छत्तीसगढ़ माध्यमिक शिक्षा मण्डल, रायपुर

उ. पु. 40 पृष्ठ

परीक्षार्थी हेतु

2019

प्रश्न पत्र सेट A, B, C लिखें | C |

पृष्ठ 2 पर दिए गए निर्देश को आवश्यक रूप से पढ़ें।

परीक्षा के नाम की सील

H. S. S. परीक्षा

1. विषय कोड | 2 | 0 | 1 | 2. विषय का नाम Physics

3. [illegible]

उ. पु. सरल क्र. : 4507317

2	1	9	1	8	1	9	8	2	5

(शब्दों में)

Two	One	Nine	One	Eight	One	Nine	Eight	Two	Five

Hritik

परीक्षार्थी हस्ताक्षर

प्रमाणीकरण

1. छात्र का अनुक्रमांक, प्रश्न पत्र सेट कोड, माध्यम, विषय कोड, विषय के नाम की जाँच की गयी, सही पायी गई।

हस्ताक्षर पर्यवेक्षक

नाम M. Agrawal पद Lect संस्था GGHSS Ara

हस्ताक्षर केन्द्राध्यक्ष

केन्द्राध्यक्ष

शा.क.उ.मा.वि.अरंग

जिला-रायपुर(छत्तीसगढ़)

प्रश्न संख्या	प्राप्तांक	प्रश्न संख्या	प्राप्तांक	प्रश्न संख्या	प्राप्तांक
1	1	11	3	21	2
2	1	12	2	22	3
3	0	13	3	23	3
4	1	14	3	24	5
5	1	15	3	25	5
6	5	16	3	26	5
7	2	17	3	27	1
8	2	18	3	28	
9	2	19	3	29	
10	0	20	3	30	

प्राप्तांक को गोल घेरा करें

00	1	2	3	4	5	6	7	8	9	10
	11	12	13	14	15	16	17	18	19	20
	21	22	23	24	25	26	27	28	29	30
	31	32	33	34	35	36	37	38	39	40
	41	42	43	44	45	46	47	48	49	50
	51	52	53	54	55	56	57	58	59	60
	61	62	63	64	65	66	67	68	69	70
	71	72	73	74	75	76	77	78	79	80
	81	82	83	84	85	86	87	88	89	90
	91	92	93	94	95	96	97	98	99	100

कुल प्राप्तांक अंकों में | 0 | 6 | 5 | शब्दों में Zero Six Five

हस्ताक्षर परीक्षक

परीक्षक क्रमांक 8802014B

हस्ताक्षर उपमुख्य परीक्षक

क्रमांक

हस्ताक्षर मुख्य परीक्षक

क्रमांक

② परीक्षार्थी के लिये निर्देश

1. परीक्षार्थी को 40 पृष्ठ की उत्तरपुस्तिका दी गयी है जिसमें से 38 पृष्ठ छात्रों के लिखने हेतु उपलब्ध रहेंगें। इसी उत्तरपुस्तिका में छात्रों को पूरा प्रश्नपत्र हल करना है। इसके अतिरिक्त अलग से पूरक उत्तरपुस्तिका नहीं दी जायेगी।
2. प्रश्नों को हल करते समय प्रश्न कमांक अंकित करके उत्तर लिखें, प्रश्न लिखना आवश्यक नहीं है। इससे परीक्षार्थी के समय की बचत होगी।
3. परीक्षार्थी अपना रोल नम्बर, विषय कोड, विषय का नाम प्रवेश पत्र से देखकर तथा प्रश्न पत्र सेट प्रश्न पत्र से देखकर एवं माध्यम, दिनांक उत्तरपुस्तिका के मुख्य पृष्ठ पर निर्धारित स्थान पर आवश्यक रूप से अंकित करें।
4. रोल नम्बर सामने दिये उदाहरण अनुसार लिखा जावे:–

1	3	2	4	7	9	5	6	0	1
एक	तीन	दो	चार	सात	नौ	पांच	छः	शून्य	एक

5. उत्तरपुस्तिका के पृष्ठों के दोनों ओर लिखें। बीच में स्थान न छोड़ें। भूल से छूटे हुए पृष्ठ या रिक्त स्थान अथवा अंत में बिना लिखे हुए सभी पृष्ठों को कास (Cross X) कर देंवे।
6. उत्तरपुस्तिका के ऊपर/अंदर तथा किसी भी भाग में चाही गई सूचना के अलावा परीक्षार्थी अपना नाम, पता, फोन नम्बर अथवा अन्य कोई जानकारी जिससे छात्र की पहचान हो सके, अंकित न करें।
7. यदि रफ कार्य हेतु आपको दी गई उत्तरपुस्तिका पर्याप्त है तो उत्तरपुस्तिका के अंतिम पृष्ठों पर रफ कार्य अंकित करके रफ कार्य करें तथा तिरछी रेखा से काट दें। यदि यह उत्तरपुस्तिका पर्याप्त नहीं है तो रफ कार्य हेतु अलग से उत्तरपुस्तिका पर्यवेक्षक से मांगें।
8. परीक्षा केन्द्र पर पुस्तक, लेख, कागज, कैलकुलेटर, मोबाईल, पेजर, किसी भी प्रकार का इलेक्ट्रानिक उपकरण तथा किसी भी प्रकार का हथियार आदि नहीं ले जायें।
9. स्कूल यूनिफार्म, स्केल, कम्पास बॉक्स अथवा अन्य किसी प्रकार से नकल सामग्री लिखकर नहीं लाये। टेबल के आस–पास कोई अवांछनीय सामग्री नहीं होनी चाहिए। नकल करना छत्तीसगढ़ सार्वजनिक परीक्षा (अनुचित साधनों का निवारण) अधिनियम 2008 के तहत दण्डनीय अपराध है।
10. अपनी उत्तरपुस्तिका/ग्राफ/मानचित्र/रफ कार्य पुस्तिका आदि परीक्षा भवन से बाहर ले जाना दण्डनीय अपराध है । अतः परीक्षा समाप्ति पश्चात उत्तरपुस्तिका एवं रफ कार्य पुस्तिका पर्यवेक्षक को सौंपकर परीक्षा कक्ष छोड़ें।
11. निर्देश कमांक 8, 9 एवं 10 का पालन नहीं करने पर अनुचित साधनों के उपयोग के अंतर्गत कार्यवाही की जावेगी।

मूल्यांकनकर्ताओं के लिये निर्देश

1. मूल्यांकनकर्ता उत्तरपुस्तिका का मूल्यांकन लाल स्याही से करेंगे।
2. प्रत्येक पृष्ठ के प्राप्तांक को जोड़कर मूल्यांकनकर्ता अंकों का प्रोग्रेसिव निर्धारित स्थान में लिखना न भूलें एवं जो पृष्ठ कोरे हैं उसे तिरछी लाईन से काट दें तथा उत्तरपुस्तिका के अंतिम पृष्ठ में कुल प्राप्तांक/पूर्णांक लिखना आवश्यक है।
3. मूल्यांकनकर्ता अंकों के योग को मुख्य पृष्ठ पर शून्य से सौ तक दिये गये टेबल में गोल घेरा करें तथा कुल प्राप्तांकों को शब्दों में भी योग लिखें।
4. मैंने सभी प्रश्नों के उत्तरों का मूल्याकंन किया है। उत्तरपुस्तिका के अन्दर के अंक एवं बाहर दर्शाये गये अंक समान हैं एवं योग भी समान है जिसका प्रमाणीकरण मेरे द्वारा मुख्य पृष्ठ पर किया गया है।

2019 (3)

3 = 3

पृष्ठ 3 के अंक | कुल अंक

[Ans. No' 1]

NPN is used to prefer transistor as an amplifier because in this power gain and voltage gain is more and electroons are available easily.

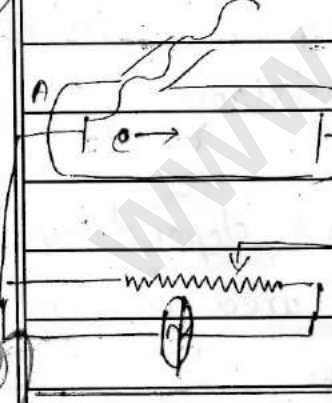
[Ans. No' 2]

Electric flux:

"The no of electric field lines passing normally through a surface is called as electric flux."

S.I. unit of Electric flux: ~~$\frac{Cm^2}{N}$~~ $\frac{N}{C}m^2$

[Ans. No' 3]



So, commutator, Ammeter or battery are the devices used in series with the fluorescent lamp, with A.C.

[Ans. No' 4]

Matter waves:

"The waves associated with the particle of some ~~mass~~ is called as Matter waves" It is given as $\lambda = \frac{h}{mv}$, m = mass of par

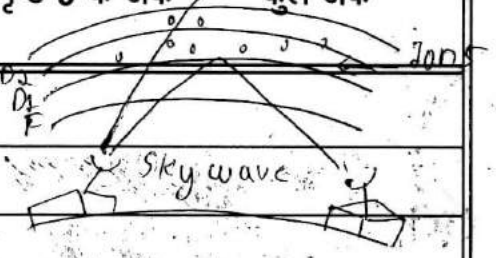
[Ans. No: 5]

Heat waves are transverse in nature, so heat waves can be polarised.

[Ans. No 6]

Difference between Resistance and specific resistance:

Resistance	Specific Resistance:
1) The obstruction offered by the conductor on the flow of electrons is called as resistance.	The resistance offered by one unit of length and one unit of area of cross-section is called as Specific resistance.
2) It depends upon length and area of the conductor.	It does not depend upon length and area of the conductor.
3) Its unit is ohm(Ω)	Its unit is (Ω m)



[Ans. No' 7]

Sky wave propagation:

"The message signals which get transmitted by the ions present in the Earth's atmosphere back to the Earth is called sky wave propagation."

The frequency range of this waves are generally 20 MHz - 200 - 300 MHz. This waves are mostly used for T.V transmission, Radar system etc.

[Ans. No' 8]

Given: We have $r = 18\,cm = 18 \times 10^{-2}\,m$

To Determine: $C = ?$

We know that the capacitance of a spherical capacitor is given as

$C = 4\pi\varepsilon_0 R$ [By formula]

putting values, we obtain-

$C = \frac{1}{9 \times 10^9} \times 18 \times 10^{-2}$

$C = 2 \times 10^{-2-9}$

$C = 2 \times 10^{-11}$ farad (Ans)

[Ans. 9]

A carbon resistor has band green, yellow and white.

The equivalent carbon resistance value is $[54 \times 10^9 \pm 20\%]\ \Omega$

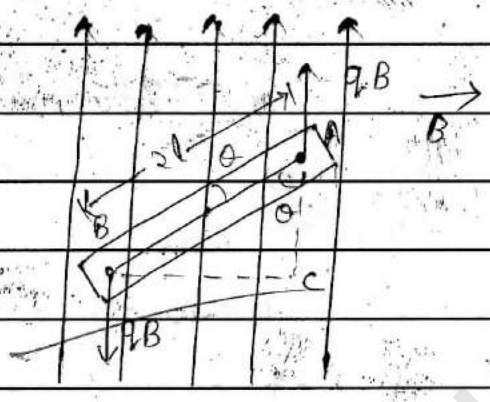
[Ans. No. 10]

"Only white and dark fringes are obtained when white light is used in young's double slit experiment.". This statement is not true because white light consists of 7 colour namely in order VIBGYOR

So, as we know that $B \propto \lambda$ so each light wave colour has different wavelength hence, there were a white band at the centre but at the ends there were be lapping of different colours and the constrast will not be good.

[Ans. No' 11]

Diagram:



Expression:

Let AB be a magnetic dipole of dipole moment m placed in a uniform magnetic field of B.

Let θ be the angle between dipole moment and the magnetic intensity B.

As two force will act on the ends of the magnetic dipole and will try to move it, but as they are equal opposite and acting on the same body will create torque.

So, τ (torque) = Force x perpendicular distance.

$\tau = F \times AC$

$\tau = qB \times AC$ ——— (i)

Now, in ΔABC, we have—

$\sin\theta = \frac{AC}{2l}$

So, $AC = 2l\sin\theta$ ——— (2)

From equation (1) & (2), we obtain-

$\tau = qB \times 2l\sin\theta$

$\tau = (q2l)B\sin\theta$

But $M = 2ql$, [magnetic moment]

So, $\boxed{\tau = MB\sin\theta}$

In vector (vector representation) form we have, $\boxed{\vec{\tau} = \vec{M} \times \vec{B}}$

This is the expression of magnetic dipole in a uniform field

[Ans. No. 12]

Gamma Rays :

"When an electron or any charged particle is accelerated in a wire then they emit electromagnetic rays of short wavelength or high frequency called as gamma rays (λ)."

Gamma rays have high penetrating power and have frequency very high with wavelength long.

Uses of Gamma rays:

(i) They are used to kill germs in the water body.

(ii) They are used to transmit message signal from one antenna to other.

(iii) They are used in medical and surgery field to cure some deadly diseases.

3

[Ans. No. 13]

We know that $\phi = LI$

when $I = 1$ ampere, then,

$\phi = L$

Coefficient of self-Inductance:

Coefficient of self inductance is numerically equal to the magnetic flux produced due the flowing of 1 ampere current in the wire.

1k

Given: 'L' when iron rod is present

$L = 2.8H$ —— (1)

and when iron rod is removed

$L' = 2mH$ —— (2)

To Determine: $\mu_r = ?$

Procedure: we have, $L = \left(\frac{\mu_0 N A}{l}\right)$

So, from eqn. (1) & (2), we get by dividing them

$$\frac{L'}{L} = \frac{\mu_0 \mu_r N A / l}{\mu_0 N A / l}$$

$$\frac{L'}{L} = \mu_r$$

$$\mu_r = \left[\frac{2.8}{2 \times 10^{-3}}\right]$$

$$\mu_r = (1.4 \times 10^3)$$

or $\mu_r = 1400\ TA^{-2}$ (Ans)

[Ans. No' 14]

(ii) Drift velocity: The average velocity with which the electron drift towards the positive terminal of the battery, when a constant potential difference is applied across the conductor is given as Drift velocity. It is represented as $\vec{V_d}$ (vector quantity)

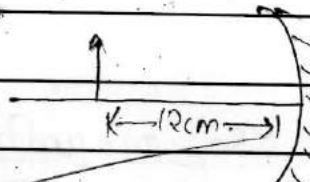
(ii) Relaxation Time: "The average time between the collision of electron with two ions inside a conductor is called as relaxation Time". It is represented as 'τ' (tau)

(iii) Potential difference: "When two isolated charges are brought from infinity to a point inside the electric field then the difference of potential between the two points is called as potential difference." Its S.I unit is volt. (V)

[Ans. No' 15]

Given: $u = 12\,cm$ or $u = 12 \times 10^{-2}\,m$

$R = 10\,cm$ or $f = \frac{R}{2} = 5\,cm = 5 \times 10^{-2}\,m$



To Determine: we have to find (v = ?) nature and magnification.

Procedure: we know that $u = (-12 \times 10^{-2}\,m)$

$f = (-5 \times 10^{-2})\,m$ (for concave mirror)

As, $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ (mirror formula)

putting values,

$\frac{1}{-5} = \frac{1}{v} + \frac{1}{(-12)}$

$\frac{1}{v} = \left(\frac{1}{12} - \frac{1}{5}\right)$

$\frac{1}{v} = \left(-\frac{7}{60}\right)$ (1)

or $v = (-8.5\ cm)$

Now, m = (magnification) = larger than the object

$m = -\frac{v}{u}$, $m = -\frac{(-8.5)}{-12}$ (1)

$m = \left(\frac{8.5}{-12}\right)$ or ~~$m = (-0.7)$~~

Obtained Answer: So, magnification, $m = (-0.7)$

position, $v = -8.5\ cm$

and nature = real and inverted.

8

[Ans. No' 16]

27 + 3 = 30

योग पूर्व पृष्ठ | पृष्ठ13 के अंक | कुल अंक

Modulation: "The process by which a low radio frequency signal is transmitted upto long distance by a carrier wave of high frequency is called as modulation." (1)

Need of Modulation - following are the causes of modulation -

(i) Due to Antenna size: when the message signal with low frequency were transmitted directly than high antenna length was needed nearly 30 m, which is not possible. So, by high frequency, the antenna length can be small.

(ii) Low Base-Band and problem in transmitting the signal: Because of low base-band the signals which were transmitting were mixed with noise and other signals. (2)

(iii) High attenuation or power loss: When the message signal were transmitted in low frequency than they were found to get attenuated soon.

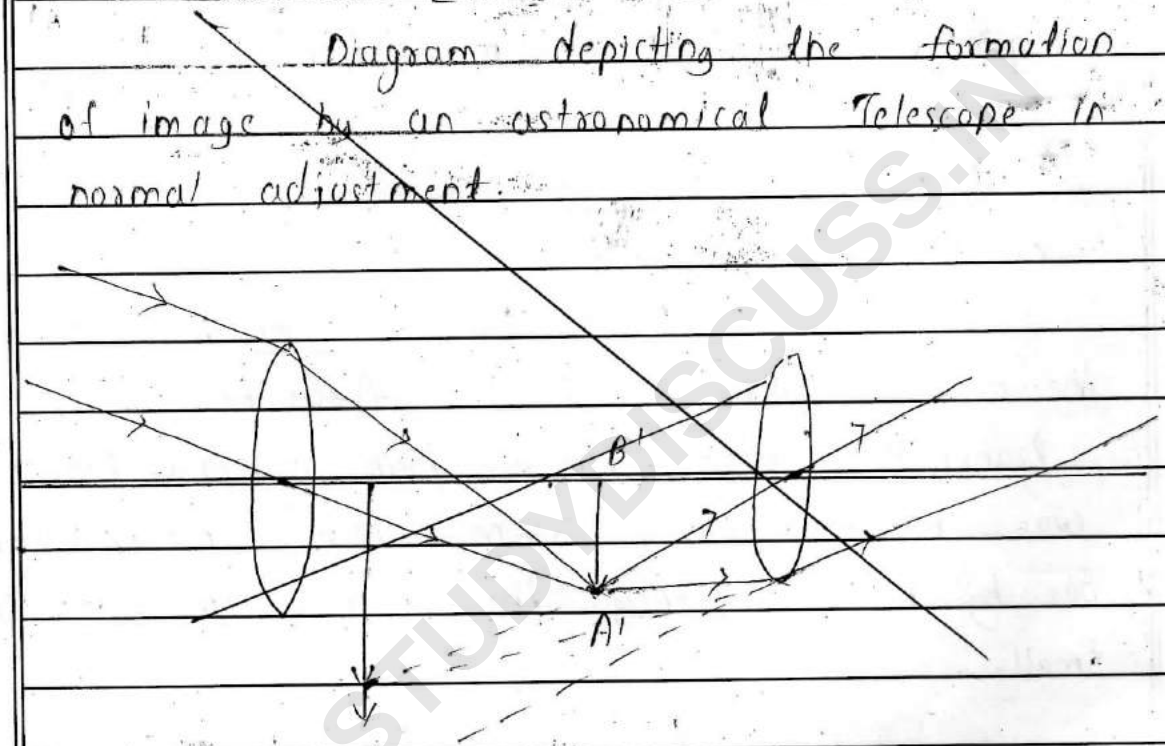
All this points for the need and

(8)

importance of modulation.

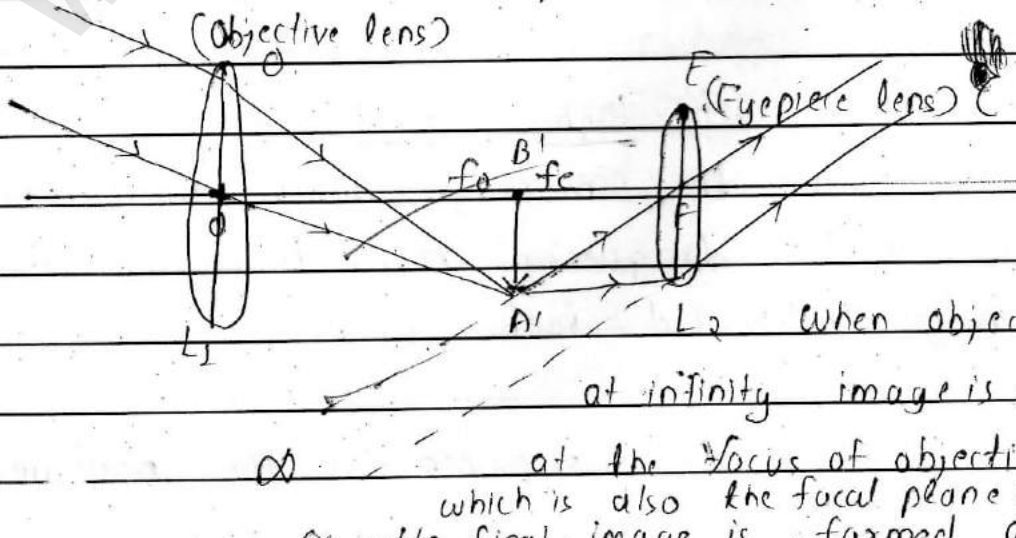
[Ans. No' 17]

Diagram depicting the formation of image by an astronomical Telescope in normal adjustment.



[Ans. No' 17]

Diagram showing formation of image in astronomical telescope in normal adjustment.



When object is at infinity image is formed at the focus of objective lens which is also the focal plane of Eye lens so, the final image is formed at infinity

[Ans. No' 18]

Photoelectric Effect: "When a light wave of suitable wavelength and frequency was made to fall on a photo-sensitive material then light was seene in opposite face due to the ejection of electron from the metal, this effect is called as photo electric effect."

Einstein's equation was,

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

Photoelectric effect as per Einsteins explanation -

(i) When the no' of photons striking the photo-sensitive metal was increased in unit area than there was a increase in the saturation current.

(ii) Photo-sensitive metal when irradiated with photons with have energy and wave greater than threshold frequency and wavelength then photo-electric effect was seen as, ν_0 (threshold frequency)

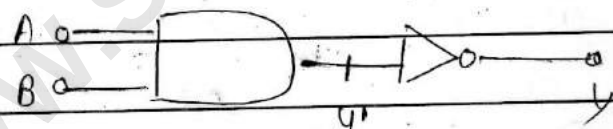
(ii) There is no apparent time lag between the emission of electron from the metal as photon (one) can hit one electron and cause photo-electric effect (nearly 10^{-10} sec)

(iii) Kinetic energy was increased of the electron with high frequency of incident light as $h\nu$ (1)

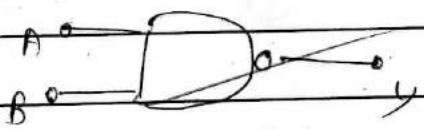
This was the Einstein's explanation to the photo-electric effect. (B)

[Ans. No' 19]

The given logic system circuit is



This is equivalent to NAND gate (1)



NAND gate

Logic symbol for the give symbol of circuit : $\boxed{y = \overline{A \cdot B}}$ (NAND gate) (1)

(Boolean expression)

Now truth table of the logic gate

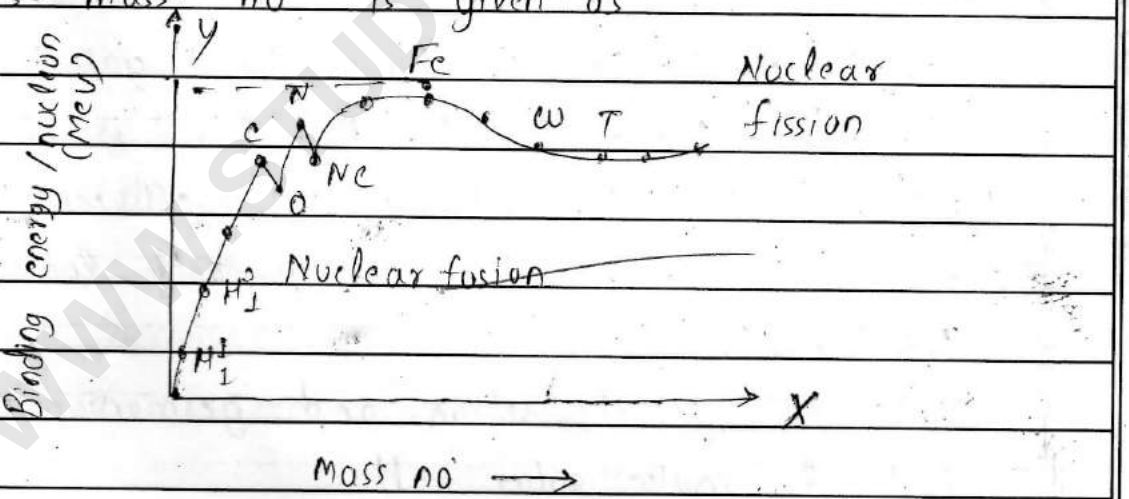
A	B	Y'	Y
1	0	0	1
0	1	0	1
0	0	0	1
1	1	1	0

1

3

[Ans. No' 20]

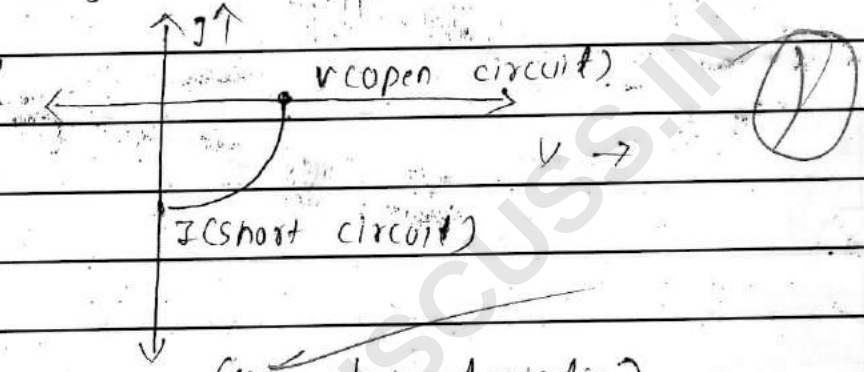
The graph showing relation between the variation of binding energy per nucleon vs. mass no' is given as



3 (A) The elements with mass no' in between 0-30, likely to give the nuclear fusion reaction. When two lighter elements with less binding energy fuse to give a nuclei with high binding energy then energy is released. This is known as Nuclear Fusion.

[Ans. No 21]

The V-I characteristic curve of solar cell is given as—



(V-I characteristic)

In this photo-absorption, the material used should have band gap in between (1.5 - 3 eV). As this is the band gap then the absorption coefficient should be comparable to this ranges only that is (1.5 - 3 eV).

Mostly silicon and germanium is used to make solar cell.

[Ans. No 22]

(i) In Lyman series the formula showing for calculating the wavelength is

given as $\frac{1}{\lambda} = R\left(\frac{1}{1^2} - \frac{1}{n^2}\right)$, where n is any integer.

Ans. (ii) The range of wavelength in Lyman series is given as- $\lambda_{shortest} = 121.3 \times 10^{-11} m$ to $\lambda_{largest} = 1030.2 \times 10^{-10} m$

Ans. (iii) This series of wavelength lies in the ultra-violet range of spectrum.

[Ans. No. 23] (or)

Ans (i) The oscillation stops when a metal plate is kept in a oscillating magnet field because of the formation of Eddy or Foucault current in the surface of the metal

Reason: As we know that conductors have electron and as the magnetic flux is changing in the face of the substance this causes the variable magnetic flux giving rise to eddy current as per Lenz's law.

(Ans. ii) The two properties of current produced in the metal plate-

(i) This current are of low value

(ii) This current can cause heat and can exploit the originality of metal. (1)

We can reduce this current by laminating the core of the metal, so that obstructuction is produced and electrons are not able to move in the conductor

(Ans. iii) The two values each shown by Vandana and Teacher-

Vandana - (i) (Damped oscillation)

(ii) Eddy current

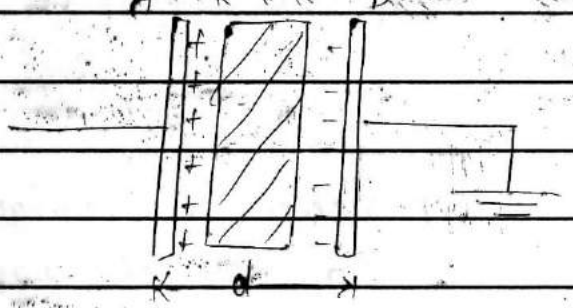
Teacher - (i) laminating core

(ii) Foucault current and reason for it (as Lens law is responsible).

(B)

[Ans. No 29]

Digram:



Expression: Let two parallel plate capacitor A and B with charges +Q & -Q respectively are placed d distance apart.

The first plate is given charge and due to electromagnetic induction like like is produced in the near end of the plate and unlike charge is produced in the farther end which is earthed.

So as we know, that electric field when the dielectric field medium is not present

$$E_0 = \frac{\sigma}{\varepsilon_0}$$

and electric field intensity inside the dielectric medium is given as

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

As we know that -

$V = Ed$, so

$V = E_a$ (displacement of charge in air) $\times$ $E_d \times$ (displace of charge in dielectric)

$V = E_a \times (d - t) + E_d \times t$

putting the values of E_a & E_d we obtain -

$$V = \frac{\sigma}{\varepsilon_0}(d - t) + \frac{\sigma}{K\varepsilon_0} A \quad (1)$$

$$V = \frac{\sigma}{\varepsilon_0}\left(d - t + \frac{t}{K}\right) \quad \text{——— (1)}$$

As, we know that capacitance is given as -

$Q = CV$ or

$C = \frac{Q}{V}$ (1)

putting value of V, we get -

$$C = \frac{Q}{\frac{\sigma}{\varepsilon_0}(d - t + \frac{t}{K})}$$

$$C = \frac{\sigma A}{\frac{\sigma}{\varepsilon_0}\left(d - t + \frac{t}{K}\right)} \quad [\because Q = \sigma A]$$

$$\boxed{C = \frac{\varepsilon_0 A}{d - t\left[1 - \frac{1}{K}\right]}}$$

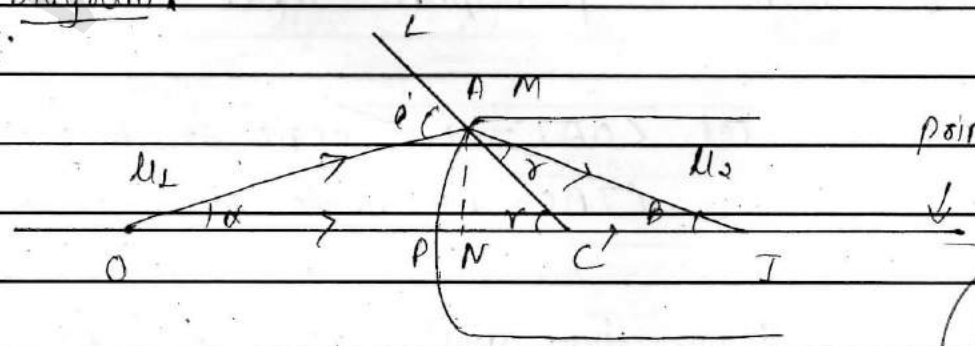
This is the value of capacitance when dielectric medium of thick. 't' is partially filled in the capacitor plate

Now, if $t = 0$, then, our formula becomes

$$\boxed{C = \frac{\varepsilon_0 A}{d}}$$ This is the required value

[Ans. NV' 25]

Diagram:



convex ~~refracting~~ surface

Expression:

Let a refracting surface is kept in front of an object.

Let O, I be the point of object and image point after refraction.

The ray starting from O after refraction passes through the refracting surface and get formed as image at I.

Let IC be perpendicular drawn at the point of refraction.

Let α, β & γ be the angle made by incident ray, refracted ray and normal with the principal axis.

Let $\angle OAL = i$ = angle of incidence

$\angle IAC = r$ = angle of refraction.

Now, by snells law, we know that

$$\frac{\sin i}{\sin r} = \frac{\mu_2}{\mu_1}$$

If sini & sinr are small than, we can write sini ≈ i & sinr ≈ r, so, we have

$$\mu_1 \times i = \mu_2 \times r \quad \text{——— (1)}$$

Now, in △ ABC, we have –

$i = \alpha + \gamma$ (sum of two interior angle is equal to the exterior angle.

and also in △ ACI, we have –

$\gamma + \beta = \gamma$

or $\gamma = (\gamma - \beta)$

putting this value in eqn. (1), we obtain –

$$\mu_1 \times (\alpha + \gamma) = \mu_2 \times (\gamma - \beta) \quad \text{——— (2)}$$

Again, we know that (angle = arc / radius)

So, $\alpha = \frac{AN}{NO}$, $\beta = \frac{AN}{NI}$ & $\gamma = \frac{AN}{NC}$

If aperture is small than P ≈ N, then –

Puting this in eqn (1) we obtain

$$\mu_1 \times \left(\frac{AN}{P_0} + \frac{AN}{P_C}\right) = \mu_2 \times \left(\frac{AN}{P_C} - \frac{AN}{P_I}\right)$$

$$\mu_1 \times \left[\frac{1}{P_0} + \frac{1}{P_C}\right] = \mu_2 \times \left[\frac{1}{P_C} - \frac{1}{P_I}\right]$$

Now, puting the values as per sign convention-

$$\mu_1 \times \left[\frac{1}{-u} + \frac{1}{R}\right] = \mu_2 \times \left[\frac{1}{R} - \frac{1}{v}\right]$$

$$-\frac{\mu_1}{u} + \frac{\mu_1}{R} = \frac{\mu_2}{R} - \frac{\mu_2}{v}$$

or $$\boxed{\frac{\mu_2}{v} - \frac{\mu_1}{u} = \left(\frac{\mu_2 - \mu_1}{R}\right)}$$

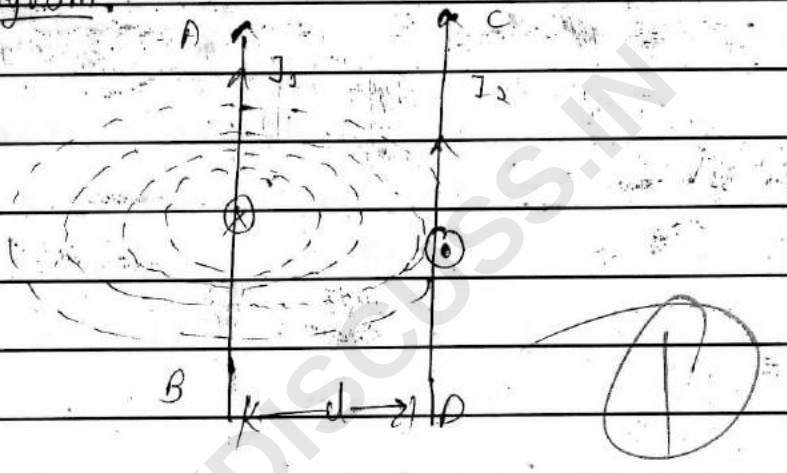
R.H.S = L.H.S

(Hence proved)

This is the formula of refraction through convex refracting surface.

[Ans No' 26]

[Ans (d)] Diagram:



Expression:

Let AB and CD are two long straigh parallel conductors placed d distance apart in air.

Let I_1 & I_2 be the current flowing in both the conductors respectively.

Now, due to the flow of current in AB, the magnetic field at the d distance apart in air is given as -

$B_1 = \frac{\mu_0}{4\pi} \frac{2I_1}{d}$ — (1), where - μ_0 is the

permeability of the medium and B_1 is the magnetic force due to conductor AB at conductor CD.

Now, as we know that any conductor which is placed in a magnetic field than lorentz force acting at the length of the conductor present in the field is given as

$F = I(\vec{l} \times \vec{B})$, here l is the length of conductor,

Now, in this case, we have, lorentz force due to conductor AB on CD as

$F_1 = I_2(\vec{l} \times \vec{B_1})$, here I_2 represent current flowing in the 2nd conductor.

$F_1 = I_2(l \times \vec{B_1})$

$F_1 = I_2 l B_1 \sin\theta$ [where θ is the angle between $\vec{l}$ & $\vec{B}$]

$F_J = I_2 \ell \times B_J \times \sin 90°$, [since $\theta = 90°$]

$F_J = I_2 \ell B_J$ ——— (2)

Now, from eqn: (1) we have B_J as –

$F_J = I_2 \ell \times \left(\frac{\mu_0}{4\pi} \frac{2I_1}{d}\right)$

$\frac{F_J}{\ell} = I_2 I_1 \times \frac{\mu_0}{4\pi} \times \frac{1}{d}$

$$\boxed{\frac{F_1}{\ell} = \frac{\mu_0}{4\pi} \frac{I_1 I_2}{d}}$$

This is the expression force force per unit length of the conductor on the other conductor.

As per Fleming's right hand rule the force on the conductor CD will be towards the conductor AB

Similarly, it can be proved for CD with respect to AB.

In general we have $\boxed{\frac{F}{\ell} = \frac{\mu_0}{4\pi} \frac{I_1 I_2}{d}}$

Conditions

(i) When current on both the conductor is along the same direction then force is attractive and if force is.

(ii) When current on both the conductor is on opposite direction then as per fleming's right hand rule force is repulsive.

This was the required formula for the two conductors.

[Anc. No. 26] (ii)

We have,

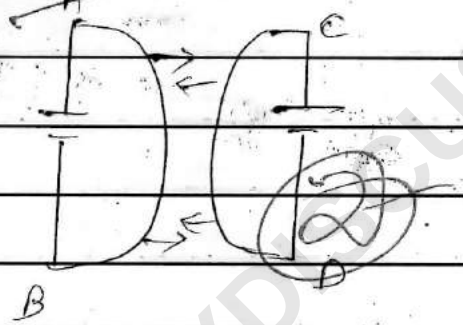
$$\frac{F}{l} = \frac{\mu_0}{4\pi} \frac{I_1 I_2}{d}$$

when, $I_1 = I_2 = I$ ampere, $\frac{\mu_0}{4\pi} = 10^{-7}$

and $d = 1m$, $l = 1m$, $F = 1N$, then we have the definition of ampere as -

"When two conductors of length

1m are placed 1 m apart in air then the force of attraction of 2×10^{-7} N required by the two conductors due the amount of current, this amount of current is called as 1 ampere."



$\phi_E = E \cdot dA$

Rough

$F = qE$

N/m^2

$\frac{1}{\lambda} = R\left(\frac{1}{1^2} - \frac{1}{n^2}\right)$

Black 0
Brown 1
Red 2
Orange 3
Yellow 4
Green 5
Blue 6
Violet 7
Gray 8
White 9

$R = 10$

$59 \times 10^9 \pm 20\%$

$\frac{1}{\lambda} = R\left(\frac{3}{4}\right)$

$R \times \frac{4}{3} = \lambda$

$\frac{1}{f} = \frac{1}{1.03 \times 10^{-7}} \times \frac{4}{3} = \lambda$

$\frac{-1}{5} = \frac{1}{v} - \frac{1}{12}$

$\frac{1}{v} = \frac{1}{12} + \frac{1}{5}$

$\frac{4}{3.09 \times 10^{-7}} = \lambda$

$\frac{4 \times 10^{-7}}{3.09} = \lambda$

$121.3 \times 10^{-9-7} = 309$

$8.5\,(121.3 \times 10^{-11}\ m)$

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

Tm

Lumen

Balmer

Paschen

Brode

$P = -5$

$\lambda =$

$R = 18 \times 10^{-2}$

$C = 4\pi\varepsilon_0 r$

$C = \frac{1}{9 \times 10^9}$

2×10^{-11} Farad

$F =$

$5 - R$

12×5

$\frac{1}{v} - \frac{7}{60}$

$v = \left(\frac{-60}{7}\right)$

1.4×10^3

1400 H

$B =$

Tm A^{-1}

CGBSE