केवल मूल्यांकनकर्ता के उपयोग हेतु!

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल 32 पृष्ठीय

केवल परीक्षक द्वारा भरा जावे। प्रश्न क्रमांक के सम्मुख प्राप्तांकों की प्रविष्टी करे।

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)	प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)
1			17		
2			18		
3			19		
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11			27		
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14					
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16					

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे ↓

परीक्षक एवं उपमुख्य परीक्षक द्वारा भरा जावे →

प्रमाणित किया जाता है कि 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

प्रश्न क्र.

Question - 01

(a) Ans → (ii) Polarisation

(b) Ans → (i) Material of wire

(c) Ans → (iv) Oersted

(d) Ans → (i) R = 2f

(e) Ans → (iii) Isobar

(f) Ans → (iv) Immobile ions

Question - 02

(a) Ans → decreases

(b) Ans. → (i) diamagnetic

(c) Ans → displacement

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(d) Ans → objective

(e) Ans → conduction band

(f) Ans → holes

Question - 0.3

(a) Ans → True

(b) Ans → False

(c) Ans → True

(d) Ans → False

(e) Ans → False

Question - 04

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Ans. (a) Electrostatic Force – Coulomb

(b) Direction of induced current – Lenz

(c) Electromagnetic Wave – Maxwell

B (d) Double slit exp. of interference – Young

(e) Dual nature of matter – De-Broglie

(f) Mass-energy equivalance relation – Einstein

Question - 05

(a) Ans. → 1.12×10^{11} $\frac{Nm^2}{C}$

(b) Ans. → Ammeter

(c) Ans → Power factor is one.

(d) Ans → At the angle of minimum deviation

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(e) Ans → p-type semiconductor

Answer – 6

Characteristics of electric field lines :-

(i) Electric field lines emerge from positive charge and terminate at negative charge.

(ii) They cannot intersect each other.

(iii) Tangent drawn at any point on it gives the direction of electric field at that point.

Answer – 07 (OR)

(P.T.O)

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	Step - up	Step - down
(i)	Step up transformer increases the alternating voltage.	Step down transformer decreases the alternating voltage.
(ii)	Number of turns in secondary coil are more than primary coil.	Number of turns in primary coil are more than secondary coil.
(iii)	Transformation ratio is more than one.	Transformation ratio is less than one

Answer - 08

Ampere circuital law states that the line integral of magnetic field through any closed surface is equal to the μ_0 times the current passing through it.

प्रश्न क्र.

Mathematical form,

$$\oint \vec{B} \cdot d\vec{l} = \mu_0 I \quad \text{T.m}$$

μ_0 - magnetic permeability
I - total current

Answer - 09 (OR)

Gamma (r) rays has the highest frequency in electromagnetic waves.

Use of gamma rays :

They are used to kill unwanted cells in treatment of cancer.

प्रश्न क्र.

Answer – 10 (OR)

If a ray of light enters obliquely from an optically rarer medium to an optically denser medium then velocity will decrease and frequency remains unchanged.

$$\therefore \quad \frac{n_d}{n_r} = \frac{V_r}{V_d}$$

and $n_d > n_r$

so, $V_r > V_d$

so, velocity will decrease

we know that,

$$v = \lambda f$$

and $V_r > V_d$ and $\lambda_r > \lambda_d$

so, f is unchanged.

That's why, frequency remains unchanged

प्रश्न क्र.

Answer - 11 (OR)

Features of Nuclear force :-

(i) Nuclear force are short range force. acts between proton - proton, neutron - proton and neutron - neutron. It does not acts for large distance.

(ii) They are attractive in nature.

(i) They are stronger than coulomb's force in nuclear range.

Answer - 12 (OR)

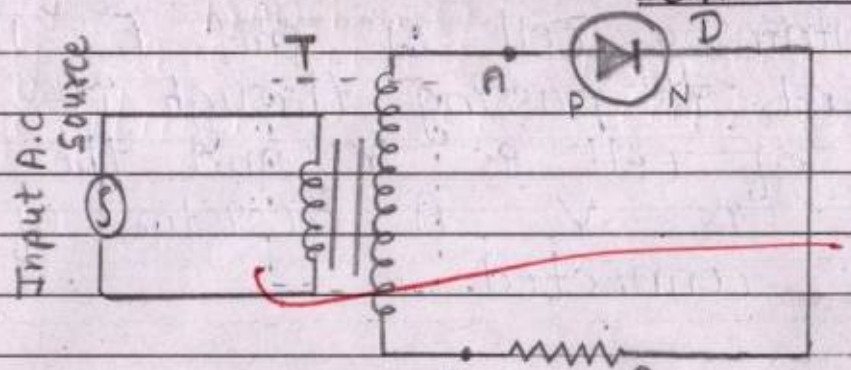

Fig. Half Wave Rectifier

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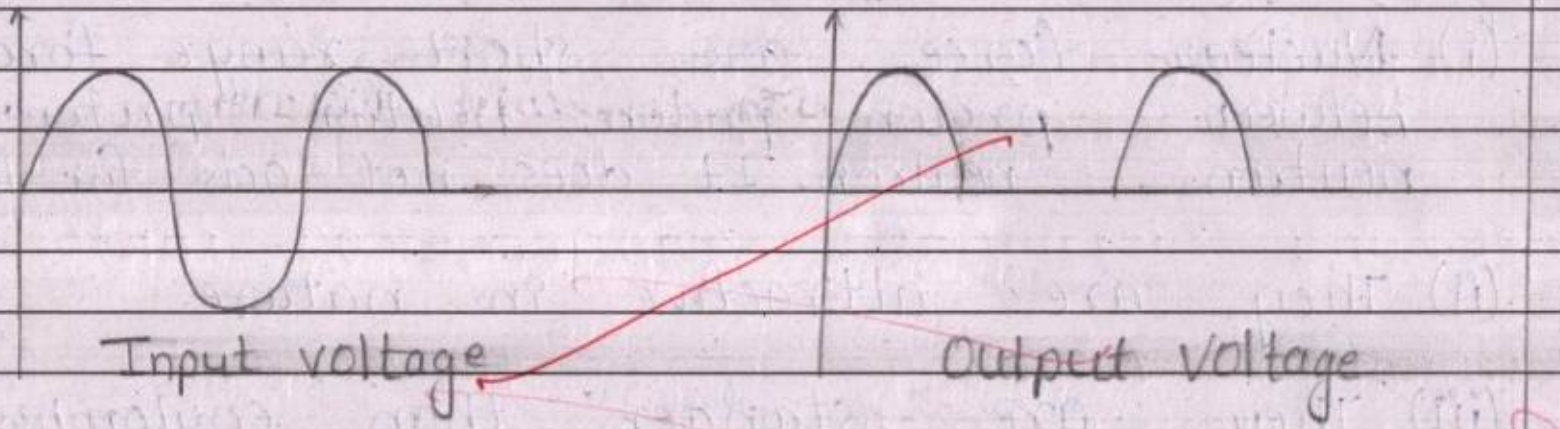
T : Step up Transformer
R : External load resistance
D : P-n junction diode



B
S
E

Answer – 13

Let a circuit containing cell of emf E. I amount of current is passing through it. Internal resistance of cell is r, and the terminal voltage is V. A resistor of resistance R is connected.

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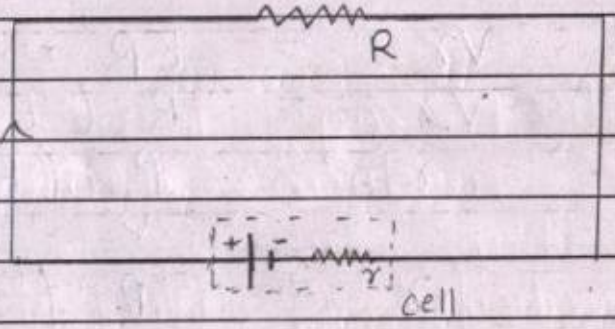

Fig. Circuit Diagram

By ohm's law,

$$V = IR$$

$$I = \frac{V}{R} \quad \text{—(i) eq.}$$

Now, the total current is,

$$I = \frac{E}{R+r} \quad \text{—(ii) eq}$$

By (1) and (2) eq.

$$\frac{V}{R} = \frac{E}{R+r}$$

$$V(R+r) = ER$$

$$VR + Vr = ER$$

$$Vr = ER - VR$$

B S E

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$$Vr = ER - VR$$
$$Vr = R(E - V)$$
$$r = \frac{R}{V}(E - V)$$

$$\boxed{r = R\left(\frac{E}{V} - 1\right)} \text{ ohm}$$

This is the required relation.

where,

r = internal resistance
E = emf of cell
R = External resistance

Answer - 14

Given : $l = 2\,m$
$N = 100$ turns
$I = 10\,A$
$\mu_0 = 4\pi \times 10^{-7}$

To find : $B = ?$

प्रश्न क्रं.

By formula,

$$B = \mu_0 n I$$

we know that

$$n = \frac{N}{l}$$

so,

$$B = \mu_0 \frac{N}{l} I$$

$$B = {}^{2}4\pi \times 10^{-7} \times \frac{100}{2} \times 10$$

$$B = 2 \times 3.14 \times 10^{-7} \times 10^{3}$$

$$B = 6.28 \times 10^{-4} \text{ Tesla}$$

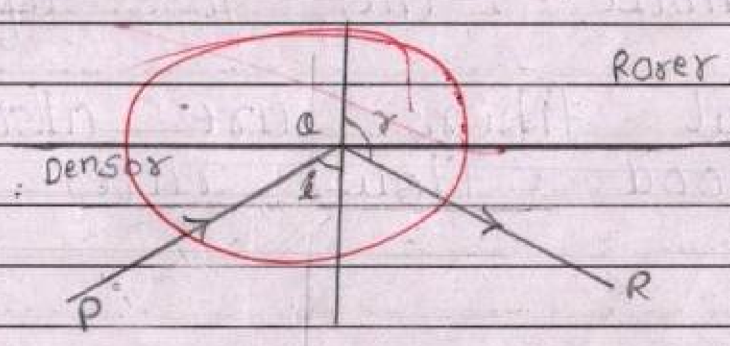
The magnitude of magnetic field is 6.28×10^{-4} Tesla.

B
S
E

Answer - 15

(i) Labelled diagram

PQ : Incident ray
QR : reflected ray
$\angle i$: angle of incidence



Total Internal Reflection

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(ii) Definition.

When a light ray travel from densor medium to rarer medium with angle of incidence greater than critical angle than instead of refraction, reflection takes place, this phenomenon is called total internal reflection.

B S E

(iii) Application.

One of the most important application of total internal reflection is Optical fibers. They are used to transmit light over long distances without the loss of intensity

Optical fibers are also used to measure blood flow rate.

प्रश्न क्र.

Answer – 16 (OR)

Characteristics of photons :

(i) Rest mass of photon is zero.

(ii) Photons are electrically neutral, they are not deflected by electric or magnetic fields.

(iii) Photon contains the energy equals to $E = h\nu$. It is measured in electron volt.

(iv) Photons are ~~Answ~~ the packets of energy.

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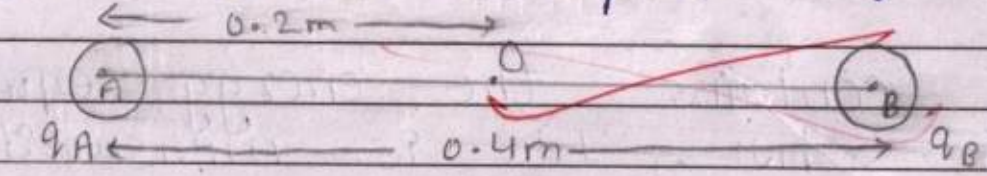
Answer – 17 ~~(OR)~~

Given : $q_A = 2\ \mu C$
$= 2 \times 10^{-6}\ C$

$q_B = -2\ \mu C$
$= -2 \times 10^{-6}\ C$
$r = 40\ cm$ or $0.4\ m$

To find : E at mid-point = ?



Electric field at O due to q_A charge.

$$E_1 = \frac{1}{4\pi\varepsilon_0} \frac{q_A}{(AO)^2}$$

$$= \frac{1}{4\pi\varepsilon_0} \frac{2 \times 10^{-6}}{(0.2)^2}$$

$$= \frac{9 \times 10^9 \times 2 \times 10^{-6}}{0.04}$$

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$$= \frac{9 \times 10^{9} \times 2 \times 10^{-6}}{0.04}$$

$$= \frac{9 \times 10^{3} \times 2 \times \cancel{100}\, 50}{\cancel{4}\,2}$$

$$= 450 \times 10^{3}$$

$$E_1 = 4.5 \times 10^{5}$$

Electric Field at O due to q_B

$$E_2 = \frac{1}{4\pi\varepsilon_0} \frac{q_B}{(OB)^2}$$

$$= \frac{1}{4\pi\varepsilon_0} \frac{2 \times 10^{-6}}{(0.2)^2}$$

$$= \frac{9 \times 10^{9} \times 2 \times 10^{-6}}{0.04}$$

$$= \frac{9 \times 10^{3} \times 2 \times \cancel{100}\, 50}{\cancel{4}\,2\,1}$$

$$= 450 \times 10^{3}$$

$$= 4.5 \times 10^{5}$$

Total electric field at O.

$$E = E_1 + E_2$$

$$= 4.5 \times 10^{5} + 4.5 \times 10^{5}$$

$$\boxed{E = 9 \times 10^{5} \ \frac{N}{C}}$$

Ans

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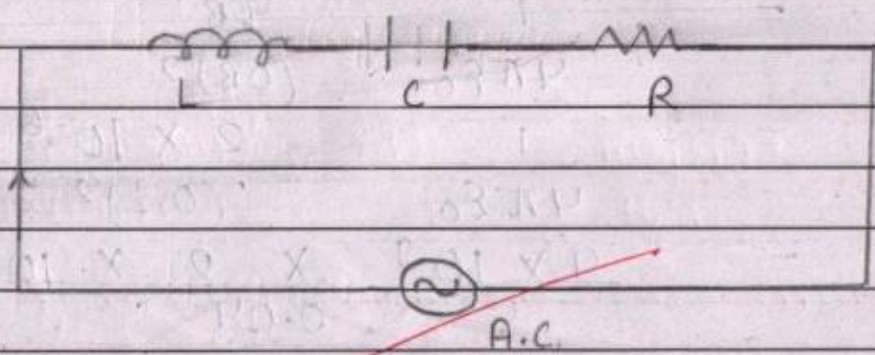
Ans. Electric field is $9 \times 10^5 \frac{N}{C}$

Answer- प्रश्न 18 (OR)

let a circuit in which inductor (L), capacitor (C) and Resistor (R) are connected in series.



$E = E_0 \sin \omega t$

$V_0^L = I_0 X_L$

$V_0^C = I_0 X_C$

$V_0^R = I_0 R$

and

$E_0 = I_0 Z$

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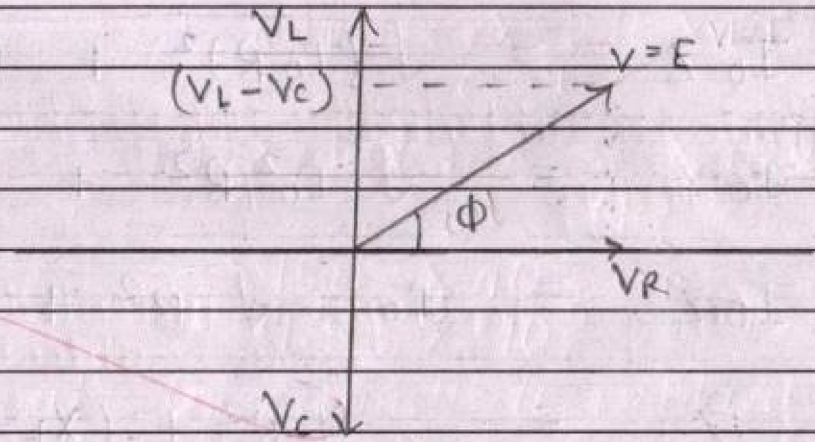

Phasor diagram

BSE

from the phasor diagram

Resultant Voltage is,

$$V_0 = \sqrt{(V_{0R})^2 + (V_{0L} - V_{0C})^2}$$

$$\boxed{V = \sqrt{(V_R)^2 + (V_L - V_C)^2}}$$

Impedence, (Z)

$$V_0 = \sqrt{(V_{0R})^2 + (V_{0L} - V_{0C})^2}$$

$$I_0 Z = \sqrt{(I_0 R)^2 + (I_0 X_L - I_0 X_C)^2}$$

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$$I_0 Z = \sqrt{(I_0 R)^2 + (I_0 X_L - I_0 X_C)^2}$$

$$I_0 Z = \sqrt{I_0^2 R^2 + I_0^2 (X_L - X_C)^2}$$

$$I_0 Z = I_0 \sqrt{R^2 + (X_L - X_C)^2}$$

$$\boxed{Z = \sqrt{R^2 + (X_L - X_C)^2}}$$

this is the impedence.

Phase difference, (ϕ)

phasor diagram,

$$\tan\phi = \frac{(V_L - V_C)}{V_R}$$

$$\tan\phi = \frac{IX_L - IX_C}{IR}$$

$$\tan\phi = \frac{X_L - X_C}{R}$$

$$\phi = \tan^{-1}\left(\frac{X_L - X_C}{R}\right)$$

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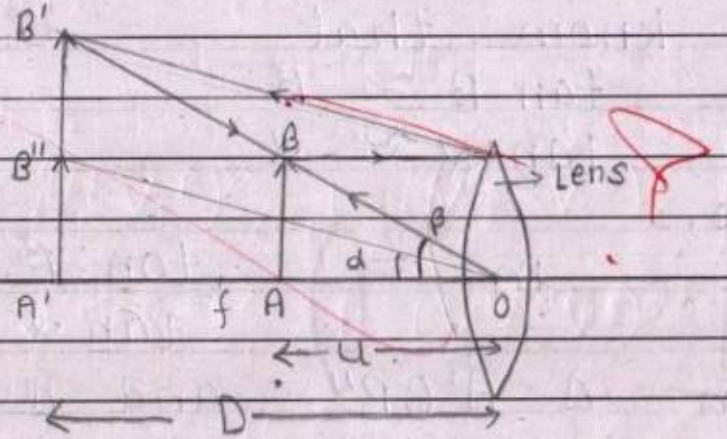
or, $$\phi = \tan^{-1}\left(\frac{\omega L - \frac{1}{\omega C}}{R}\right)$$

This is the phase difference.

Answer – 19 (OR)

B S E

Simple microscope is used to the see tiny objects.



Simple Microscope

let a simple microscope of focal length f. An object (AB) is placed at distance u from the centre of lens O.

The angle subtented at object is α and by image is β.

$$m = \frac{\text{angle subtented by image}}{\text{angle subtented by object}}$$

$$m = \frac{\beta}{\alpha}$$

we know that

$$\tan\beta \approx \beta$$
$$\tan\alpha \approx \alpha$$

So,

$$m = \frac{\tan\beta}{\tan\alpha}$$

In $\Delta A'OB''$ and ΔABO

$$\tan\alpha = \frac{A'B''}{A'O}$$

$$\tan\beta = \frac{AB}{AO}$$

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$$m = \frac{AB/AO}{A'B''/A'O}$$

$$m = \frac{AB/AO}{AB/A'O} \qquad (\because AB = A'B'')$$

$$m = \frac{A'O}{AO}$$

By sign convention, $A'O = -D$, $AO = -u$

$$m = \frac{-D}{-u}$$

$$m = \frac{D}{u} \qquad \text{——(i) eq.}$$

i) When image is at infinity

then, $u = f$

by (1) eq.

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

this is the magnification when image is at ∞.

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(ii) when image is at least distance of distinct vision.

By using lens formula.

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

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

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

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

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

$$\frac{D}{u} = \frac{D}{f} + 1 \qquad \text{---(ii) eq.}$$

by ① & ② eq.

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

This is required expression

योग पूर्व पृष्ठ + पृष्ठ 25 के अंक = कुल अंक

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Answer - 20 (OR)

Nuclear Fusion

Nuclear fusion : When two lighter nucleus are fused together to form a heavy nucleus and liberate large amount energy then this process is called nuclear fusion.

Example : $_{1}^{2}H + _{1}^{2}H \longrightarrow _{2}^{4}He + 24\ MeV$

When two deutrium of atomic mass 2 amu which has the atomic number one. are fused together to form a Helium nucleus of mass 4 amu and has the atomic number 2. In this process energy is released which is 24 MeV. This process is held at very large temperature. That's why it is not possible at laboratories.

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Formation of hydrogen bomb is based on nuclear fusion. Source of energy in the sun is also due to nuclear fusion.

Nuclear Fission

B S E

Nuclear fission: When a heavy nucleus is split down into lighter nucleus on bombarding neutrons on it and large amount of energy is produced in this process. This process is called nuclear fission.

Example: $^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{92}_{36}Kr + {}^{141}_{56}Ba + 3{}^{1}_{0}n + 200\ MeV$

(P.T.O)

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Example: $^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{92}_{36}Kr + {}^{141}_{56}Ba + 3\,{}^{1}_{0}n + 200\,MeV$

When Uranium nucleus is bombarded with neutron then it get split down into $^{92}_{36}Kr$ and $^{141}_{56}Ba$ and neutrons. A hyge amount of energy is released during this process. Released energy is 200 Mev. This process can be done at normal temperature so it can be done in laboratories. Large amount of energy is released in this process as compared to nuclear fusion.

B S E