2017

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

परीक्षार्थी द्वारा भरा जावे ↓

24 पृष्ठीय

परीक्षा का विषय	विषय कोड			परीक्षा का माध्यम
PHYSICS	2	1	0	ENGLISH

परीक्षार्थी द्वारा भरा जावे →

[redacted]

परीक्षार्थी का रोल नम्बर

7 3 1 7 0 2 1

seven three one seven zero two one

उदाहरणार्थ

एक एक दो चार तीन नौ पांच छः आठ

केन्द्राध्यक्ष/सहायक केन्द्राध्यक्ष एवं पर्यवेक्षक द्वारा भरा जावे →

क - पूरक उत्तर पुस्तिकाओं की संख्या अंकों में 3 शब्दों में Three.

ख - परीक्षार्थी का कक्ष क्रमांक Hall-B

ग - परीक्षा का दिनांक 11 03 2017

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

[illegible] परीक्षा केन्द्र क्र. 671054

पर्यवेक्षक का नाम एवं हस्ताक्षर	केन्द्राध्यक्ष/सहायक केन्द्राध्यक्ष के हस्ताक्षर
11/3/17	Malkia

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे →

प्रमाणित किया जाता है कि मूल्यांकन के समय पूरक उत्तर पुस्तिकाओं की संख्या उपरोक्तानुसार सही पाई होलो 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 लगाएं।

उप मुख्य परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा	परीक्षक के हस्ताक्षर एवं निर्धारित मुद्रा
07-4-17 S.C. Chaturvedi (Principal) Head Val. No. 74755.	A.K. Pandey 74750

केवल परीक्षक द्वारा भरा जावे।

प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्ठी करें।

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)
1		✓
2		✓
3		✓
4		✓
5		✓
6		✓
7		✓
8		✓
9		✓
10		✓
11		✓
12		✓
13		✓
14		✓
15		✓
16		✓
17		✓
18		✓
19		✓
20		✓
21		
22		
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25		
26		
27		
28		

कुल प्राप्त [illegible] में

C

प्रश्न क्र.

Question - 01.

(a) ~~(i)(ii)~~ L.E.D. (iv) Photo diode.

(b) (iii) $\frac{\Delta I_c}{\Delta I_b}$.

(c) (i) 1.32×10^{-27} kg x m/s.

(d) (iii) Insulator.

(e) (ii) 9 km.

Question - 2

(a) Infinite.

(b) 9.1×10^{-31} kg.

(c) Zero.

(d) Zero.

(e) Negative (-ve)

प्रश्न क्र.

Question 3

Column A	Column B.
(a) Potential energy of daipole	(vii) ~~pE (1-cosθ)~~
(b) Ultraviolet rays	(vi) ~~As a Germ killer.~~
(c) Infrared rays	(iv) ~~In photography in dark.~~
(d) Intensity of mag. feild of current carrying solenoid at the centre	(iii) ~~μ₀nI.~~
(e) Intensity of mag. feild at one end of current carrying solenoid.	(i) ~~$\frac{\mu_0 n I}{2}$.~~

क्र.

Question 4

(a) Neon lamp shows absorption spectrum.

(b) NOR gate represent Boolean expression $Y = \overline{A+B}$

(c) Core of transformer is laminated so as to minimise the energy & heat loss due to eddy current.

B

S

E

(a) Simple microscope is also called reading lens.

(e) Resolving power of microscope depends inversely on the wavelength of light used.

$$\text{Resolving Power} = \frac{d}{1.22\lambda}.$$

Question 5
OR

Remote Sensing :- Obtaining information about the characteristics such as size, weather, colour, etc without physically touching the source of information (Ex - earth) is called Remote Sensing.

→ Remote Sensing is done by polar satallites.

Question - 6
OR

Conjugate Focii :- Conjugate focii are a pair of point on principle axis such that when object is placed at one point the image is obtained at another point. Same thing happens when the object is placed on other point the image of object is observed at the previous I st point. This is

प्रश्न क्र.

called conjugate foci.

Question – 7

Laws Of Photoelectric Effect :–

(1) For ejection of $\bar{e}$ by photo sensitive metal the incident light should have a particular minimum frequency (ν_0) required for ejection of $\bar{e}$ and that is known as "Threshold frequency."

(2) The no. of electrons ejecting from metal is directly proportional to the intensity of incident photons or radiation.

No. of electrons $\propto$ Intensity.

Question - 8
OR

Characteristics Of Laser Rays:-

(1) Laser beams / rays are highly coherent in nature.

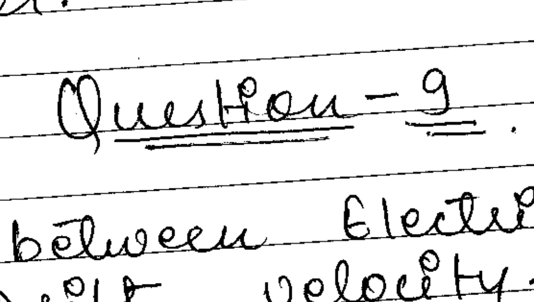
(2) ~~Laser beams are monochromatic.~~

(2) All the photons in laser beam are of same frequency and amplitude.

(4) All the rays / radiation in laser beam are parallel to each other.

Question - 9

Relation between Electric Current and Drift velocity.



प्रश्न क्र.

Suppose a conductor of cross section area A and length of conductor to be l.

No. of electrons in conductor per unit ~~area~~ volume to be n.

Then the charge on conductor can be denoted as.

Q = no. of $\bar{e}$ x charge of $\bar{e}$ x Volume per unit volume of conductor

$$Q = n\bar{e} \times Al. \longrightarrow (1)$$

We know that current can also be written as.

$$I = \frac{Q}{t} \longrightarrow (2)$$

Here, $t = \frac{\text{length of cond.}}{\text{drift velocity}}$

$$t = \frac{l}{v_d} \longrightarrow (3)$$

[Here, v_d = drift velocity of $\bar{e}$]

Now putting the value of equation (1) and (3) in equation (2) we get.

$$I = \frac{Q}{t} = \frac{n\bar{e}Al}{l/Vd}$$

$$\boxed{I = n\bar{e}AVd} \longrightarrow (4)$$

where, I = current in circuit
n = no. of $\bar{e}$ per unit volume
A = area of cross sec^{n}
l = length of cond.
Vd = drift velocity.

So, by equation (4),
i.e. $I = n\bar{e}AVd$
we can say that

$$I \propto Vd$$

i.e. current is directly proportional to drift velocity.

क्र.

Question-10

OR

Super Conductors :- Super conductors are the metals which offer zero resistance to the flow of current at temprature 0 K. (kelvin)

→ Super conductors show high value to conductivity.

→ But with increase ~~w~~ in temprature they develop a resistance but ~~en~~ ~~ev~~ even then they can be used as efficient conductors.

Uses Of Superconductors :-

i) Super conductors can be used in heavy machines so as to minimise the loss of energy in form of heat as they offer minimum resistance.

(ii) Super conductors are also use in making of strong parmanent magnets.

प्रश्न क्र.

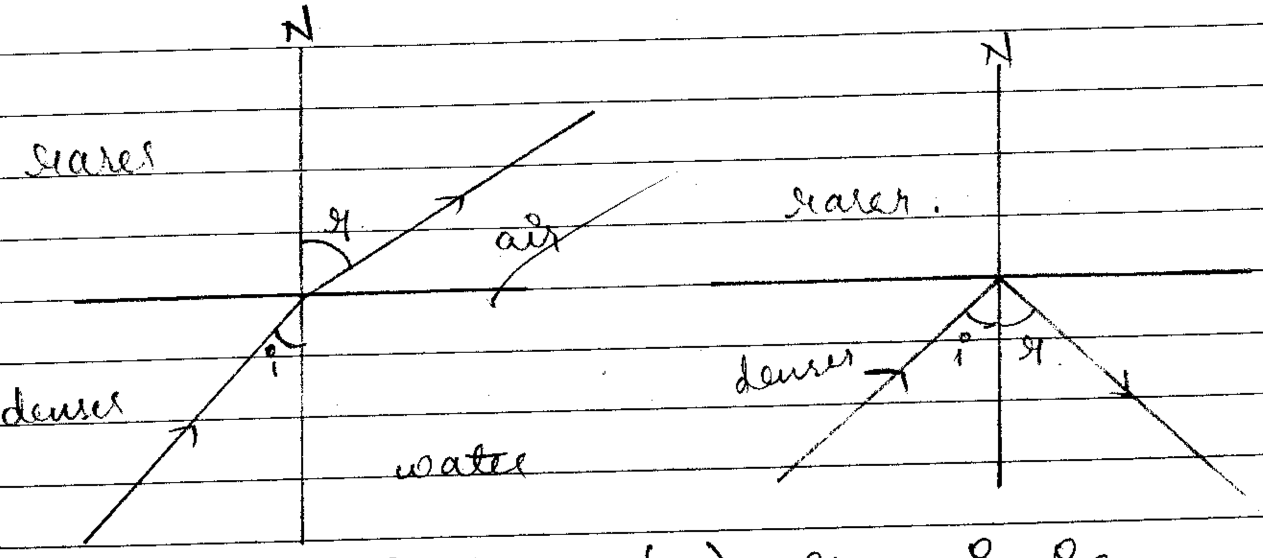
Question : 11

Relation between critical angle and refractive index.

Critical Angle (i_c) → It is the minimum angle of incidence for which the refracted ray goes parallel to the interphase of medium and "angle of refraction is 90°."

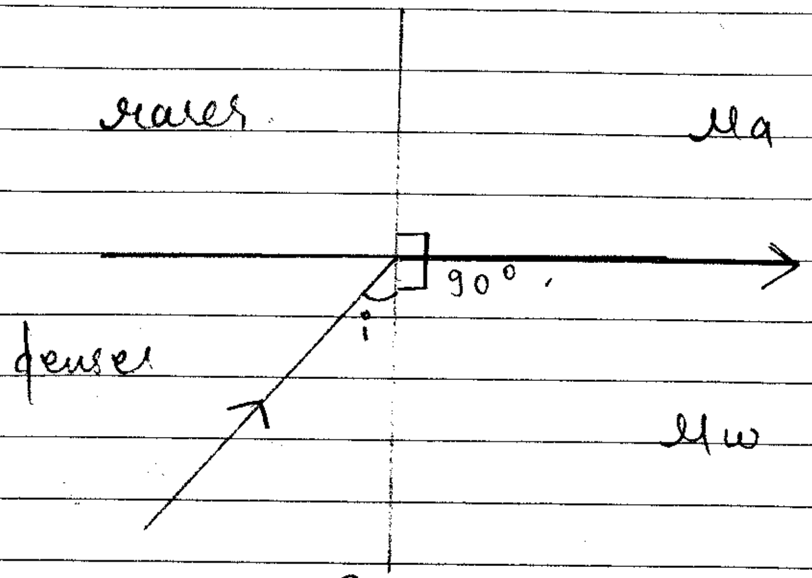
Condition

(i) Ray of light should go from denser medium to rarer medium.



(I) When i is less then i_c

(II) When i is greater than i_c.



Here, $i = i_c$
$r = 90^\circ$

Relation
Assume that the angle of incidence is equal to critical angle then.

According to Snells Law,

Refractive Index $= {}_w\mu_a = \dfrac{\sin i}{\sin r}$

$$\left[\begin{array}{l}\sin i = \sin i_c \\ \sin r = \sin 90^\circ\end{array}\right]$$

[${}_w\mu_a$ = as ray goes from water to air].

प्रश्न क्र.

So, $_{w}\mu_{a} = \frac{\sin i_c}{\sin 90^\circ}$

$[\sin 90 = 1]$.

$_{w}\mu_{a} = \frac{\sin i_c}{1}$.

$$\left[{_{w}\mu_{a}} = \frac{1}{_{a}\mu_{w}} \right]$$

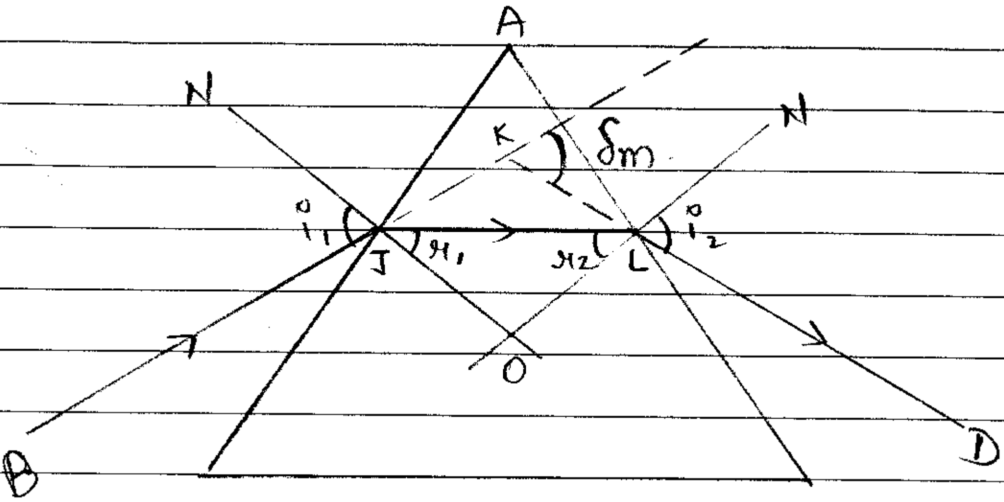
So, $\frac{1}{_{a}\mu_{w}} = \sin i_c$

$$\boxed{_{a}\mu_{w} = \frac{1}{\sin i_c}}$$

So, Refractive Index is inversally proportional to critical angle.

Question 12

Refractive Index Of Prism.



Theory
~~An~~ incident ray BJ strike the prism at angle i_1 and emerges out making angle i_2.

Angle of refraction are r_1 & r_2.

N is a Normal drawn at prism.

δm here is the deviation of incident ray.

A is the angle of prism.

प्रश्न क्र.

We know that,

$\delta m = \angle KJO + \angle KLO$

(Exterior angle property)

$\delta m = (i_1 - r_1) + (i_2 - r_2)$

$\delta m = 2i - 2r.$

considering the case of minimum deviation $i_1 = i_2 = i$

$r_1 = r_2 = r.$

$\therefore \delta m = 2i - 2r \longrightarrow (1).$

Now In Quadrilateral AJOL.

$\angle AJO \& = \angle ALO = 90^\circ.$

So,

$\angle JAL + \angle JOL = 180^\circ$

$\angle A + \angle O = 180^\circ. \longrightarrow (2)$

In $\triangle$le JLO.

$r_1 + r_2 + \angle O = 180^\circ. \longrightarrow (3)$

Equating equation (2) & (3)

we get.

$\angle A + \angle O = r_1 + r_2 + \angle O$

$2r = \angle A \longrightarrow (4).$

Now putting value of eqⁿ (4) in eqⁿ (1) we get

$$\delta m = 2i - A$$

$$\text{So, } i = \frac{\delta m + A}{2} \longrightarrow (5)$$

We know by Snells Law that

$$\mu = \frac{\sin i}{\sin r} \longrightarrow (6)$$

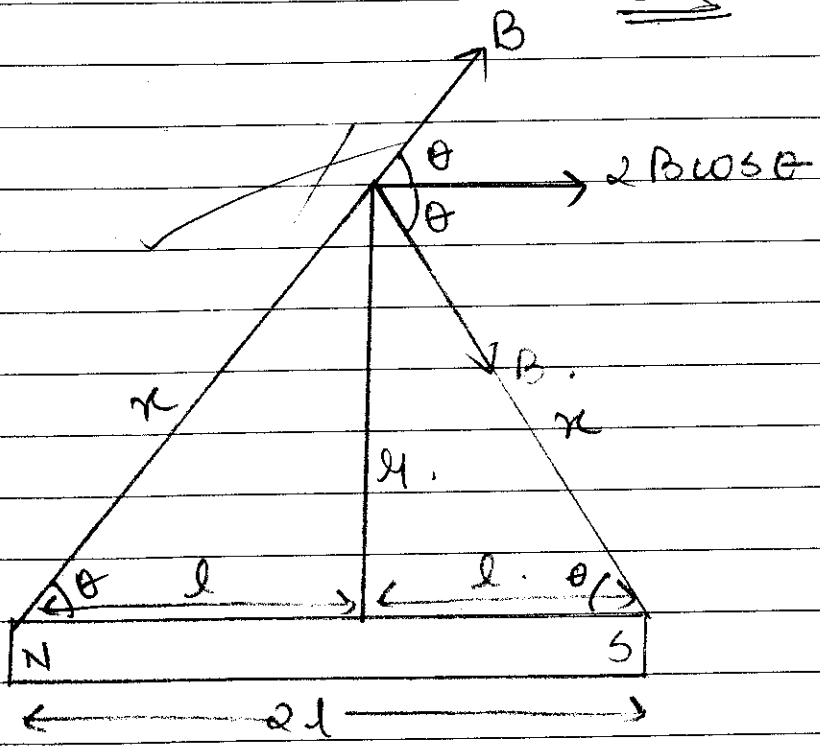
putting value of eqⁿ (4) & (5) in eqⁿ (6) we get

$$\mu = \frac{\sin\left(\frac{\delta m + A}{2}\right)}{\sin\left(\frac{A}{2}\right)}$$

Hence, the above expression is the formula for refractive index of prism.

प्रश्न क्र.

Question - 13 OR



Theory

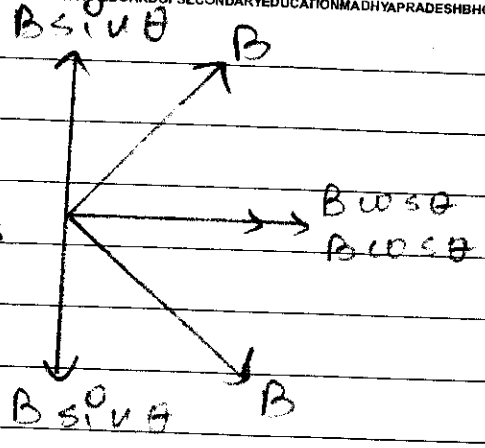
x is the equal distance from poles of bar magnet.

M is the perpendicular distance.

The length of bar magnet is 2l.

The mag. field of every pole is divided into components.

योग पूर्व पृष्ठ + पृष्ठ 19 के अंक = कुल अंक



Eo.
sinθ components are cancelled.

Derivation

Here the cosθ components are added so the net magnetic field is

$$B_{net} = 2B\cos\theta.$$

$$B_{net} = 2 \times \frac{\mu_0}{4\pi} \times \frac{m}{x^2} \times \cos\theta$$

$$= 2 \times \frac{\mu_0}{4\pi} \times \frac{m}{(\sqrt{r^2+l^2})^2} \times \cos\theta$$

$$[x^2 = r^2 + l^2]$$

$$\cos\theta = \frac{l}{\sqrt{r^2+l^2}}$$

$$B_{net} = \frac{\mu_0}{4\pi} \times \frac{2m}{r^2+l^2} \times \frac{l}{\sqrt{r^2+l^2}}.$$

$$= \frac{\mu_0}{4\pi} \times \frac{2ml}{(r^2+l^2)^{3/2}}.$$

प्रश्न क्र.

$2ml = M$ = mag moment.

$$B_{net} = \frac{\mu_0}{4\pi} \times \frac{M}{(x^2+l^2)^{3/2}}$$

Here, $l << x$.

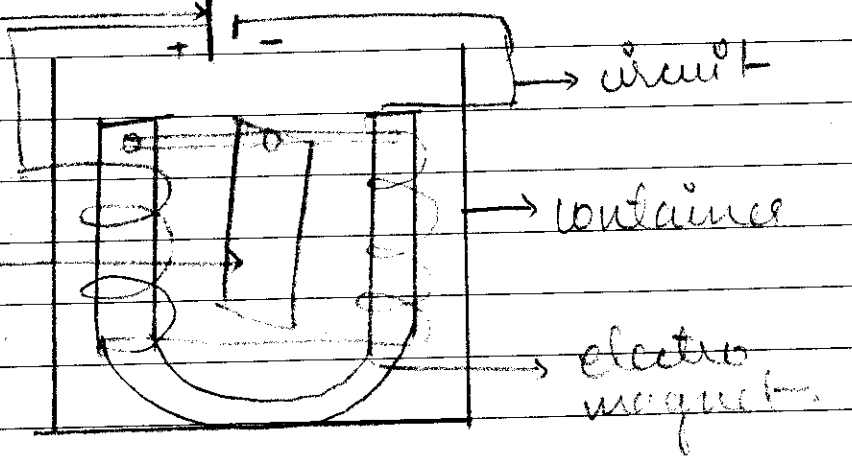
So, $$\boxed{B_{net} = \frac{\mu_0}{4\pi} \times \frac{M}{x^3}}$$

proved.

Question-14 OR

Eddy Current :-

Whenever the metallic conductor is between a magnetic field and flux through the conductor is varying then eddy current is generated in conductor.



Set up :- A electromagnet is taken and a conductor is fixed such that it is free to move horizontally.

Experiment :- When the key is open on the conductor is made of to oscillate it stops after some time due to air resistance. But when the key is closed and current flow. The magnetic feild is setup. Now when the conductor is made to oscillate it stops suddenly.

Observation :- This sudden stoppage of conductor is due to the generation of eddy current in the conductor which opposes the motion of conductor in magnetic feild.

Uses :- (1) Used to make Galvanometer dead beat.
(2) Used in electric breaks
(3) Used in Induction furnace
(4) Used in Induct

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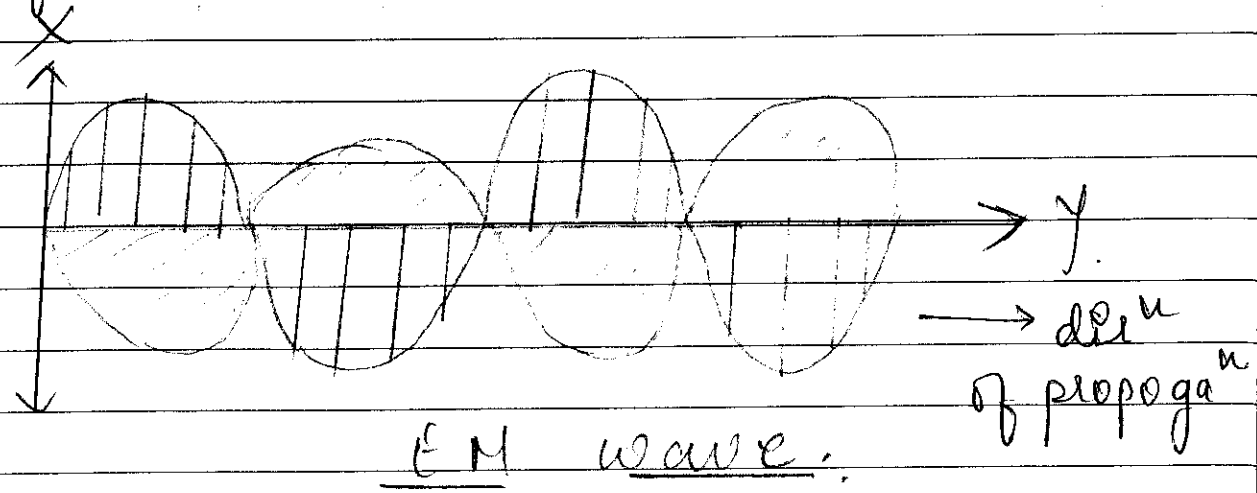
Question-15

Electromagnetic Waves :-

The waves which are formed by the perpendicular vibrations of magnetic wave & electric wave and their direction of propogation is perpendicular to the direction of vibration.



EM wave.

Characteristics :-

(1) EM waves can travel in vacuum.

(2) EM waves do not have phase difference.

प्र.13) The two component of wave i.e. ~~electro mag.~~ & electric and mag. component are perpendicular to each other.

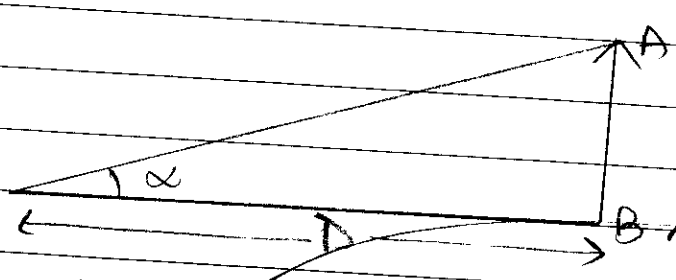
14) EM waves do not need a material medium to its propogation.

15) EM waves travel with the speed of light i.e. 3×10^8 m/s.

16) The wavelength also depends on the refractive index of propogation of ray.

Question - 16 OR

Simple Microscope.



α = visual angle of object

AB = length of object

D = least dist of distinct

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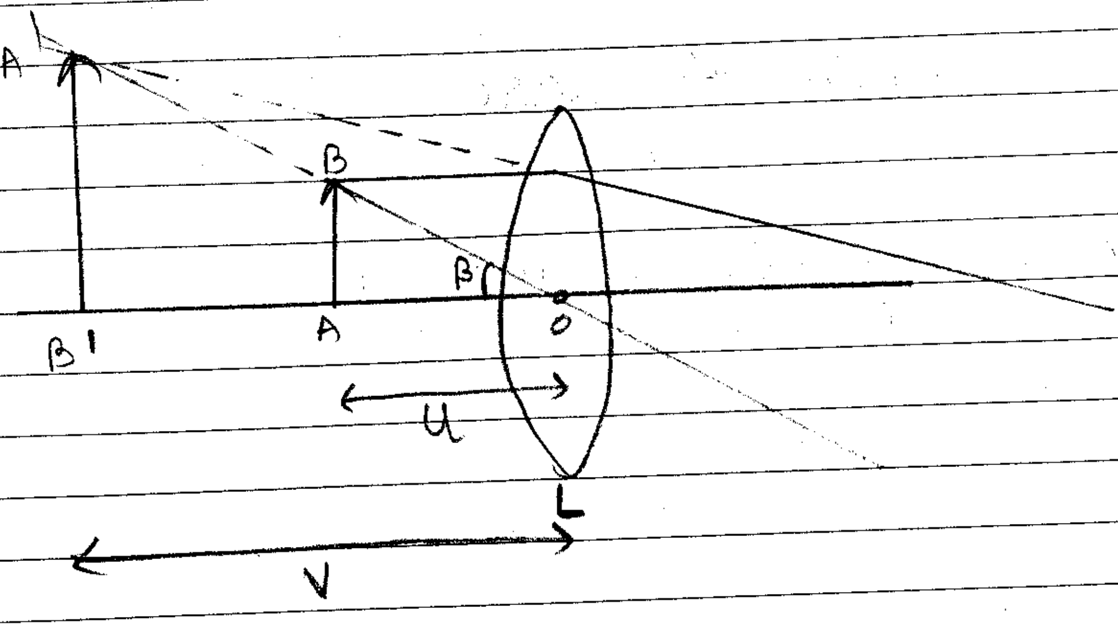

Here, β = visual angle of image.
u = object dist
V = image distence.
A'B' = length of image.
L = lens used.

<u>Magnification</u> :- Magnification is defined as the ratio of visual angle of image to the visual angle of object placed at the minimum distence of distinct vision.

$$M = \frac{\tan\beta}{\tan\alpha} \longrightarrow (1)$$

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, 4 पृष्ठीय

परीक्षार्थी द्वारा भरा जावे

परीक्षा का विषय: Physics | विषय कोड: 2 1 0 | परीक्षा का माध्यम: English | परीक्षा का दिनांक: 11 03 17

स्टीकर तीर के निशान से मिलाकर लगायें

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

केन्द्र क्र. 671054

पर्यवेक्षक का नाम एवं हस्ताक्षर

11/3/17

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर

Sonakia

परीक्षार्थी द्वारा भरा जावे

[redacted]

मुख्य उत्तर [redacted] ....तक कुल प्राप्तांक ☐ + ☐ = ☐

$$\tan \alpha = \frac{AB}{D}.$$

$$\tan \beta = \frac{AB}{u}.$$

Putting the value in eq^n (1) we get.

$$M = \frac{AB}{-u} \times \frac{-D}{AB}$$

$$\text{So, } \boxed{M = \frac{D}{u}}$$

Magnification of simple Microscope is $M = \frac{D}{u}$!

B
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के अंकों का योग

प्रश्न क्र.

Condition One

Image should be obtained at least distence of distinct vision.
So, ~~D~~ v = D.

We know,

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

$$\frac{1}{f} = \frac{1}{-D} + \frac{1}{u}.$$

Multiply D with whole eq^n we get.

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

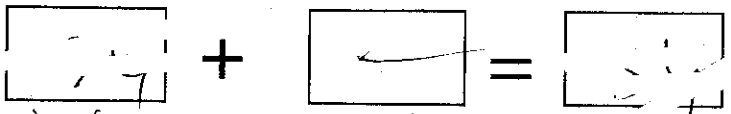
$$\boxed{\frac{D}{u} = \frac{D}{f} + 1}$$

$$\boxed{M = \frac{D}{u} = \frac{D}{f} + 1}$$

Condition 2

Image at infinity. So u = f.

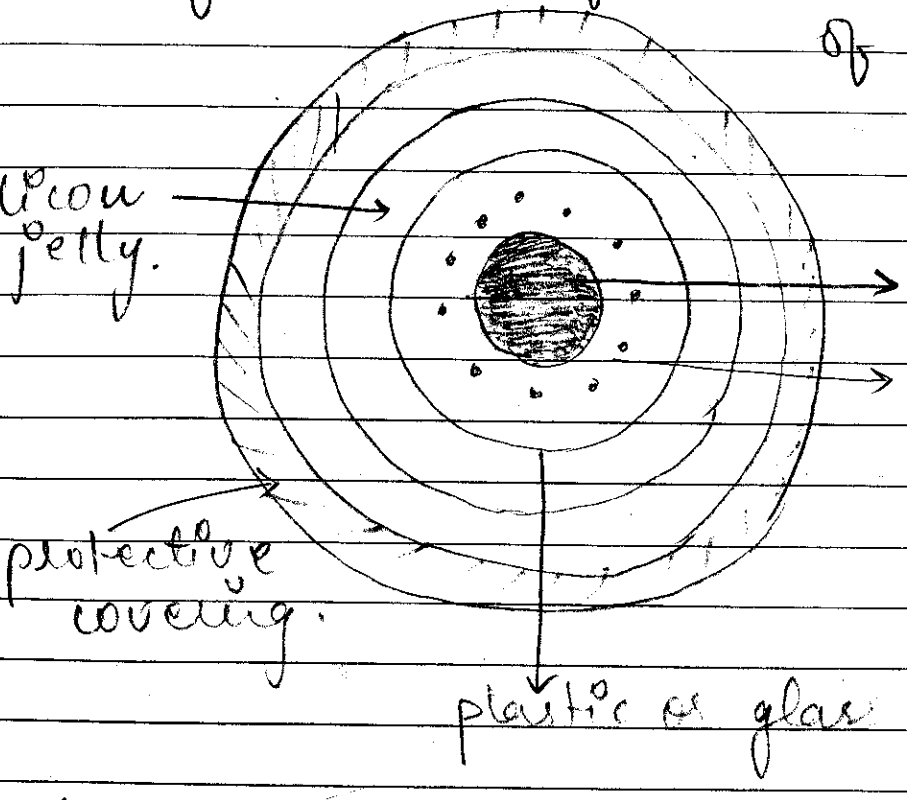
$$\boxed{M = \frac{D}{f}}$$



प्रश्न क्र.

Question 17

Optical fibre :- Optical fibre is a thin wire made up of glass core and other layers of glass or plastic in its periphery. It is used in transmission of data/information in form of "light beam".



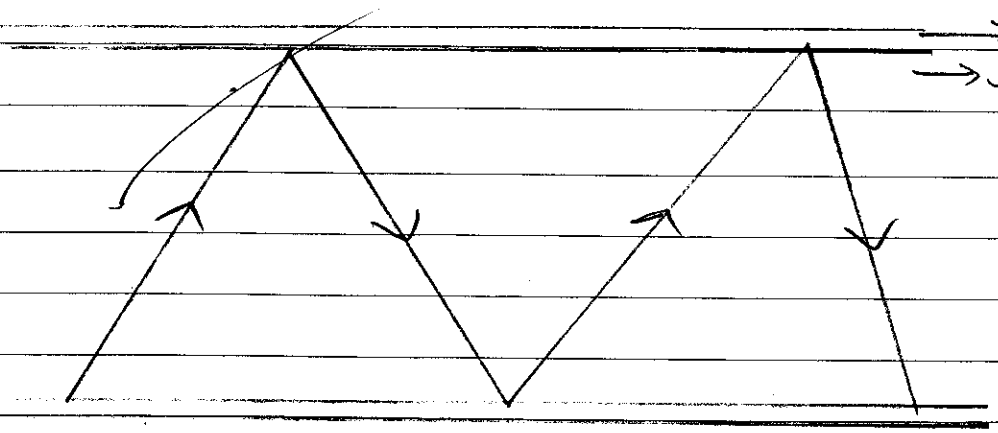
→ **Core** :- Core of optical fibre is made up of pure glass of refractive index $\mu = 1.7$.

→ **Cladding** :- It is the covering of core with refractive index $\mu = 1.5$.

BSE

→ Other protective covering → covering of optical fibre is further done by silicous jelly.

★ Optical fibres have high band width. and can transfer optical signal in form of light beam.



Transmission

★ Signals are transmitted by the principle of "Total Internal reflection" due to difference in refractive indexes of material.

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.	11 03 17

[redacted]

परीक्षार्थी द्वारा भरा जावे

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

हायर सेकेण्डरी परीक्षा केन्द्र क्रमांक 671054

पर्यवेक्षक का नाम एवं हस्ताक्षर

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर

Sonakia

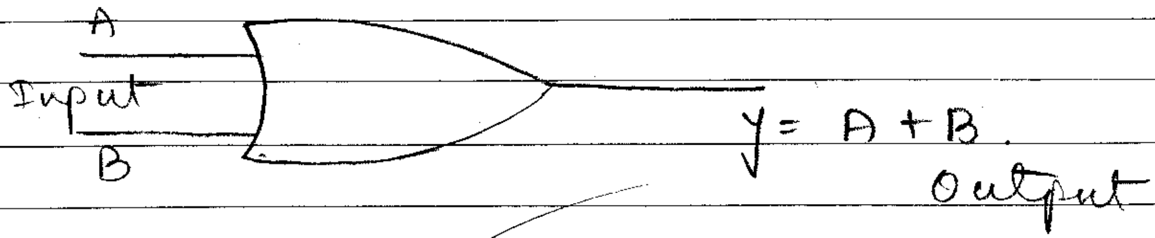
मुख्य उत्तर पुस्तिका के अंतिम पृष्ठ क्रमांक..................................तक कुल प्राप्तांक ☐ + ☐ = ☐

B S E

Question 18

(i) OR Gate.

(i) Sympol.



(ii) Teuth Table.

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

पृष्ठ के अंकों का योग

(2) [ ] + [ ] = [ ]

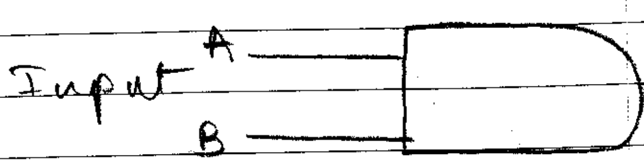
योग पूर्व पृष्ठ   पृष्ठ अंक   कुल अंक

प्रश्न क्र. (iii) Booleau Expression. $y = A + B = B + A.$

$y =$

(II) AND GATE.

(i) Symbol



$y = A \cdot B = A \times B,$
Output

(ii) Truth Table.

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

(iii) Booleau Expression.

$y = A \cdot B = A \times B$

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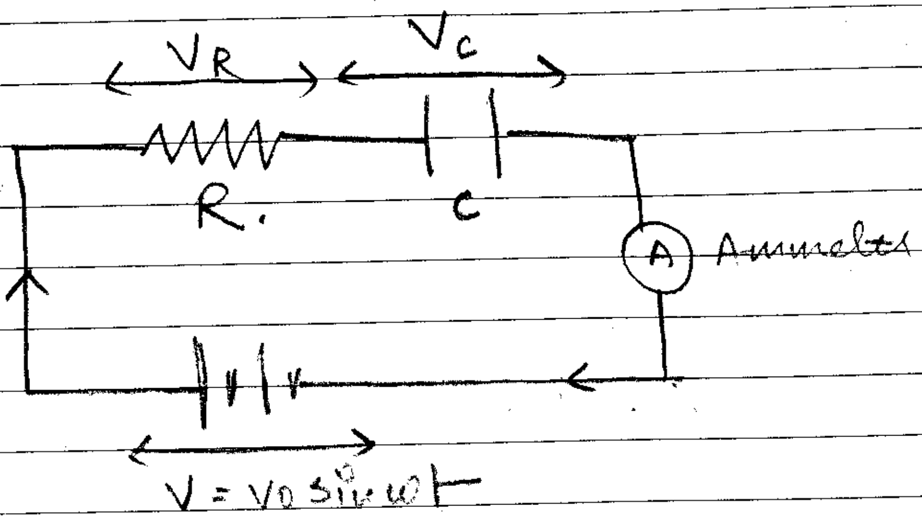
Question - 19

RC circuit



B
S
E

Suppose a circuit consist of a resistance and a capacitor.

The voltage is $V = V_0 \sin \omega t$.

The voltage across resistance = $V_R = IR$.

The voltage across capacitor = $V_C = I X_C$.

We know that the voltage of capacitor lags behind the current by phase diff of $\pi/2$.

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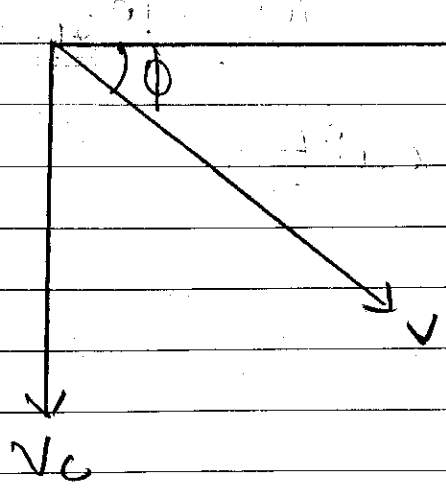

(i) Resultant voltage $= V = \sqrt{V_R^2 + V_c^2}$

we know $= V_R = IR$

$V_c = IX_c$.

$$V = \sqrt{(IR)^2 + (IX_c)^2}.$$

$$V = \sqrt{I^2R^2 + I^2X_c^2}$$

$$\frac{V}{I} = \sqrt{R^2 + (X_c)^2}.$$

$\frac{V}{I}$ = R by ohm law but here it is denoted as impedence and written as Z.

(ii) Impedence $= Z = \sqrt{R^2 + (X_c)^2}$.

So, $X_c = \frac{1}{\omega C}$.

So, $Z = \sqrt{R^2 + \frac{1}{\omega^2 C^2}}$.

(iii) Phase difference (ϕ).

$$\tan\phi = \frac{V_c}{V_R}$$

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

$$\boxed{\tan\phi = \frac{1}{\omega C R}}$$

Now, $\phi = \tan^{-1}\frac{1}{\text{stored}}$

phase differe

Question -20 OR

Prove Gauss Theorum.

Gauss Theorum. →

The net electric flux through any closed surface is ~~the~~ 1/ε0 time of the charge enclosed in it.

$$\phi = \frac{q}{\varepsilon_0}$$

where, ϕ = Electric flux.
q = charge.
ε_0 = dielectric constan

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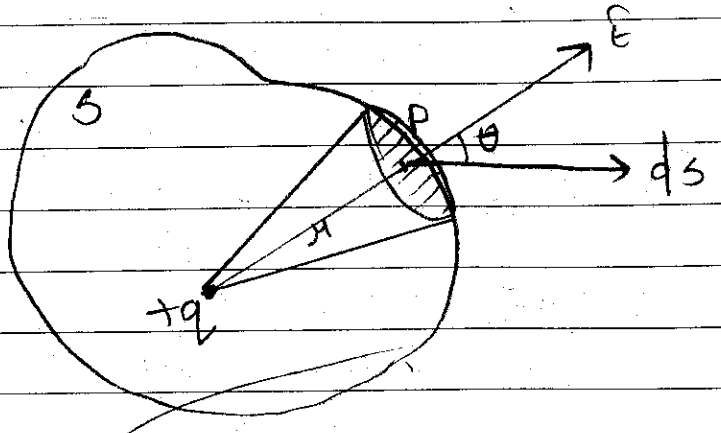

→ Suppose a closed surface S and charge +q enclosed within it.

→ A point P is marked at distance r from the charge and surface area marked is ds.

→ Angle θ is there between the net electric feild and component of area.

We know that,

Electric flux = Electric feild x Area. x cosθ.

$$\phi = E\,ds\cos\theta \longrightarrow (1)$$

प्रश्न क्र.

We know,

$$E = \frac{1}{4\pi\varepsilon_0} \times \frac{q}{r^2}.$$

Putting the value of ~~eq^n~~ E in eq^n (1)

we get

$$\phi = \frac{1}{4\pi\varepsilon_0} \times \frac{q}{r^2} \times ds\cos\theta$$

$$= \frac{1}{4\pi\varepsilon_0} \times q \times \frac{ds\cos\theta}{r^2}.$$

$\frac{ds\cos\theta}{r^2}$ is the solid angle $= d\omega$.

$$\phi = \frac{1}{4\pi\varepsilon_0} \times q \times d\omega.$$

Here the value of solid angle is 4π

so, $d\omega = 4\pi$.

$$\phi = \frac{1}{4\pi\varepsilon_0} \times q \times 4\pi$$

$$\boxed{\phi = \frac{q}{\varepsilon_0}}$$

Gauss Theorem.

Hence, the Gauss Theorem is proved.