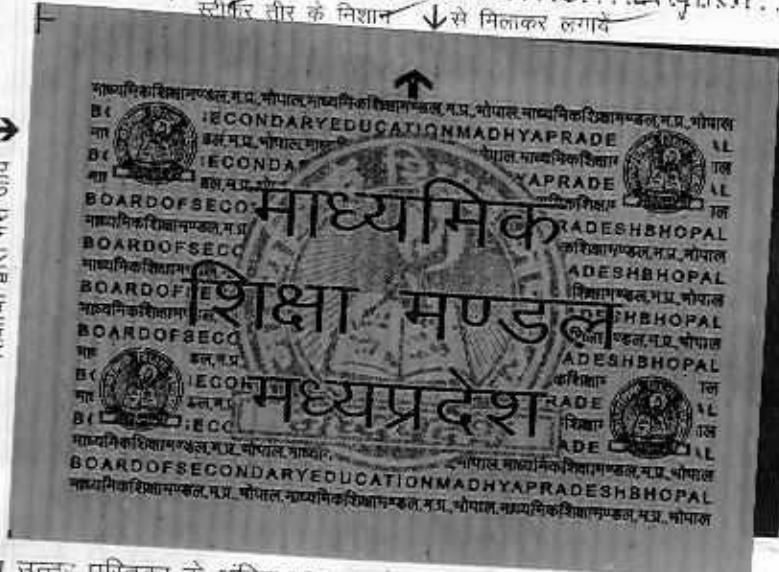
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English

14 | 3 | 19

स्टीपर तीर के निशान ↓ से मिलाकर लगावे

परीक्षार्थी द्वारा भरा जावे →



परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

हाउस से के एंड्री परी बुक

उत्तर पुस्तिका
182001

पर्यवेक्षक का नाम एवं हस्ताक्षर

आरती तिवारी
[Signature]

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर



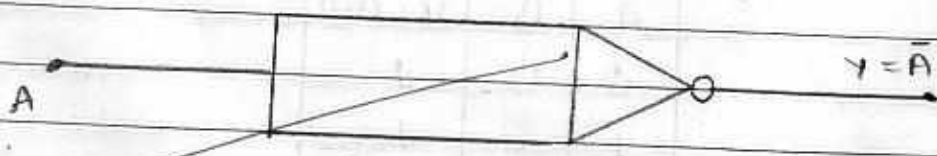
मुख्य उत्तर पुस्तिका के अंतिम पृष्ठ क्रमांक तक कुल प्राप्तांक

[] = []

(3) NOT Gate

NOT gate having only one input and one output.

Symbol :



Truth table :

A	$Y = \bar{A}$
0	1
1	0

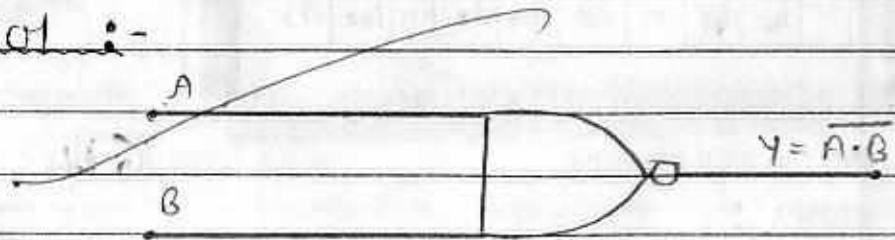


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(4) NAND gate

NAND gate is constructed on applying NOT gate beyond AND gate.

Symbol :-



B
S
E

Where, A and B are inputs and Y is output

Truth table :

A	B	$Y = \overline{A \cdot B}$
0	0	1
1	0	1
0	1	1
1	1	0



The End