2023

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

32 पृष्ठीय

परीक्षार्थी द्वारा भरा जावे ↓

परीक्षा का विषय	विषय कोड	परीक्षा का माध्यम
Physics	210	English

स्टीकर तीर के निशान ↓ से मिलाकर लगायें

प्रश्न पत्र का सेट [ए]

:– परीक्षार्थी का कक्ष क्रमांक [07]

:– परीक्षा का दिनांक [01 | 03 | 2023]

शिक्षा का नाम एवं परीक्षा केन्द्र क्रमांक की मुद्रा

हायर सेकेण्डरी परीक्षा
451013

वेक्षक का नाम एवं हस्ताक्षर	केन्द्राध्यक्ष / सहायक केन्द्राध्यक्ष के हस्ताक्षर
एस. पटिदार	

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

णित किया जाता है कि होलो क्राफ्ट स्टीकर क्षतिग्रस्त नहीं पाया गया तथा अन्दर के ों के अनुरूप मुख्य पृष्ठ पर अंकों की प्रविष्टी एवं अकों का योग सही है।

धारित मुद्रा : नाम, पदनाम, मोबाईल नम्बर, परीक्षक क्रमांक एवं पदांकित स्था के नाम की मुद्रा लगाएं।

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 प्राप्तांकों की प्रविष्टी करें।

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
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14		
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27		
28		

कुल प्राप्तांक शब्दों में | कुल प्राप्तांक अंकों में

प्रश्न 1

Ans of Q.1.

(a) 1.67×10^{-31} kg.

(b) Ampere / meter^2

(c) $\pi/2$.

(d)

(e) 1.1 eV

(f) Junction diode.

(g) is more than

Ans. of Q.2.

(i) 3900 Å - 7800 Å

(ii) decrease.

(iii) vector.

(iv) sensitivity

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(v) Zero (0).

(vi) Zero

(vii) Gamma ray.

Ans. of Q.3.

i) False.

ii) False.

iii) True.

(iv) False.

(v) False.

vi) True.

(vii) True.

Ans of Q.4.

(i) South pole to north pole.

(ii) by connecting a high resistance in series.

(iii) The drift velocity decreases on increasing temperature.

(iv) The relation between energy & frequency of radiation is → $\boxed{E = h\nu}$

where,
h = planck's constant.
ν = frequency.

(v) Threshold frequency → Threshold frequency is that minimum frequency below which photoelectron do not emit from the surface of the metal, whatever may be the intensity. It is denoted ν_0

(vi) ~~Qui~~ Diffraction → The phenomenon in which light

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(v) ~~y~~ get bend at edge of the object, which is come in its path ~~or~~ offered in its path.

(vii) The unit of Power of lens is Dioptre (D)

Ans. of Q. 5

→ Isotopes → The elements in which the numbers of protons (Atomic number) are same but the atomic mass is different, are called isotopes.

Isotopes of Hydrogen →

(i) Protium. Protium — $_{1}^{1}H$
(ii) Deuterium — $_{1}^{2}H$
(iii) Tritium. — $_{1}^{3}H$

Ans. of Q. 6.

Fundamental charge → The charge carried by an Electron

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is called fundamental charge.

Its value is → 1.6×10^{-19} C.

Ans. of Q. 7.

→ Electric cell → The device which convert chemical energy into electrical energy by the continuous flow of electron is called electric cell.

In this, chemical reactions are take place due which electron flow from cathode to anode, produce electricity.

Eg → (i) Dry cell.
(ii) Mercury cell.
(iii) Fuel cell
(iv) Lead storage cell.

Ans. of Q. 8.

→ The vector form of Bio-savart law is as follows:-

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$$\boxed{d\vec{B} = \frac{\mu_0}{4\pi} \frac{I(d\vec{l} \times \vec{r})}{r^3}} \text{ Tesla}$$

In general form.

$$\boxed{dB = \frac{\mu_0}{4\pi} \frac{I\,dl \sin\theta}{r^2}} \frac{N}{A \cdot m}$$

Ans of Q. 10 (or)

Refractive Telescope.	Reflective telescope.
1) In it the objective is a convex lens.	1.) In it the objective is parabolic mirror.
2.) It need less adjustment, so it is easy to use.	2.) It need more adjustment, so difficult to use.
3) It has spherical abberation and chromatic abberation, so the image formed by it is implicit.	3.) It has no spherical and no chromatic abberation, so the image formed by it is called intense
4) Its length is less	4.) Its length is greater.

प्रश्न 1.

Ans. of Q. 11.

→ **Photoelectric effect** → The phenomenon in which illuminated light ray of suitable frequency made to incident on the metal surface due to which electron emits from its surface is called photoelectric effect.

Einstein photo-electric eqn is

$$\boxed{\frac{1}{2} m v_{max}^2 = h\nu - h\nu_0}$$

(or)

$$\frac{1}{2} m v_{max}^2 = h(\nu - \nu_0)$$

Ans. of Q. 12.

→ Two postulates of Bohr's model are →

(i) The total positive charge of an atom is concentrated at the centre is called Nucleus.

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(i) Electron around the nucleus revolve in certain specific orbit.

(ii) When electron jump from high orbit of higher energy to lower orbit of lower energy then it emit some part of energy in the form of radiation.

(iii) There angular momentum is an integral multiple of $\frac{h}{2\pi}$ (h = planck's constant)

Ans. of Q 13 (Or)

Resistance	Specific Resistance
1 The obstruction offered by conductor in the flow of current is called Resistance	It is the resistance of the material of conductor of unit length and unit cross-sectional Area.
2) Its SI unit is Ohm (Ω).	It's SI unit is Ohm. meter. (Ωm).

B
S
E

प्रश्नक.

3) It depend upon the length and area.	3) It does not depend upon length and area. It is a constant quantity.
4) It the property of conductor	4) It the property of material of conductor.
5) Denoted by 'R'	5) Denoted by 'ρ'.

Ans. of Q.16.

→ Let consider the electric flux linked with a surface is —

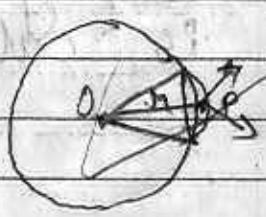
$$d\phi = E\,ds\cos\theta \quad \text{— (1)}$$

here, $\theta = 0$ then $\cos 0 = 1$

eqn (1) become

$$d\phi = E\,ds$$

For total electric flux.



$$\phi = \oint E\,ds$$

$$\phi = E \oint ds$$

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Area of sphere $\Rightarrow \oint ds = 4\pi r^2$

$$\phi = E 4\pi r^2 \quad \text{—(1)}$$

We know that by Gauss law.

$$\phi = \frac{1}{\varepsilon_0} q. \quad \text{—(2)}$$

from eqn (1) & (2)

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

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

if q_0 charge is bring near this then the force experience by it is.

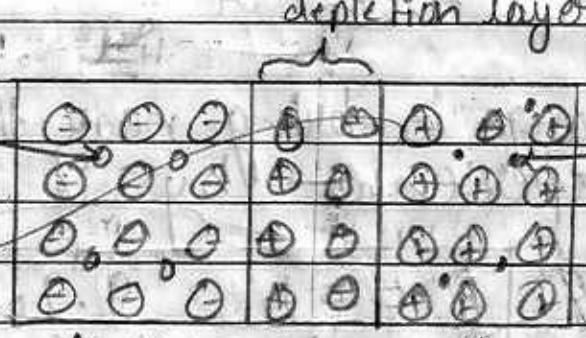
Coulomb's law. $\rightarrow$ $$\boxed{F = \frac{1}{4\pi\varepsilon_0} \frac{q \cdot q_0}{r^2}}$$ Newton.

~~Ans~~

प्रश्न क्र.

Ans. of Q. 17. (Or)

→ **P-N Junction Diode** → When a crystal of intrinsic or pure semiconductor is doped by acceptor impurity (i.e. Trivalent impurity) from one side and other side or region is doped by donar impurity (i.e. Pentavalent impurity), because of presence of both type of impurities O, it is called P-N Junction or diode.



P-N Junction diode.

It can be used as two type :-
(i) half wave rectifier.
(ii) full wave rectifier.

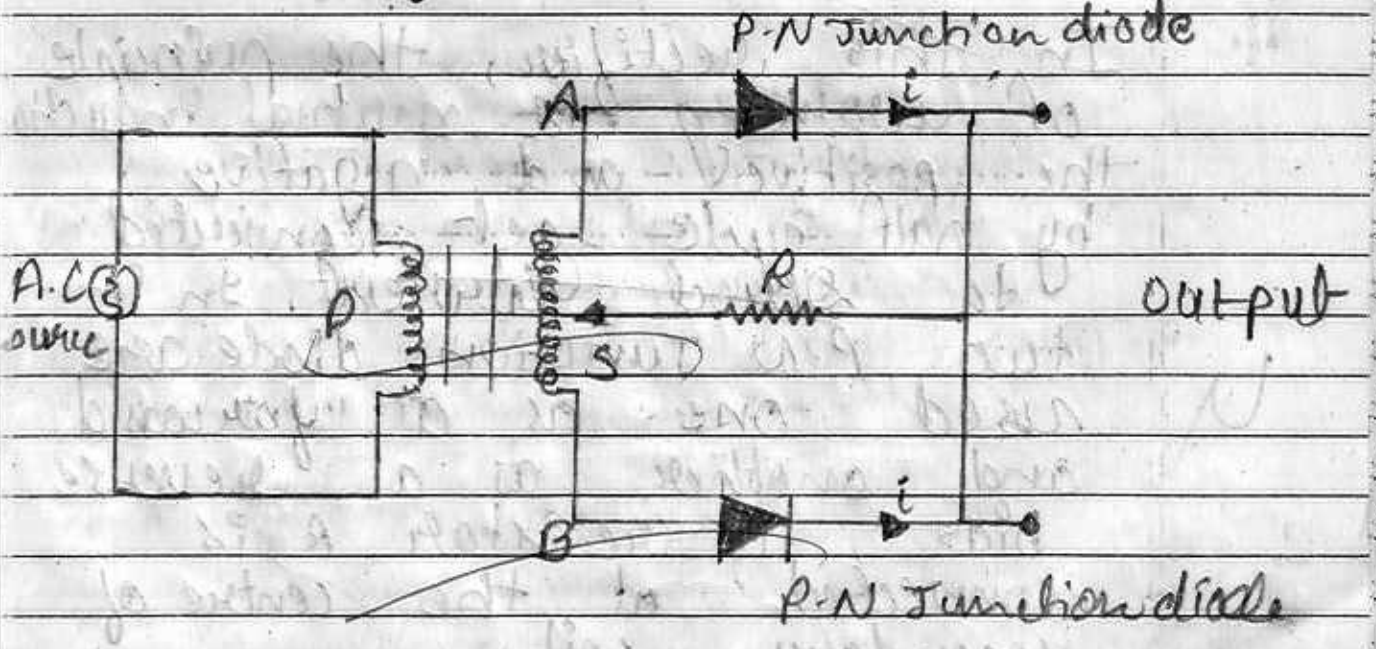
According to ques.

प्रश्न 1.

ii) Full wave rectifier :-

The rectifier is a device which convert AC into DC, and this process is called rectification.

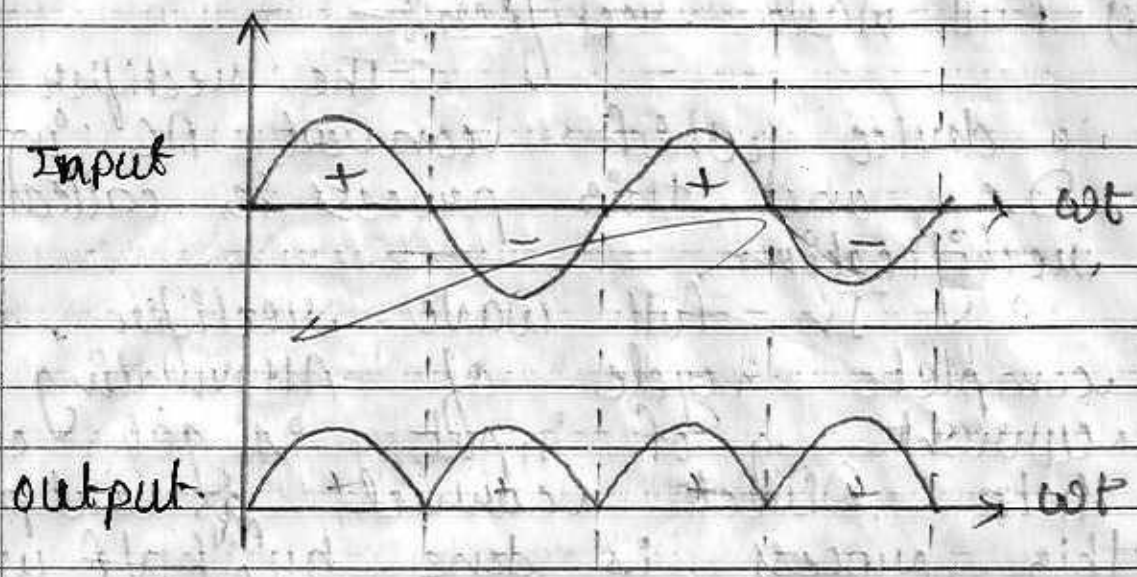
In full wave rectifier, the complete cycle of Alternating current of input is get convert into Direct current as output. this process is done by full wave rectifier and called full wave rectification.



Full wave rectifier.

BSE

प्रश्न 5.



Graph of full wave rectifier

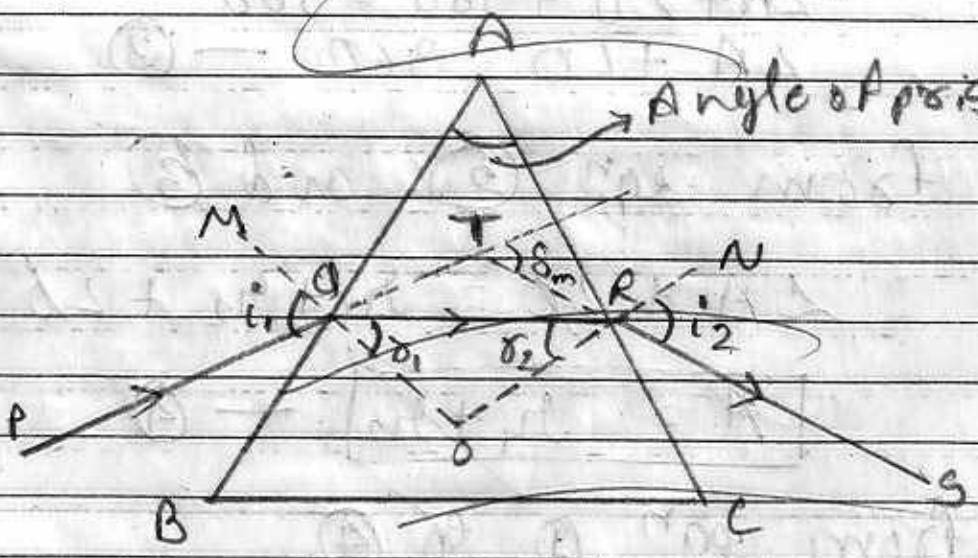
In this rectifier, the principle of working is mutual induction, the positive and negative by half cycle get converted to Direct Current. In it two P-N Junction diode are used one as a forward and another as a reverse bias, a resistor R is connected at the centre of secondary coil.

प्रश्न.

Ans of Q.18.

→ Consider a prism 'ABC' which Angle of prism 'A'. A ray PQ. is incident on the AB surface, which refracted as QR and angle of incidence is 'i_1', then refracted ray get emerge out as 'RS' ray and forms angle r_1 and r_2, MO and NO are normal for AB and AC resp. δ is angle of deviation.

PQ = incident. ray,
QR = refracted ray.
RS = emergent ray.



In Δ TQR,

$\delta = \angle TQR + \angle TRQ$

(Exterior angle = sum of oppo. interior angle)

प्रश्न :

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

$$\delta = (i_1 + i_2) - (r_1 + r_2) \quad \text{—①}$$

In $\triangle OQR$,

$$r_1 + r_2 + \angle O = 180 \quad \text{—②}$$

Sum of all angle of triangle is 180°

In quadrilateral AQOR

$$\angle A + \angle Q + \angle R + \angle O = 360$$

OQ and OR are ⊥ so $= 90°$

$$\angle Q + \angle R = 180$$

$$\angle A + \angle O + 180 = 360$$

$$\angle A + \angle O = 360 \quad \text{—③}$$

from eqⁿ ② and ③

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

$$\boxed{A = r_1 + r_2} \quad \text{—④}$$

from eqⁿ ① & ④

$$\delta = i_1 + i_2 - A \quad \text{—⑤}$$

In condition of minimum deviation. (δ_m)

$$i_1 = i_2 = i \quad \text{---} \quad (6)$$

$$r_1 = r_2 = r \quad \text{---} \quad (7)$$

from (5) & (6)

$$\delta_m = i + i - A$$

$$\delta_m = 2i - A$$

$$2i = \delta_m + A$$

$$\boxed{i = \frac{\delta_m + A}{2}} \quad \text{---} \quad (8)$$

from eq (4) & (7)

$$A = r + r$$

$$A = 2r$$

$$\boxed{r = \frac{A}{2}} \quad \text{---} \quad (9)$$

by Snell's law

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

Substituting the value of i and r.

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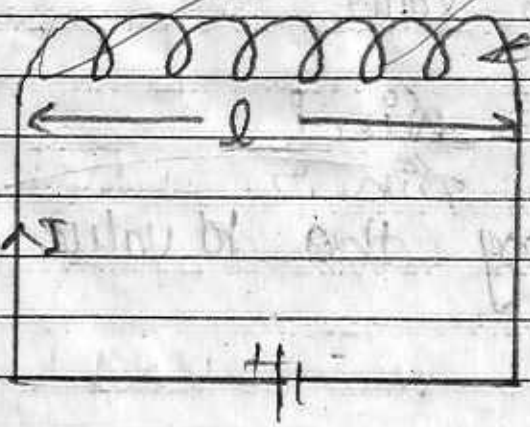
$$\mu = \frac{\sin\left(\frac{\delta_m + A}{2}\right)}{\sin\frac{A}{2}}$$

Ans. Q - 19.

→ **Self Inductance** – When current flowing in coil change its magnetic flux also changes due to which induced current start flowing in it called self induction.

→ Expression →

Consider a coil of length 'l' and Area of cross-section 'A' and 'I' current flowing in it. If N is the no. of turns of total coil. then



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Total no. of turns = N

no. of turns per unit length $n = \frac{N}{l}$

if the magnetic field produce by it is

$$B = \mu_0 n I \quad \text{---} (1)$$

and magnetic flux linked with it is

$$\phi = NBA$$

from eq (1)

$$\phi = N \mu_0 n I A$$

$$\phi = \frac{N \mu_0 N I A}{l} \qquad \left(n = \frac{N}{l}\right)$$

W.k that, for self induction,

$$\phi = LI$$

So,

$$LI = \frac{N^2 \mu_0 I A}{l}$$

$$L\phi = \frac{N^2 \mu_0 I A}{l I}$$

$$\boxed{L = \frac{N^2 \mu_0 A}{l}} \quad \text{Henry}$$

if soft iron core is applied.

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$$L = \frac{N^2 \mu_0 \mu_r A}{l} \text{ Henry.}$$

→ factor affecting self inductance of solenoid:-

1) Area of cross section → self inductance is directly proportional to Area

$L \propto A.$

2) Number of turns → It is directly proportional to square of no. of turns.

i.e, $L \propto N^2$

3) Length :- It also depend on length.

i.e, $L \propto \frac{1}{l}$

4) Temperature → The temperature around it is also affect the self inductance of solenoid.

प्रश्न 9.

Ans. of Q.9.

Given,

$P = 200\ W$

$V = 220\ V$

for current, We know that.

$P = VI$

$I = \frac{P}{V}$

$I = \frac{200}{220} = \frac{20}{22} = 0.9$ Ampere.

$I = 0.9$ Ampere.

for resistance by ohm's law.

$R = \frac{V}{I} = \frac{220}{0.9} = 244.4$ ohm.

$R = 244.4\ \Omega$

The resistance of the bulb is $244.4\ \Omega$.

Ans. of Q. 14. (OR)

Given, length is half of its initial.

then,

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$$L_2 = \frac{L_1}{2} \quad -(1)$$

Area is two times of initial So, it become

$$A_2 = 2A_1 \quad -(2)$$

if the wire is same then the material of the wire should also be same so 'ρ' is same in both;

We know that the Resistance before changes.

$$R_1 = \frac{\rho l_1}{A_1} \quad -(3)$$

and resistance after changes.

$$R_2 = \frac{\rho l_2}{A_2}$$

From eqn (1) & (2)

$$R_2 = \frac{\rho l_1/2}{2A_1} = \frac{\rho l_1}{4A_1}$$

$$R_2 = \frac{\rho l_1}{4A_1}$$

from eqn (3).

$$R_2 = \frac{R_1}{4}$$

The resistance after changes decreased four times of initial.

Ans. of Q.13.

Given,

$R_1 = 10$ cm.
$R_2 = -15$ cm.
$f = -12$ cm.
$\mu_1 = ?$
$\mu_2 = 1.1$

We know that,

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

Substituting the values.

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

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

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$$\Rightarrow \frac{1}{-12} = \left(\frac{1}{u_1} - 1\right)\left(\frac{1}{10} - \frac{1}{-15}\right)$$

$$\Rightarrow \frac{1}{-12} = \left(\frac{1}{u_1} - 1\right)\left(\frac{1}{10} + \frac{1}{15}\right)$$

$$\Rightarrow \frac{1}{-12} = \left(\frac{1}{u_1} - 1\right)\left(\frac{3+5}{30}\right)$$

$$\Rightarrow \frac{1}{-12} = \left(\frac{1}{u_1} - 1\right)\left(\frac{8}{30}\right)$$

$$\Rightarrow \frac{1}{u_1} - 1 = \frac{1}{-12} \times \frac{30}{8}^{15}_{4}$$

$$\Rightarrow \frac{1}{u_1} - 1 = -\frac{15}{48}$$

$$\Rightarrow \frac{1}{u_1} = -\frac{15}{48} + 1$$

$$\Rightarrow \frac{1}{u_1} = \frac{-15+48}{48}$$

$$\Rightarrow \frac{1}{u_1} = \frac{33}{48}$$

$$\Rightarrow u_1 = \frac{48}{33}$$

$$\Rightarrow \boxed{u_1 = 1.5}$$

प्रश्न 3

The refractive index is 1.5 of glass.