वर्ष–2023

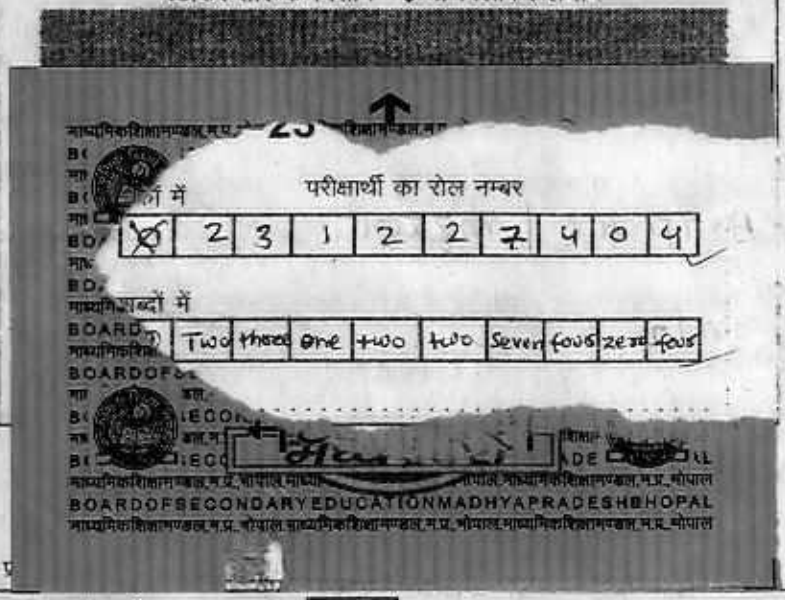
माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

32 पृष्ठ

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय	विषय कोड	परीक्षा का माध्यम
Physics	210	English

स्टीकर तीर के निशान ↓ से मिलाकर लगायें



परीक्षार्थी द्वारा भरा जावे →

क :– परीक्षार्थी का कक्ष क्रमांक 08

ख :– परीक्षा का दिनांक 06 03 23

परीक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

हायर सेकेण्डरी केन्द्र क्रमांक–122014

केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष/पर्यवेक्षक द्वारा भरा जावे →

पर्यवेक्षक का नाम एवं हस्ताक्षर	केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर
उमेन्द्र कुशवाह	

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे →

प्रमाणित किया जाता है कि 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
K.K.PATEL 333001	Dr. A.P Singh V.No. 335 / R.K.Bais

केवल परीक्षक द्वारा भरा जा
प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रवि 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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25		
26		
27		
28		

प्र क्र.

Answer NO·1

Ans·1 (ii) 1.67×10^{-27} kg ✓

Ans·2 (ii) Ampere / meter^2 ✓

Ans·3 (iii) $\pi/2$ ✓

Ans·4 (i) New Delhi ✓

Ans·5 (iii) 0·72 eV ✓

Ans· (ii) ~~Transformer~~ (i) Junction diode ✓

Ans·7 (i) is less than ✓

Answer NO·2

Ans·1 10^{14} Hz ✓

Ans·2 decreases ✓

Ans·3 vector ✓

Ans·4 sensitivity ✓

Ans·5 zero ✓

(6) zero

Ans. 7 Gamma rays.

Answer No. 3

Ans. 1 False

Ans. 2 False

Ans. 3 True

Ans. 4 False

Ans. 5 False

Ans. 6 True

Ans. 7 False

Answer NO. 4.

Ans. 1 From south pole to north pole.

Ans. 2 By joining high resistance wire in series with coil of galvanometer.

Ans. 3 Drift velocity decreases on increasing temperature.

Ans. 4 $E = h\nu$

Ans 7 Diopter

Ans. 6 Diffraction :- When the light bends at the corner of the obstacle this phenomenon is called diffraction.

Ans. 5 Threshold frequency :- It is the minimum frequency of incident light below which emission of electron is not possible is called threshold frequency.

Answer No·5

Isotopes :- The atoms of same element having equal atomic number but different mass number i.e. different number of neutron but same number of proton is called isotopes.

Ex- Proteum ($_1^1H$) & Deuterium ($_1^2H$) are the two isotopes of hydrogen.

Answer No·6

Fundamental charge :- It is the minimum charge on any substance which have. The charge on an electron is said to Fundamental charge.

Its value is $\pm 1.6 \times 10^{-19}$ C

Answer No. 7 (OR)

Ohm's Law :- According to Ohm's law " If the physical conditions remains same the potential difference at the ends of a conductor is directly proportional to the current flowing through the conductor.

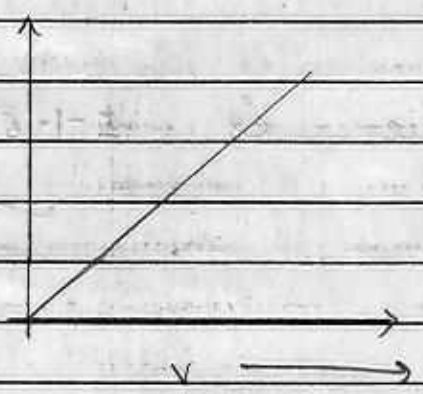
i.e.

$$V \propto I$$

$$V = IR$$

Here R is a constant called a resistance of conductor.
Its unit is ohm (Ω)

Draw b/w voltage & current :- On drawing ~~b/w~~ graph between voltage & current a straight line is obtained.



Answer No. 8

Bio - savart law :- Bio - savart ~~law~~ gives a law related to find magnetic field due to small element of conductor. According to this :-

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

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

where, k is a constant ~~for~~ its value depends on medium of surrounding and system of unit of measurement.

$$\therefore \quad k = \frac{\mu_0 \mu_r}{4\pi}$$

For air or vacuum

$$k = \frac{\mu_0}{4\pi}$$

then, $k = \frac{\mu_0}{4\pi} = 10^{-7}$

In vector form :-

$$\boxed{\vec{dB} = \frac{\mu_0}{4\pi} \frac{(I\, \vec{dl} \times \vec{r})}{r^3}}$$

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Answer No. 9

Given, voltage at bulb = 220V

Power of bulb = 200W

then,

we know that

$$R = \frac{V^2}{P}$$

$$R = \frac{(220)^2}{200}$$

$$R = \frac{220 \times 220}{200}$$

$$R = \frac{22 \times 22}{2}$$

$$R = 242\ \Omega$$

Hence,

the resistance of bulb is 242 Ω.

Answer No. 10

Conjugate focus :- It is the pair of two on principle axis such that when object is placed at ~~one~~ first point then image is formed at other

point & when object is placed other point then image is formed at first point. It is obtained only in case of concave mirrors because real images is formed in concave mirrors.

Answer No. 11

Photoelectric effect :- when electromagnetic radiation is incident on metallic surface then electrons are immited called photo electrons & this process is called photoelectric emission & this effect is known as photoelectric effect.

when a photon of energy $h\nu$ is incident on metal surface then it is divided into parts -

$h\nu$ = work function + maximum kinetic energy.

$$h\nu = \phi + \frac{1}{2} m v_{max}^2$$

$$\frac{1}{2} m v_{max}^2 = h\nu - \phi$$

प्रश्न क्र.

$$\frac{1}{2}mv^2_{max.} = h\nu - h\nu_0$$

$$\boxed{\frac{1}{2}mv^2_{max.} = h(\nu - \nu_0)}$$

Answer NO°12

Two Postulate's of Bohr's atomic model are :-

(i) Electron revolve in some specific circular orbits. These orbits are called stationary orbits or non-radiatting orbit. Electron revolve in these orbits do not radiate any energy.

(ii) when electrons revolve in orbits then centripetal force is called equal to electrostatic force b/w cleus and electron.

i.e.

$$\boxed{\frac{mv^2}{r} = \frac{1}{4\pi\varepsilon_0}\frac{Ze(e)}{r^2}}$$

Answer NO°13 (OR)

Resistance	Specific Resistance
① It is obstruction in the flow of current through conductor	① Resistance of a conductor of unit length & unit area of cross-section is called specific resistance
② It depends on length & area of cross-section of conductor.	② It does not depend on length and area of cross-section of conductor.
③ Its unit is ohm (Ω)	③ Its unit is ohm x meter (Ω m)

Answer NO°14 (OR)

Let initial length of wire is l and area of cross-section of wire is A

then, resistance of wire is given by

$$R = \frac{\rho l}{A} \quad -(1)$$

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According to question.

On changing length to half then length becomes $l/2$ & area of cross-section becomes $2A$ then, new resistance of conductor is given by

$$R' = \frac{\rho \, l/2}{2A}$$

$$R' = \frac{1}{4}\frac{\rho l}{A} \quad \text{— (2)}$$

From eqn (1) & (2)

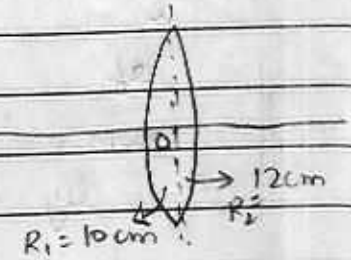
$$R' = \frac{1}{4} R$$

Hence, Resistance is decreases to four times.

Answer NO:15.

Given, A double convex lens

Radius of first surface is $R_1 = 10\,cm$



and radius of second surface $R_2 = -15\,cm$

and its focal length (f) = 12cm
refractive index of glass (μ_2) = ?

We know that
By lens maker formula

$$\frac{1}{f} = \left(\frac{\mu_2}{\mu_1} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$$

Here: μ_2 is refractive index of glass
μ_1 is refractive index of air
$\therefore \mu_1 = 1$

Now,

$$\frac{1}{12} = \left(\frac{\mu_2}{1} - 1\right)\left(\frac{1}{10} - \frac{1}{(-15)}\right)$$

$$\frac{1}{12} = (\mu_2 - 1)\left(\frac{1}{10} + \frac{1}{15}\right)$$

$$\frac{1}{12} = (\mu_2 - 1)\left(\frac{3+2}{30}\right)$$

$$\frac{1}{12} (\mu_2 - 1) = \frac{1}{12} \times \frac{30}{5}$$

$$(\mu_2 - 1) = \frac{1}{2}$$

$$\mu_2 = \frac{1}{2} + \frac{1}{1}$$

$$\mu_2 = \frac{1+2}{2}$$

$$\mu_2 = 3/2$$

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$\mu_2 = 1.5$

Hence, refractive index of glass is 1.5

Answer No. 16. (OR)

Capacity of a conductor :- Capacity of a conductor is the capacity of to store electric charge & energy. On ~~charge~~ increasing charge potential is also increases.

i.e. $Q \propto V$

$Q = CV$

Here, C is a constant called capacity of a conductor.

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

Its S.I. unit is coulomb / volt or farad its C.G.S unit is stat - farad

1 farad = 9×10^{11} stat-farad.

Factor affecting the capacity of a Conductor are :-

1) On the radius or size of conductor :- On increasing the size of conductor capacity increases.

2) On the dielectric constant of medium :- capacity increases to K times in the presence of dielectric medium.

3) In the presence of other conductor :- In the presence of other conductor potential decreases hence capacity increases.

Answer No. 17,

Intrinsic semiconductor	extrinsic semiconductor
① A pure semiconductor is said to intrinsic semiconductor	① A semiconductor obtained on adding impurity is called extrinsic semiconductor. It is two type : N-type, P-type
② During electric conduction intrinsic semiconductor remains electrically neutral it has equal number of electrons and holes.	② In N - type semi-conductor no. of electrons is more than no. of holes & In P-type semiconductor no. of holes is more than no. of electrons.

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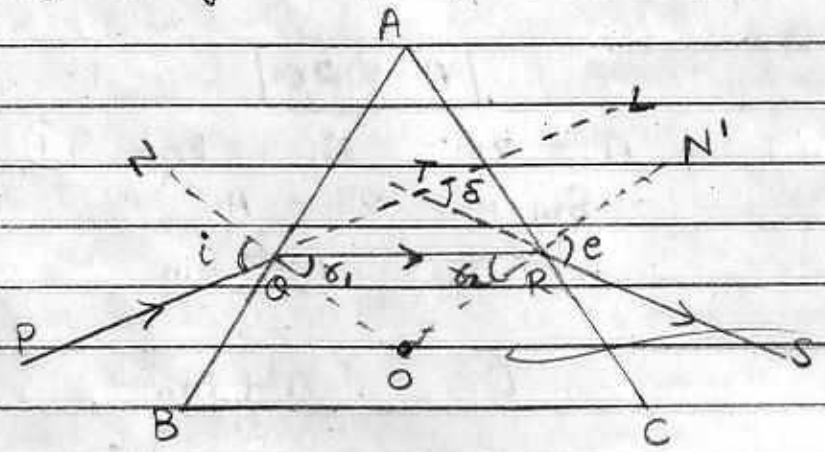
③ In intrinsic semi-conductor electric conductance due to breaking of covalent bonds.	③ In N-type semi-conductor flow of current due to flow of electrons & In P-type semiconductor flow of current due to flow of holes.
④ Conductivity of it is very low.	④ Conductivity of it is very large
⑤ Example - pure silicon, pure Germanium.	⑤ N-type it is obtain by adding impurity of pentavalent atom, P-type it is obtain by adding impurity of trivalent atom.

Answer NO. 18

Let there is a prism ABC having refractive surface AB & AC. Let a incident ray PQ incident on refracting surface AB & refracted along QR. This ray

QR incident ray on refracting surface AC and refracted along RS. Incident ray PQ & refracted ray RS are extendent & meet at a point T. Normal ON is drawn on refracting surface AB and ~~on~~ normal ON' is drawn on refracting surface BC.



In ΔQRT we have,

$$\delta = i - \gamma_1 + e - \gamma_2$$

For minimum deviation

$$i = e \qquad \gamma_1 = \gamma_2 = \gamma$$

then,

$$\delta_{min} = i - \gamma + i - \gamma$$

$$\delta_m = 2i - 2\gamma \quad — (1)$$

Now,

In Quadrilateral AQOR

$$A + \angle QOR = 180^\circ \quad — (2)$$

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In ΔQOR, we have

$$r_1 + r_2 + \angle QOR = 180^\circ \quad \text{—— (3)}$$

for ⊙ minimum deviation

$$r_1 = r_2 = r$$

then,

$$2r + \angle QOR = 180^\circ \quad \text{—(3)}$$

From equation (2) & (3)

$$A + \angle QOR = 2r + \angle QOR$$

$$\boxed{A = 2r}$$

put $A = 2r$ in eqn (1)

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

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

$$i = \frac{A + \delta m}{2}$$

We know that

refractive index $\mu = \frac{\sin i}{\sin r}$

$\therefore i = \frac{A + \delta m}{2}$ $\quad r = \frac{A}{2}$

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

It is required refractive index of glass prism.

Answer No:19 (OR)

Transformer :- It is a device which is used to increase or decrease the alternating voltage

It is of two types :

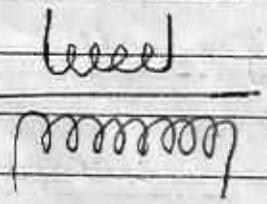
(i) Step up transformer :- It increases the voltage or decreases the current

(ii) Step down transformer :- It decreases the voltage or increases the current.

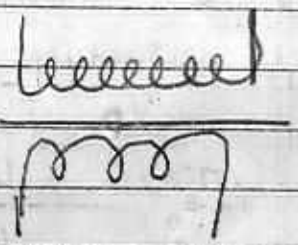
Main parts :-

(i) primary coil (ii) secondary coil

(iii) laminated core

(i) 

Step-up

(ii) 

Step-down

Principle :- It works on the principle of mutual induction. when voltage is applied at the ends of primary coil then current flowing in primary coil changes

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Due to this magnetic flux linked with secondary coil is changed & emf is induced and if coil is closed then induced current is flowing. This is the principle of transformer.

- Number of turns in primary coil is less than the secondary coil in step up transformer.
- Number of turns in secondary coil less than the primary coil in step down transformer.

Let no. of turns in primary & secondary coil are N_p & N_s & voltage at the ends of primary & secondary coil are V_p & V_s

Then, By Faraday's second law in primary coil

$$V_p = -N_p \frac{d\phi}{dt} \quad -(1)$$

Similarly

$$V_s = -N_s \frac{d\phi}{dt} \quad -(2)$$

Dividing eqn (2) by (1)

$$\frac{V_s}{V_p} = \frac{N_s}{N_p} \quad -(3)$$

In ideal transformer (Power loss is loss) then,

$$V_S I_S = V_P I_P$$

$$\frac{V_S}{V_P} = \frac{I_P}{I_S} \quad \text{— (4)}$$

From eqn (3) & (4)

$$\boxed{\frac{V_S}{V_P} = \frac{N_S}{N_P} = \frac{I_P}{I_S}} = \text{transformer ratio}$$

In Step-up : $r > 1$ $V_S > V_P \Rightarrow N_S > N_P \Rightarrow I_P > I_S$

In step-down : $r < 1$ $V_S < V_P \Rightarrow N_S < N_P \Rightarrow I_P < I_S$

Energy loss in transformer :-

Copper loss :- when current flowing in transformer some part of energy is wasted in the form of heat is called copper loss.
To reduce it thick wire is used in coil of transformer.

Iron loss :- Due to eddy current some part energy is wasted in the form of heat is called Iron loss.

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To reduce it laminated core of soft iron is used in transformer.

(3) Magnetic flux leakage :- Magnetic flux linked with primary coil does not equal with the magnetic flux linked with secondary coil this is called magnetic flux leakage. To reduce it transformer core is kept in the form of closed loop.

(4) Hysteresis Loss :- In magnetization and demagnetization some part of energy is wasted in the form of heat this is called Hysteris loss To reduce it soft iron core or laminated core of soft iron is used in transformer.