माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

24 पृष्ठीय

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय	विषय कोड	परीक्षा का माध्यम
Physics	2 1 0	English

एक | एक | दो | चार | तीन | नौ | पाच | छः | आठ

क :– पूरक उत्तर पुस्तिकाओं की संख्या अंकों में ____ शब्दों में ____

ख :– परीक्षार्थी का कक्ष क्रमांक 01

ग :– परीक्षा का दिनांक 13 03 20

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

हायर सेकेण्डरी सर्टिफिकेट परीक्षा

केन्द्र क्रमांक 16801

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष एवं परीक्षक द्वारा भरा जावे

पर्यवेक्षक का नाम एवं हस्ताक्षर	केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर
Balram Tirkey	

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

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

SUNEEL MISHRA (LECTURER)

एन० पी० मिश्रा (प्राचार्य)
शा० हाई स्कूल, बीजापुर कौड़ियां
मो० नं० 9425890689

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे

नोट :– "हायर सेकेण्डरी परीक्षा में केवल वाणिज्य संकाय के विषयों तथा हाईस्कूल परीक्षा में प्रायोगिक विषय को छोड़कर शेष विषयों हेतु नियमित एवं स्वाध्यायी छात्रों के लिये प्रश्न पत्र 100 अंकों का होगा किन्तु नियमित छात्रों को 100 अंक के प्राप्तांक का 80% अधिभार एवं स्वाध्यायी छात्रों को 100 अंक के प्राप्तांक ही अंकसूची में प्रदर्शित किये जावेंगे।"

केवल परीक्षक द्वारा भरा जावे।

प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करें।

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
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28		

कुल प्राप्तांक शब्दों में

प्रश्न क्र. 2 के अंक

Ques-1

Answers

(1) Coloumb x meter

(2) $W = 2\pi/T$

(3) Nil 1.33

(4) Number of protons present inside the nucleus

(5) ...ctrons in majority

Ques-2

Answers

(1) Ampere / meter^2

(2) Ohm (Ω)

(3) 1.76×10^{11} C/Kg

(4) -13.6 eV

(5) Four (4)

प्रश्न क्र.

Ques-3

column A	column B
(1) value of electric field inside the conductor	zero
(2) chrome	resistance wire
(3) mall bar magnet	magnetic dipole
(4) order of magnitude of wave length of visible light	10^{-6} m
(5) alpha particle	Helium nucleus

Ques-4

Answers

(1) Lorentz force

(2) 06 x 05 = 30

(3) $E = h\nu$
Here, E = energy , ν - frequency

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[redacted]

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(4) [redacted] -1.6×10^{-19} C

(5) [redacted] Zero (nearly)

Ques - 16

Rectifier -

The device which convert AC signal into DC signal is called rectifier.

There are two kinds of rectifier

(i) Half wave rectifier

(ii) Full wave rectifier

HALF WAVE RECTIFIER

In it a step down transformer T diode D and load resistance R_L are used. The ends of primary coil of transformer is connected with an alternating AC source and with the ends A & B of secondary coil of transformer, diode D &

load resistance R_L are connected in series combination.

Working :-

When an alternating source is connected with L_1 then due to mutual induction voltage is induced ~~in~~ at ends A & B of secondary coil of transformer.

During positive half cycle of input alternating potential, ~~and~~ A is P-terminal of diode D is at positive potential and N-terminal of diode D is at negative potential in this condition ~~do~~ diode is at forward bais. so the conduction of current takes place and voltage is obtained across load resistance R_L

Since, only one half cycle of AC, signal is converted into DC so the rectifier is called half wave rectifier.

The efficiency of half wave rectifier is ~~100%~~ 40%.

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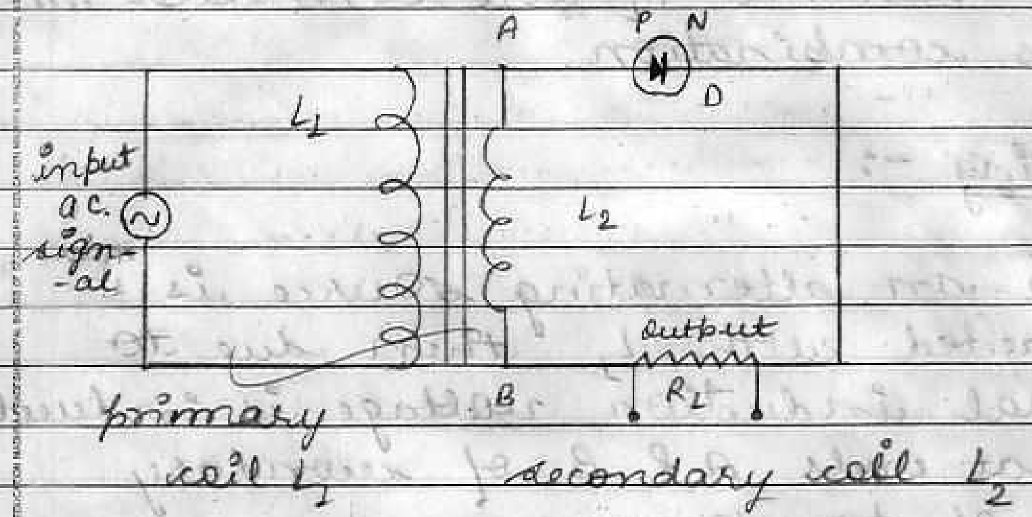
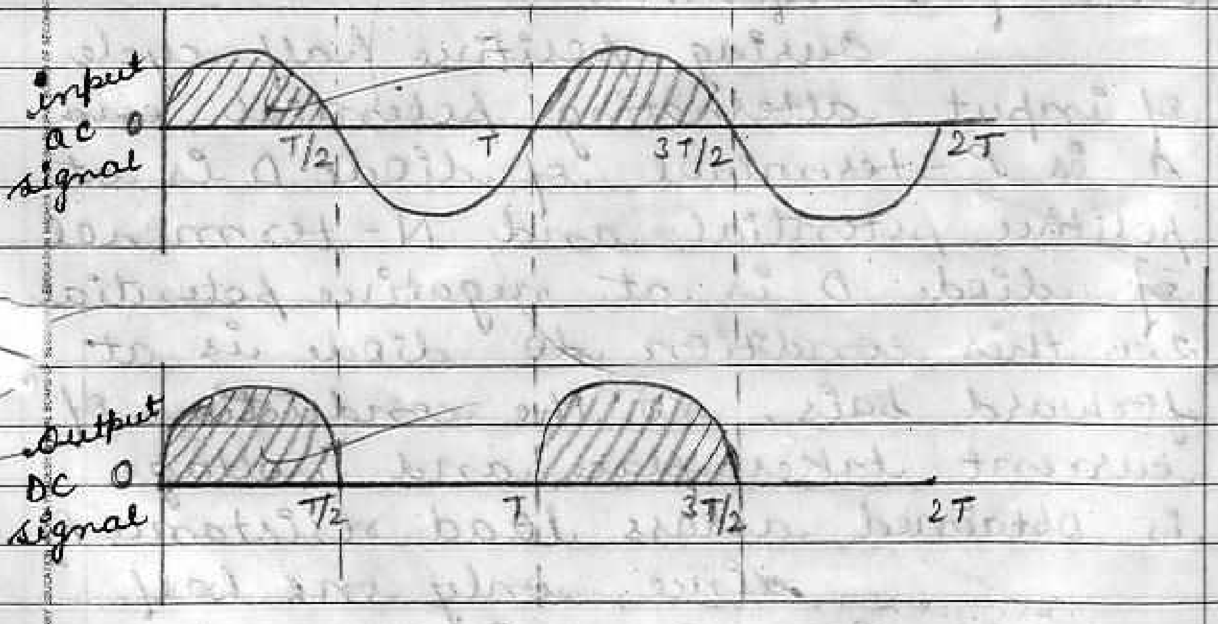
Half wave rectifier





Ques - 17

[Or]

Dynamo - A dynamo is a device which convert mechanical energy into electrical energy. It

प्रश्न क्र.

works on the principle of electromagne-tic induction.

Principle - when a rectangular coil rotates in magnetic field in a direction perpendicular to the field then the magnetic flux linked with the coil changes and emf is induced into it. If the circuit of coil is closed then I induced current flows in it.

B S E

~~main parts~~

AC dynamo - It convert mecha-nical ~~eng~~ energy into electrical energy

Main parts of AC dynamo -

(1) Field magnet - It is strong horse shoe permanent magnet

(2) Armature or coil - It is soft iron core on which a large no. of turns of insulated copper wire is wound

(3) Slip rings - Two metallic slip rings S_1 & S_2 are attached with two ends of armature coil

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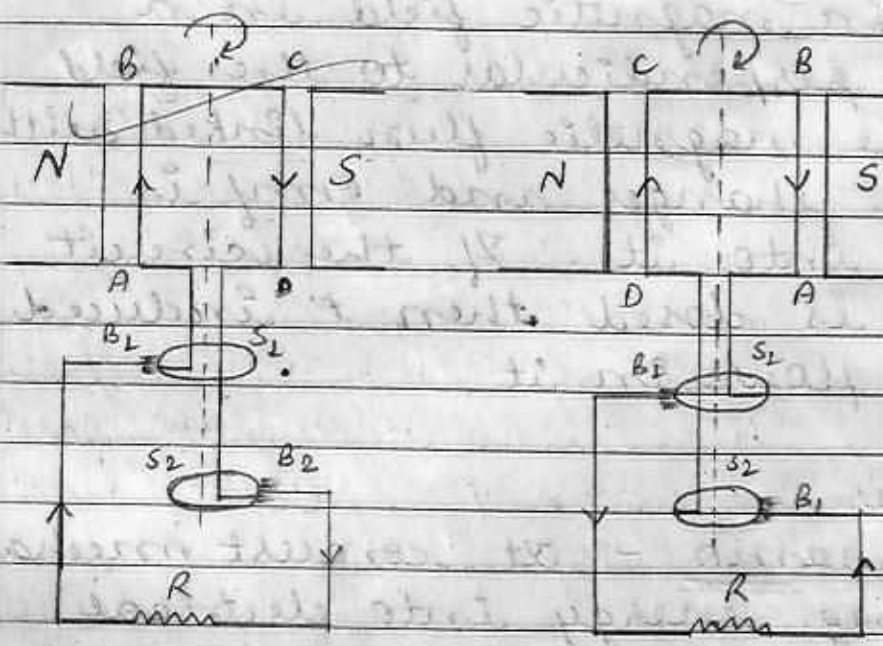
(4) Brushes - B_1 & B_2 are two carbon brushes which keep in contact with slip rings S_1 & S_2



Working -

Initially, the plane of the coil is perpendicular to the magnetic field i.e. magnetic flux linked with the coil is maximum. The end A of armature is in contact with slip ring S_1 and end D is in contact with slip ring S_2. The brushes B_1 and B_2 touches the slip rings S_1 and S_2

when the coil is rotated clockwise, the magnetic flux link with the

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coil decreases due to which emf is induced in the coil.

When the coil is completely rotated by 90°, then magnetic flux link with it become 0 & emf induced is maximum. Due to this an induced current flows in the coil from ABCD according to fleming right hand rule and the current in external circuit flows from brush B_2 to brush B_1

As the coil is further rotated by 90°, the magnetic flux linked with again become maximum and emf induced is maximum

On further rotating the coil by 90°, then after half cycle arms AB and CD interchange their position. The Brushes B_1 & B_2 remains in contact with slip rings S_1 & S_2. The magnetic flux link with become 0 & induced emf is maximum. According to flemings right hand rule, current flows as DCBA. In outer circuit, current flows from brush B_1 to brush B_2

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योग पूर्व पृष्ठ + पृष्ठ 10 के अंक = कुल अंक

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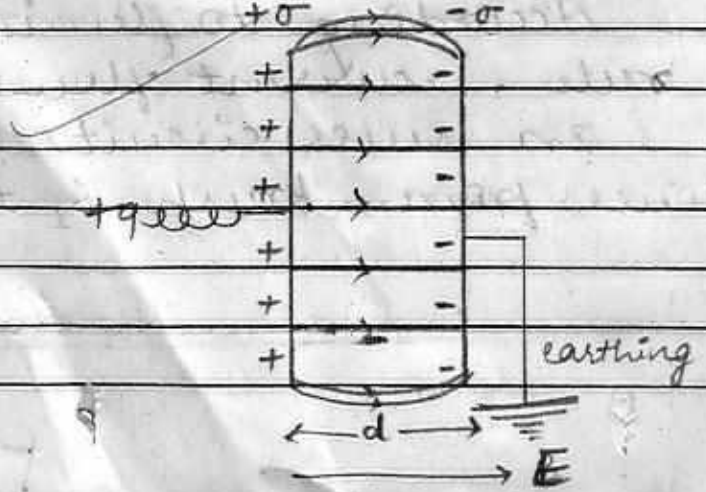
Ques - 16

[Or]

Consider, A & B be the plates of parallel plate capacitor. Let A be the area of each plate and d be the distance between them A dielectric medium of constant K is placed between the plates.

On imparting +q charge to plate A then due to induction -q charge develop on near face of B and +q charge develop on far face of B. Since the plate B is earthed so, +q charge get neutralize.

Let the surface charge density of plate A and B be respectively +σ and -σ. The electric field is uniform between the plates except at the corners



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The electric field intensity between the plates

$$E = \frac{\sigma}{K\varepsilon_0}$$

Potential difference between the plates

V = intensity × distance

$$V = \frac{\sigma . d}{K\varepsilon_0}$$

As, $\sigma = \frac{q}{A}$

so,

$$V = \frac{q . d}{AK\varepsilon_0} \quad \text{—①}$$

If the capacity of parallel plate capacitor is C then

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

from eq ①

$$C = \frac{q}{qd/AK\varepsilon_0}$$

$$\boxed{C = \frac{KA\varepsilon_0}{d}} \text{ farad}$$

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Here K is dielectric constant

Factors affecting capacitance

(i) On the area of plates - The capacity of parallel plate capacitor is directly proportional to area A i.e $C \propto A$
On increasing area, the capacity increases

(ii) Distance between the plates - The capacity of parallel plate capacitor is inversely proportional to distance d i.e. $C \propto \frac{1}{d}$
On increasing the distance between the plates, the capacity decreases

(iii) On the medium placed ~~inside~~ b/w the plates of capacitor - when a medium is placed inside the capacitor, the potential decreases and the capacity increases

Ques - 15

[Or]

Nuclear fission -

Nuclear fission is

the process in which heavy nuclei is splitted into two light nuclei of nearly equal fragments on bombarding the heavy nuclei with fast neutrons. In this process, tremendous large amount of energy is nearly 190 MeV is released.

The process of nuclear fission was discovered by scientists - Strassman & Otto Hann.

* Process - In this process, when fast moving neutrons is bombarded on radioactive - U-235 then it gets absorbed in it and highly radioactive isotope U-238 is formed which then split into two light fragments of Barium ($^{144}_{56}B$) and Krypton ($^{89}_{36}Kr$) and with three neutrons and energy

$$^{235}_{92}U + ^{1}_{0}n \longrightarrow ^{238}_{92}U \longrightarrow ^{144}_{56}Ba + ^{89}_{36}Kr + 3\,^{1}_{0}n + \text{energy}$$

- This process takes place at ordinary temperature and pressure. Atom bomb is based on it.
- Plutonium - 239 is a good fissional substance.

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Uses of nuclear fission -

(i) [illegible] constructive use

(ii) [illegible] destructive uses

Ques - 14

[OR]

B S E

Given that -

Radius of curvature $R_1 = +20$ cm

$R_2 = \infty$

Refractive index $a_{lg} = 1.5$

We know that -

$R_2 = \infty$, $R_1 = +20$

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

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

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

$$f = \frac{1}{0.5} \times 200$$

$$f = 40 \text{ cm}$$

Thus, the focal lengths of lens = 40 cm

Ques-13

[or]

B S E

★ Polarisation of light - the transverse waves are not perfectly symmetrical about the direction of travel of wave. This lack of symmetry about the direction of propagation of wave is called polarisation of light.

★ Brewsters law - ~~when~~

According to brewsters law, the angle of polarisation ip depends on refractive index u of the medium. the ~~polaris~~ tangent of polarising angle ip depends on refractive index u of the reflecting surface i.e.

$$\tan ip = u$$

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This is called Brewsters law.

Explanation -

Let AO be the incident light on the boundary seperating two medias (air & glass) then it partially gets reflected as OB and partially repracted as OC. consider, ∠ angle of incidence = polarising angle ip & angle of repraction r then

Acc. to Brewsters law -

$$\tan ip = \mu \quad \text{---} (1)$$

Acc. to snells law

$$\mu = \frac{\sin ip}{\sin r} \quad \text{---} (2)$$

from eq (1) & (2)

$$\tan ip = \frac{\sin ip}{\sin r}$$

$$\left[\because \tan ip = \frac{\sin ip}{\cos ip} \right]$$

प्रश्न क्र. ... क अंक कुल अंक

$$\frac{\sin ip}{\cos ip} = \frac{\sin ip}{\sin r}$$

$$\frac{1}{\cos ip} = \frac{1}{\sin r}$$

$$\cos ip = \sin r$$

$$\left[\because \sin r = \cos(90^\circ - r)\right]$$

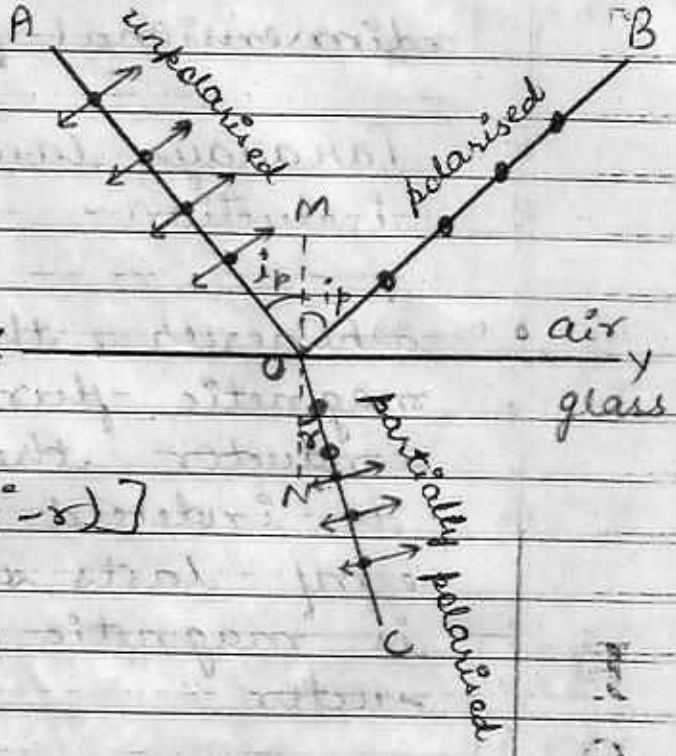
$$\cos ip = \cos(90^\circ - r)$$

$$ip = 90^\circ - r$$

$$r = ip + 90^\circ$$

Or

$$ip + r = 90^\circ$$

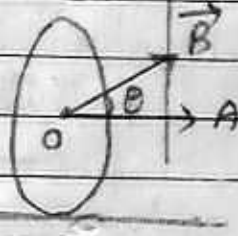


Ques - 12

Magnetic flux - The total numbers of magnetic lines of ~~for~~ forces passing perpendicular to the surface placed in magnetic field is called magnetic flux.

$$\phi_B = B . \Delta A \cos\theta$$

Its SI unit is **weber**. Its



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dimensional formula is $[ML^2T^{-2}A^{-1}]$

faradays law of electromagnetic induction -

- whenever, there is change in magnetic flux linked with the conductor, an emf is induced in it. The induced emf lasts so long as there is magnetic flux cut by the conductor

- The magnitude of induced emf is directly proportional to the change in magnetic flux cut by the conductor. If there is uniform change in magnetic flux then a steady emf is produced.

Consider, initially the magnetic flux linked with conductor is ϕ_1 then after time dt the flux changes to ϕ_2 then,

Rate of change of magnetic flux = $\frac{(\phi_2 - \phi_1)}{dt}$

$= \frac{-d\phi}{dt}$

According to faraday's IInd law

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

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

Here (−) sign shows that the direction of induced emf is such that it always tends to oppose the cause that produces it

If the conductor is coil & coil has N no. of turns then emf induced

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

If the circuit has R resistance and it is closed then induced current produced in it i.e.

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

$$\boxed{I = \frac{N}{R}\frac{d\phi}{dt}} \text{ ampere}$$

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Ques - 11 [or]

Ans The physical quantities which determine the complete magnetic field intensity of Earth at a place are called the elements of earth's magnetic field.

They are as follows -

(i) **Angle of declination** - The acute angle between magnetic meridian and geographical meridian at a place is called angle of declination

(ii) **Angle of dip or inclination** - The angle which the axis of magnetic needle in magnetic meridian makes with the horizontal line is called angle of dip

Direction of component of Earth magnetic field -

The direction of ~~horizontal component~~ magnetic field at magnetic equator is parallel to Earth surface and at magnetic pole, it is perpendicular to earth surface.

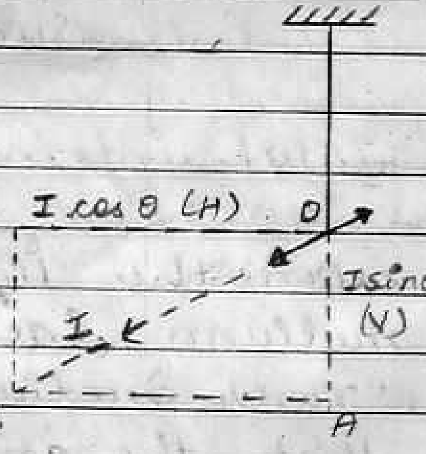
Earth can be resolved into two components.

i) Horizontal component along OC

ii) vertical component along OA

Relation

OB represents the resultant intensity of Earth magnetic field I
I can be resolved into two components -



vertical component
$V = I \sin\theta$ (along OA) ①

Horizontal component
$H = I \cos\theta$ (along OC) ②

dividing eq. ① & ②

$$\frac{V}{H} = \frac{I \sin\theta}{I \cos\theta}$$

$$\frac{V}{H} = \tan\theta \quad \left[\because \frac{\sin\theta}{\cos\theta} = \tan\theta\right]$$

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$$V = H \tan\theta$$

Squaring & adding eq ① & ②

$$V^2 + H^2 = I^2 \sin^2\theta + I^2 \cos^2\theta$$

$$V^2 + H^2 = I^2$$

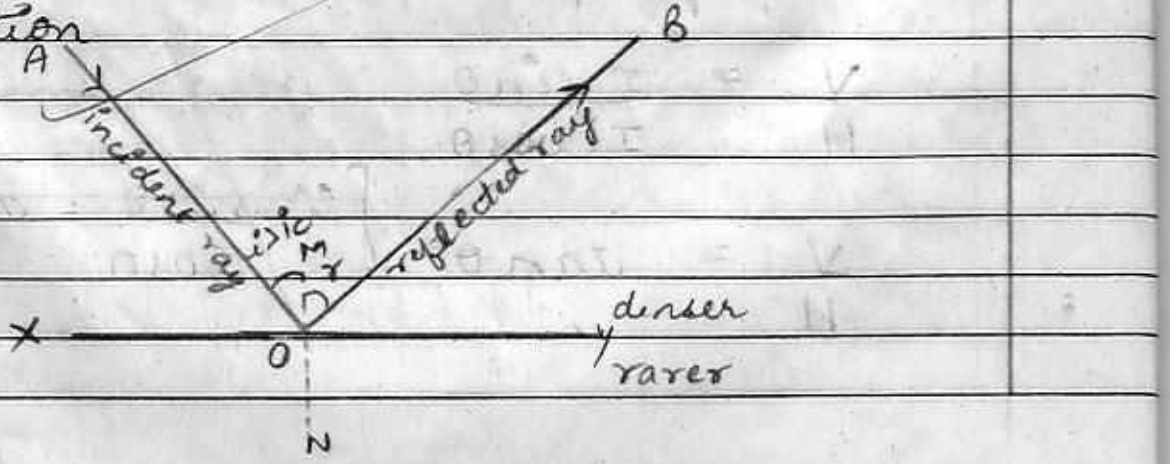
$$I = \sqrt{V^2 + H^2}$$

Hence proved relation b/w I, V & H

Ques-20

Total internal reflection →

when the light travelling in denser medium incident on the surface of rarer medium in such a manner that the angle of incidence is greater than critical angle then this ray of light reflect back in denser medium. this phenomenon is called total internal reflection



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condition for total internal reflection

(i) The light rays must travel from denser medium to rarer medium

(ii) The angle of incidence must be greater than critical angle ($i > i_c$)

Applications -

(i) In optical fibre.

(ii) In total reflecting prisms

Ques - 9

Resistance	Specific resistance
(1) The obstructions offer by the conductor to the flow of current is called resistance (R)	(1) Specific resistance (ρ) is the resistance of material of wire of length 1 m and area of cross section 1 m^2
(2) It depends on length and area of cross	(2) It does not depend on length & area

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	of the conductor	of cross section of conductor
(3)	Its unit is Ohm (Ω)	(4) Its unit is ohm x meter (Ω×m)

Ques - 7

Ans

The five spectral series present in line spectrum of hydrogen atom are-

(1) Lyman series in UV region

(2) Balmer series in visible region

(3) Paschen series in infrared region

(4) Brackett series in far infrared region

(5) Pfund series in far far infared region

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय	विषय कोड	परीक्षा का माध्यम	परीक्षा का दिनांक
Physics	2 1 0	English	13 03 20

परीक्षार्थी द्वारा भरा जावे →

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

केन्द्र क्रमांक 168019

पर्यवेक्षक का नाम एवं हस्ताक्षर

श्रीमती सुनीता शर्मा

हाई स्कूल परीक्षा

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर

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

Ques-6

stopping potential -

The negative potential of anode or plate P for which the photoelectric current is 0 is called stopping potential or cut off potential.

~~on increasing the frequency of incident light stopping potential~~

It depends on frequency of incident light and does not depend on intensity of incident light

पृष्ठ के अंकों का योग

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योग पूर्व पृष्ठ

Ques-5

Ans Gamma rays were discovered by the scientist Bequeral and curie

The source of gamma rays is nucleus.

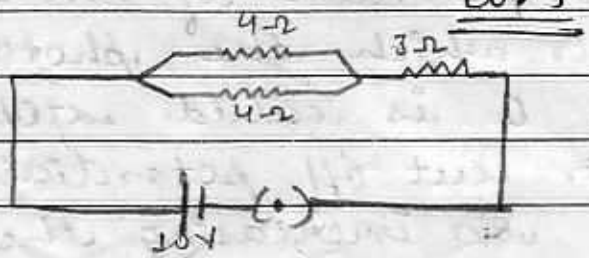
uses

(i) Gamma rays are used in preserving food material

(ii) They are used in nuclear reactions

Ques-6

[or]



given resistances

$R_1 = 4\Omega$

$R_2 = 4\Omega$

$R_3 = 3\Omega$

$V = 10$ volt

(i) Equivalent resistance in parallel combination -

$$\frac{1}{R_{eq}} = \frac{1}{4} + \frac{1}{4}$$

$$\frac{1}{R_{eq}} = \frac{1+1}{4}$$

$$\frac{1}{R_{eq}} = \frac{2}{4} = \frac{1}{2}$$

$$R_{eq} = 2\ \Omega$$

Equivalent resistance in series combination

$$R'_{eq} = R_3 + R_{eq}$$
$$= 3 + 2$$
$$R'_{eq} = 5\ \Omega$$

(ii)

Current obtained from battery

By Ohm's law -

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

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$$I = \frac{10}{5}$$

$$\boxed{I = 2\ A}$$ Ans