माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

24 पृष्ठीय

द्वारा भरा जावे ↓

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कर तीर के निशान ↓ से मिलाकर लगायें

320 - 0327485

परीक्षार्थी का रोल नम्बर

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उदाहरणार्थ

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केवल परीक्षक द्वारा भरा जावे।

प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करें। प्रश्न ... प्राप्तांक (अंकों में)

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क :– पूरक उत्तर पुस्तिकाओं की संख्या अंकों में 1 शब्दों में One

ख :– परीक्षार्थी का कक्ष क्रमांक 01

ग :– परीक्षा का दिनांक 13 03 202

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

केन्द्राध्यक्ष/सहायक केन्द्राध्यक्ष एवं पर्यवेक्षक द्वारा भरा जावे

पर्यवेक्षक का नाम एवं हस्ताक्षर

केन्द्राध्यक्ष/सहायक केन्द्राध्यक्ष 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 गई 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 लगाएं।

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे

कुल प्राप्तांक शब्दों में Seve

100 अंकों का होगा किन्तु नियमित छात्रों को 100 अंक के प्रश्नांक का 80% अधिभार एवं स्वाध्यायी छात्रों को 100 अंक के प्राप्तांक ही अंकसूची में प्रदर्शित किये जायेंगे।"

प्रश्न क्र.

Answer of Q.1.

(a) (ii) coulomb × meter.

(b) (iv) $K = \frac{2\pi}{\lambda}$.

(c) (i) 1.33.

(d) (iii) Number of proton present inside the nucleus.

(e) (i) Electrons in majority.

Answer of Q.2

(a) Ampere / meter^2 (Amp/m^2).

(b) ohm (Ω).

(c) 1.76×10^{11}

(d) - 13.6.

(e) four (4).

प्रश्न क्र.

Answer of Q.3.

'A'	'B'
(a) value of Electric field inside the conductor	→ (v) zero.
(b) Nichrome.	→ (iii) Resistance wire
(c) Small bar magnet	→ (iv) Magnetic dipole
(d) Order of magnitude of wave length of visible light.	→ (i) 10^{-6} m.
(e) Alpha particle	→ (ii) Helium nucleus.

Answer of Q.4.

(a) Lorentz force.

(b) 30.

(c) $E = h\nu$

ν → frequency of radiation
E → Energy.
h → planck's constant.

(d) 1.6×10^{-19} C.

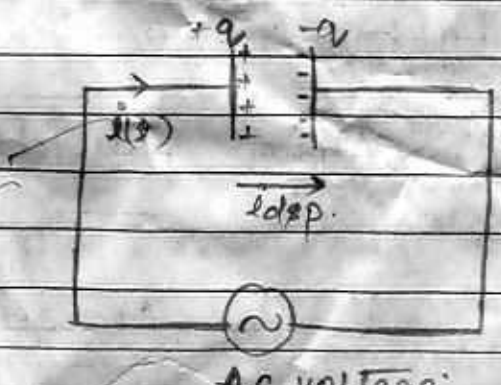
zero.

Answer of Q.5. (Or)

Displacement current: The current develops between the plates of a capacitor when the circuit is connected to an oscillating A.C voltage. The current in the ckt also changes with time(t).

$$i = \frac{dq}{dt} = \frac{d(\phi_E \times \epsilon_0)}{dt}$$

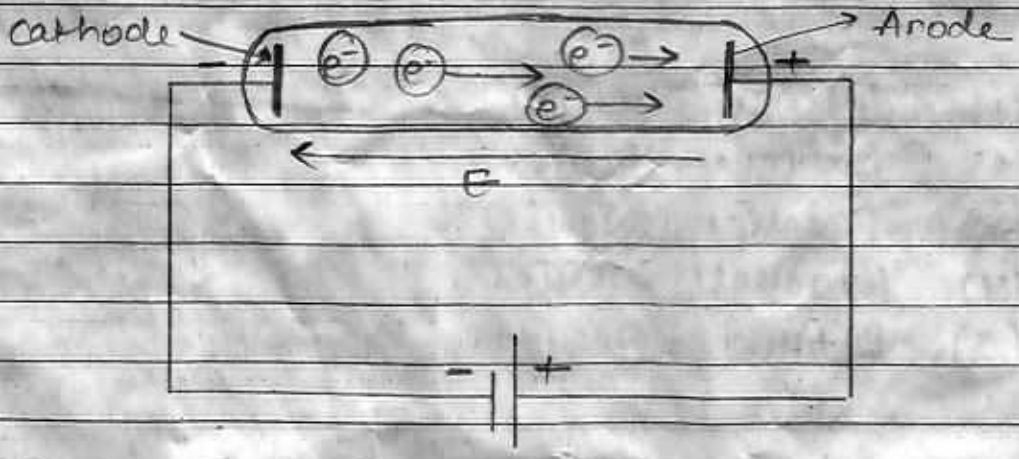
$$\boxed{i_{dsp} = \epsilon_0 \frac{d\phi_E}{dt}}$$



where ϵ_0 → permittivity of free space / air.
ϕ_E → Electric flux.
i_{dsp} → Displacement current.

Answer of Q.6.

In the discharge tube exp. under high voltage an electron gains kinetic energy(K) and moves from cathode to anode.



Initially e⁻ gain K.E when cathode is at -ve potential and anode at +ve potential.

→ "The -ve potential of Anode w.r.t cathode after reversing the polarity of battery to make the current in the circuit zero by stopping maximum K.E gain electron." called stopping potential (V_s).

$$K.E_{max.} = eV_s$$

प्रश्न क्र.

Answer of Q.7.

When we heat Hydrogen atom and obtain line spectrum by the transition of electron, following spectral lines are obtained :—

(1) Lymen series.
(2) Balmer series.
(3) Paschen series.
(4) Brackett series.
(5) P-fund series.

Answer of Q.8 (04)

Given that,

$R_1 = R_2 = 4$ ohm

$R_3 = 3$ ohm.

$V = 10$ volt.

Since R_1 and R_2 are connected in parallel, their equivalent resistance will be.

$$\frac{1}{R_{equ.}\ (\text{of } R_1 \text{ and } R_2)} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$R_{equ} = \frac{R_1 R_2}{R_1 + R_2}$$

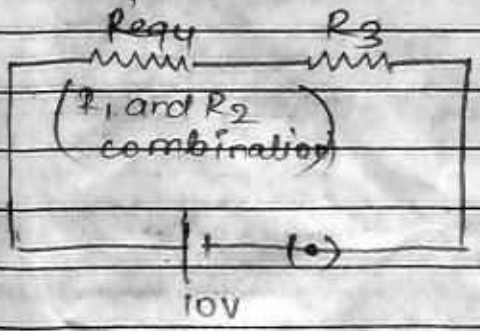
प्रश्न क्र.

$$R_{equ} = \frac{4 \times 4}{4+4} = \frac{16}{8}$$

$$\boxed{R_{equ.} = 2 \text{ ohm}} \quad \text{---} (1).$$

Since, the $R_{equ.}$ of R_1 and R_2 are in series with R_3, Thus, Net equivalent Resistance of circuit will be -

$$R_{equ.} = R'_{equ} + R_3 \quad \text{---} (2)$$



Putting value R'_{equ} in equ. (2) from equ. (1).

$$R_{equ} = 2 + 3 \text{ ohm}$$

$$\boxed{R_{equ.} = 5 \text{ ohm}.} \quad \underline{\text{Ans}}.$$

(ii) Current in the ckt -

$$V = I R_{equ.} \Rightarrow I = \frac{V}{R_{equ.}}$$

$$\boxed{I = \frac{10}{5} = 2 \text{ amp}} \quad \underline{\text{Ans}}.$$

Hence, Equivalent Resistance is 5 ohm & current is 2 Amp.

B S E

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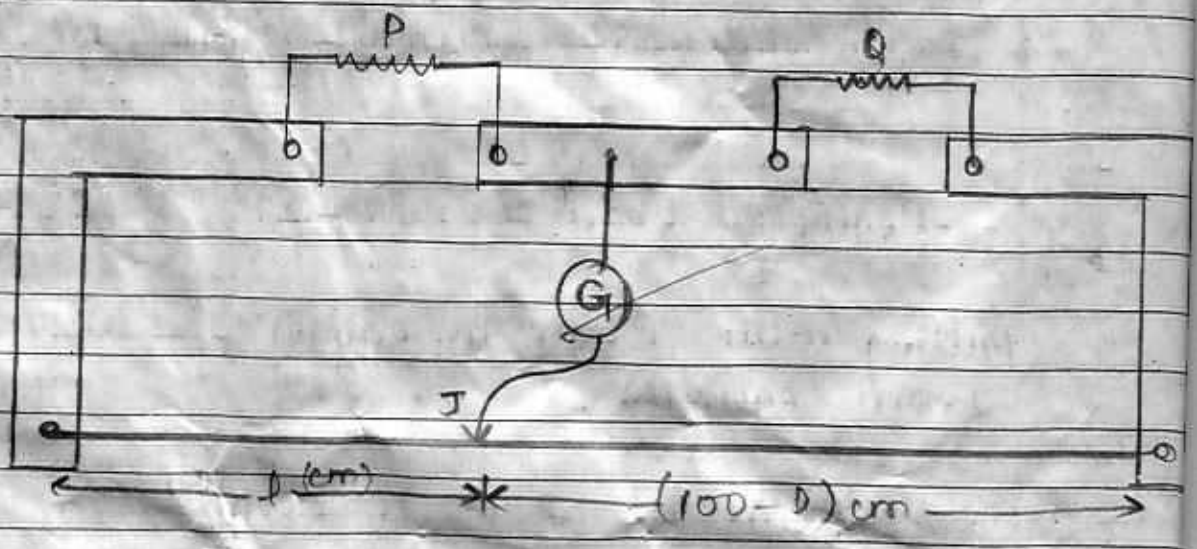
प्रश्न क्र.

Answer of Q.9. (or)

Metre Bridge.

(i) Labelled Diagram:



where P = Known Resistance
Q = Unknown Resistance.
G = Galvanometer
J = Jockey.

(ii) **Principle:** The Metre bridge is a device which is used to measure value of unknown Resistance. It works on the principle of wheatstone Bridge. i.e. in null point deflection in Galvanometer.

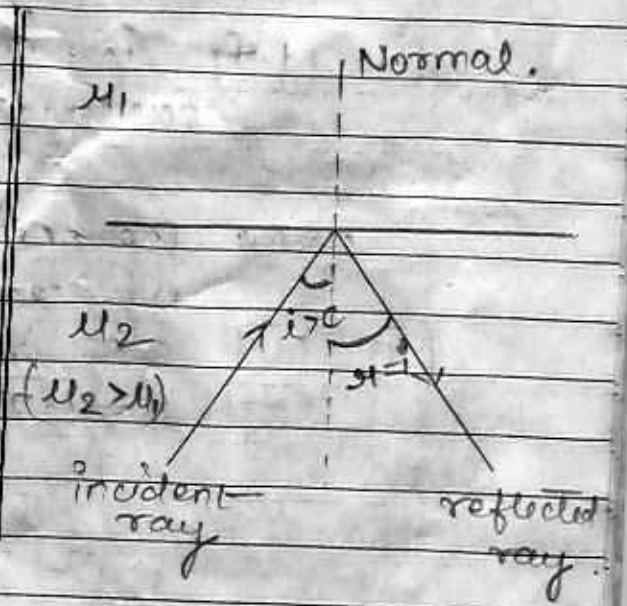
Answer of Q10.

Conditions for obtaining Total internal Reflection —

(1) The light ray should ~~take place~~ move from denser to rarer medium.

(2) The angle of incidence($\angle i$) should be greater than the critical angle ($\angle c$)

$$\boxed{\angle i > \angle c}.$$



Applications.

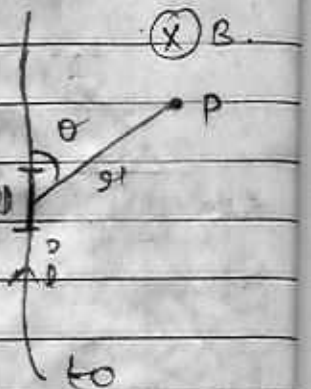
(I) Optical fibre: It is a thin ~~steam~~ stranded bundle of wires helps in transfer of information It works on principle of T.I.R.

(II) fish uses T.I.R technique in seeing the object under water.

Answer of Q.11

Bio-Savart's law.

This law is used to determine a magnetic field experience by a small section of wire in the presence of magnetic field.



→ We have to determine Magnetic field at P.

→ According to this law,

(i) M.f is directly proportion to current flowing in a wire.

$$B \propto i. \quad \text{—— (1)}$$

(ii) M.f is directly proportional to length vector.

$$B \propto dl \quad \text{—— (2)}$$

(iii) M.f is directly proportional to $\sin\theta$.

$$B \propto \sin\theta. \quad \text{—— (3)}$$

प्रश्न क्र.

(iv) M.F is inversely proportional to the square of distance b/w them (r).

$$B \propto \frac{1}{r^2} \quad \text{---(4)}$$

By (1), (2), (3) & (4) equ.

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

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

where K is constant, $K = \frac{\mu_0}{4\pi} = 10^{-7}\ \frac{N}{amp^2}$

$\mu_0 \rightarrow$ permeability of free space / air.

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

Hence, unit current is defined as —

" It is the current when a wire is kept perpendicular to point of observation ($\theta = 90°$, $\sin\theta = 1$) with a unit distance and unit length and it placed in a ~~unit~~ 10^{-7} magnetic field."

Answer of Q.12 (or)

Self Induction: It is the property of Inductive coil that resist any change in the current in the circuit by inducing an induced current in the circuit.

Its unit: Henry (H), $\frac{\text{Joule}}{\text{amp}^2}$, $\frac{\text{N-m}}{\text{amp}^2}$, etc.

Answer of Q.12

Magnetic flux: The no. of magnetic field lines passes per unit area perpendicularly.

$$\phi_M = \vec{B} \cdot \vec{A} = BA\cos\theta$$

$\theta \rightarrow$ angle b/w M.F lines and area vector ($\hat{n}$)

Unit: weber (wb), $\frac{\text{N-m}}{\text{amp}}$, $\frac{\text{Joule}}{\text{amp}}$, etc.

प्रश्न क्र.

→ Faraday's law of (EMI) Electro magnetic spectrum.

Ist law: The current induced in a closed circuit whenever there is a change in magnetic flux linked with the coil.

IInd law: The induced emf develop is directly proportional to the rate of change of Total flux linked with coil.

$$e \propto N\frac{d\phi}{dt}$$

$$\boxed{e = -N\frac{d\phi}{dt}}$$

where -ve sign indicates that direction of induced emf is opposite to direction of flux change. (According to Lenz law)

Answer of Q.B.

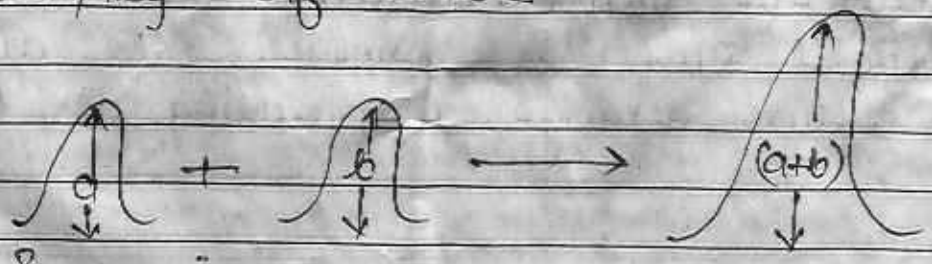
Interference : It is a phenomenon which represent wave nature of light. when two or more than two light waves meet in same phase or opposite phase, then the resultant amplitude and resultant intensity changes.

B S E

→ Sources of light must be coherent.

→ There are 2 type of interference:

(i) **Constructive interference:** when two light waves meets in same phase. This type of interfere will lead to increased amplitude and intensity of wave.

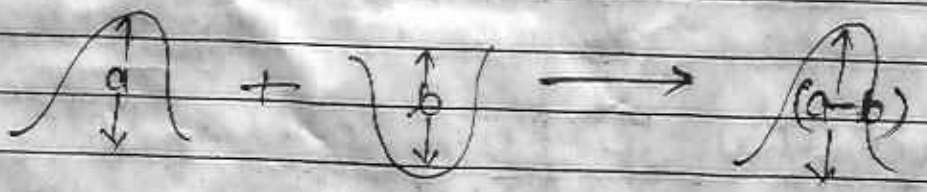


Thus, Maximum

Amplitude = $(A_1 + A_2)$

$a+b = (a+b)$

(ii) Destructive interference : In this type of interference two waves meet out of the phase and resultant amplitude decrease due to their superimposition.



Thus, $A_{min} = A_1 - A_2$

$= (a-b)$

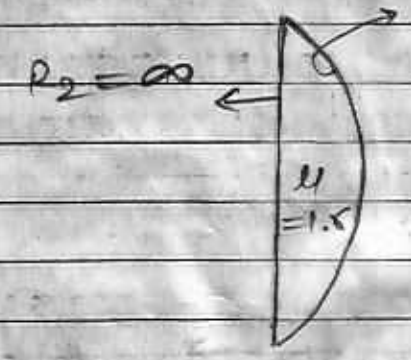
Factors affecting fringe width of light

(1) Wavelength : On increasing wavelength fringe width increases.

(2) Distance b/w slit and screen : On increasing the distance b/w slit and screen (D), fringe width increases.

Distance b/w two slits : On increasing the distance b/w slits, fringe width decreases.

Answer of Q.14



B Given that, $R_1 = 20\,cm$, $R_2 = \infty$, $\mu = 1.5$.

S

E By using Lens Maker formula,

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

Putting value,

$$\frac{1}{f} = (1.5 - 1)\left(\frac{1}{20} - \frac{1}{\infty}\right)$$

$$\frac{1}{f} = 0.5 \times \frac{1}{20}$$

$$f = \frac{20}{0.5} = 40\ cm.$$

Ans.

4

Thus focal length of plano convex lens is 40 cm.

Answer of Q.15.

Radioactivity : The disintegration of heavy nucleus into light nucleus inside nucleus, termed as Radioactivity.

Law of Radioactive Decay: According to this law, "Rate of Radioactive decay is directly proportional to the nuclie that remain unaccayed."

$$\therefore -\frac{dN}{dt} \propto N$$

$$\frac{dN}{dt} = -\lambda N$$

→ where λ is Decay constant.

$$\frac{dN}{N} = -\lambda dt$$

→ Integration Both side

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प्रश्न क्र.

$$\int_{N=N_0}^{N=N} \frac{dN}{N} = -\lambda \int_{t=0}^{t=t} dt$$

$$\left[\log_e N\right]_{N_0}^{N} = -\lambda \left[t\right]_0^t$$

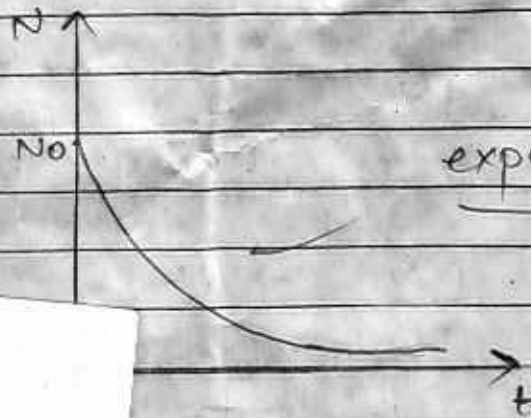
$$\log_e N - \log_e N_0 = -\lambda t$$

$$\log_e \left(\frac{N}{N_0}\right) = -\lambda t \qquad \left[\because \log_e (m-n) = \log_n \frac{m}{n}\right]$$

$$\frac{N}{N_0} = e^{-\lambda t}$$

$$\boxed{N = N_0 e^{-\lambda t}}$$

At time = t instant, the radioactive decay is exponential.



exponential decay curve

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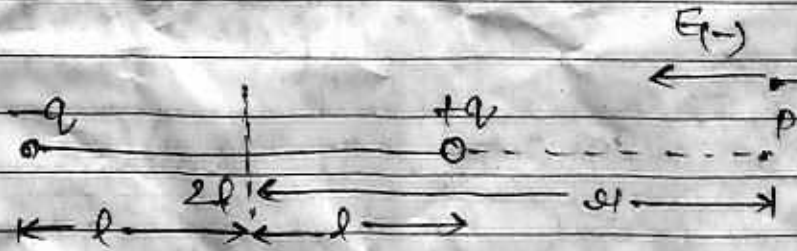
Answer of Q.16.

Electric dipole : It is a system of two opposite charge kept at certain distance (2l) from each other. Dipole moment is a vector quantity and its direction is from -ve to +ve charge.

Intensity of Electric field at end on position (axial position)

Suppose we have to determine Electric field at point P on the axis of dipole.



$|E_+|$ = Electric field due to +q charge = $\frac{Kq}{(r-l)^2}$

$|E_-|$ = E.f due to -ve charge = $\frac{Kq}{(r+l)^2}$

At point P, $|E_+|$ and $|E_-|$ are in opposite direction.

Thus, Net Electric field at P will be

$\therefore E_{axis} = |E_+| - |E_-|$

$\longrightarrow E_{axis} = \frac{kq}{(x-l)^2} - \frac{kq}{(x+l)^2}$

$\longrightarrow E_{axis} = kq\left[\frac{1}{(x-l)^2} - \frac{1}{(x+l)^2}\right]$

$\longrightarrow E_{axis} = kq\left[\frac{(x+l)^2 - (x-l)^2}{(x-l)^2(x+l)^2}\right]$

$\longrightarrow E_{axis} = kq\left[\frac{4xl}{(x^2-l^2)^2}\right]$

$\longrightarrow E_{axis} = \left[\frac{kq\,(2x)(2l)}{(x^2-l^2)^2}\right]$

$\longrightarrow E_{axis} = \frac{2kp\,x}{(x^2-l^2)^2}$

$\therefore$ for a short Dipole $l << x$

$\therefore l \longrightarrow 0$.

क्र.

$$\rightarrow E_{axis} = \frac{2kp\,y}{(y^2)^2}$$

$$\rightarrow E_{axis} = \frac{2kp\,y}{y^4}$$

$$\rightarrow E_{axis} = \frac{2kp}{y^3}$$

$\therefore$ Thus, $\boxed{E_{axial} = \frac{1}{4\pi\epsilon_0} \cdot \frac{2p}{y^3}}$

$\rightarrow$ In vector form,

$$\boxed{\vec{E}_{axial} = \frac{1}{4\pi\epsilon_0} \cdot \frac{2\vec{p}}{y^3} \cdot \hat{y}}$$

Hence proved.

P.T.O $\rightarrow$

Answer of Q17.

Transformer.

(1) Kinds of Transformer: It is a device which converts low voltage A.C in high voltage and viceversa.

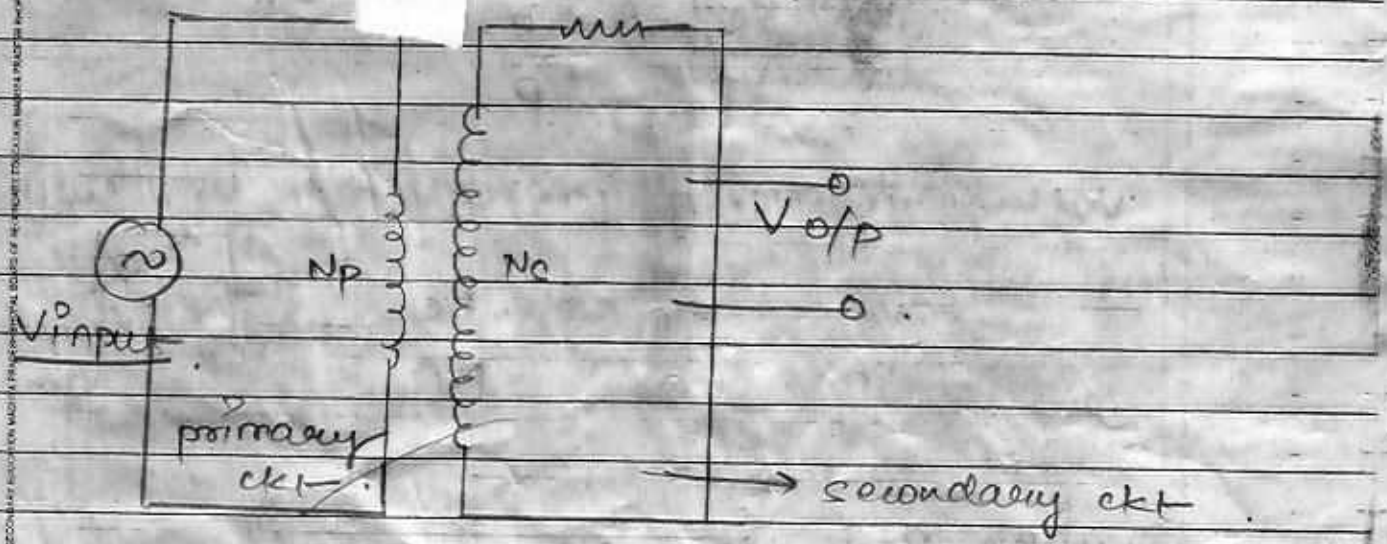
There are 2 type of Transformer.

(a) Step-up Transformer: It converts low voltage into high voltage. No. of coils in secondary circuit is more than primary.

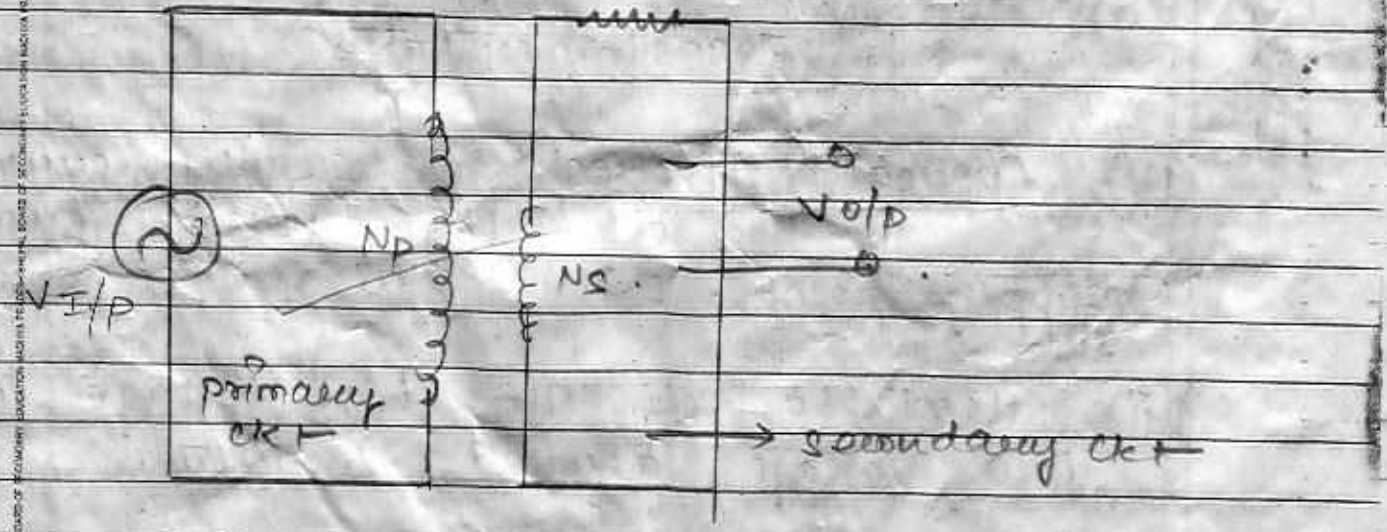
(b) Step-down Transformer: It converts high voltage A.C into low voltage A.C. Number of coils in primary circuit is more than secondary.

(2) Labelled diagram:

(a) Step-up Transformer.



(b) Step-down Transformer.



(3) Principle : It converts low voltage A.C into high voltage and viceversa. The Number of turns(N) in coil is directly proportion to voltage.

$V \propto N$.

प्रश्न क्र.

$$\frac{\quad}{p} = \frac{\quad}{N_p} \quad \text{--- (I)}$$

voltage inversely proportional to current

$V \propto \frac{1}{i}$

$$\frac{V_s}{V_p} = \frac{i_p}{i_s} = \frac{N_s}{N_p} \quad \text{--- (II)}$$

$$\boxed{K = \frac{V_s}{V_p} = \frac{i_p}{i_s} = \frac{N_s}{N_p}}$$

K = Transformer Ratio

(4) Application: (i) used to supply current at high voltage from supply point. It used to reduce power loss.

(ii) used to convert high voltage into low voltage around locality.

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

4 पृष्ठीय

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय	विषय कोड	परीक्षा का माध्यम	परीक्षा का दिनांक
Physics	2 1 0	English	13 05 20

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

पर्यवेक्षक का नाम एवं हस्ताक्षर

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर

परीक्षार्थी द्वारा भरा जावे →

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

Answer – 18 (or)

NAND gate : It is a combination of AND gate and NOT gate. It inverts the output of AND gate.

Symbol :

Truth Table :

Inputs (A)	Inputs (B)	Y output $Y = \overline{A \cdot B}$
0	0	1
1	0	1
0	1	1
1	1	0

ले अंकों का योग

[ ] + [ ] = [ ]

पृष्ठ पृष्ठ अंक

→ Wave form :

Wave signal form.