केवल मूल्यांकनकर्ता के उपयोग हेतु!

माध्यमिक शिक्षा मण्डल, मध्यप्रदेश, भोपाल

32 पृष्ठीय

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

प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)	प्रश्न क्रमांक	पृष्ठ क्रमांक	प्राप्तांक (अंकों में)
1			17		
2			18		
3			19		
4			20		
5			21		
6			22		
7			23		
8			24		
9			25		
10			26		
11			27		
12			28		
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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
D.K. Chaurasia (Principal) G.H.S.S. Shyamnagar (Satna) Valuer No. 11909	Sudhir Kumar Gupta (UMS) G.Ex.H.S.S.Venkat No.-1,Satna Valuer No. 315215 M No.-9302804568

योग पूर्व पृष्ठ + पृष्ठ 2 के अंक = कुल अंक

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{Answer of Ques.[1]}

[1] (ii) Polarisation

[2] (i) Material of wire.

[3] (iv) Oersted.

[4] (i) $R = \frac{?}{f}$

[5] (iii) Isobar.

[6] (iv) Immobile ions.

योग पूर्व पृष्ठ | पृष्ठ ऊ क अंक | कुल अंक

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{Answer of Ques. [2]}

[1] Decreases.

[2] Diamagnetic substances.

[3] Displacement current.

[4] Objective.

[5] Conduction band.

[6] Hole

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{Answer of Ques. [3]}

[1] True.

[2] False.

[3] True.

[4] False

[5] False.

{Answer of Ques. [4]}

[1] Electrostatic force — (v) Coulomb

[2] Direction of induced Current — (vi) Lenz

[3] Electromagnetic wave — (ii) Maxwell

[4] Double slit experiment of Interference. — (vii) Young.

[5] Dual nature of matter — (i) De-Broglie

[6] Mass-energy equivalence relation — (iv) Einstein.

{Answer of Ques. [5]}

[1] Total electric flux emanating from a unit positive charge in air is $1.13 \times 10^{11}\ Nm^2/C$

[11] Ammeter is used to measure current in an electric circuit.

[redacted]

[iii] Power factor for a pure resitive circuit is one.

[iv] Under the condition of minimum deviation the refracted ray inside the prism become parallel to prism base. In this position $\angle i = \angle e$

[v] P-type semiconductor is obtained when pure semiconductor is doped with trivalent impurities.

{Answer of Ques.[6]}

Two characteristics of electric field lines are :-

[i] Electric field lines starts from positive charge and end into the negative charge.

[ii] It forms open curves which continuous and differentiable. Tangent drawn at any

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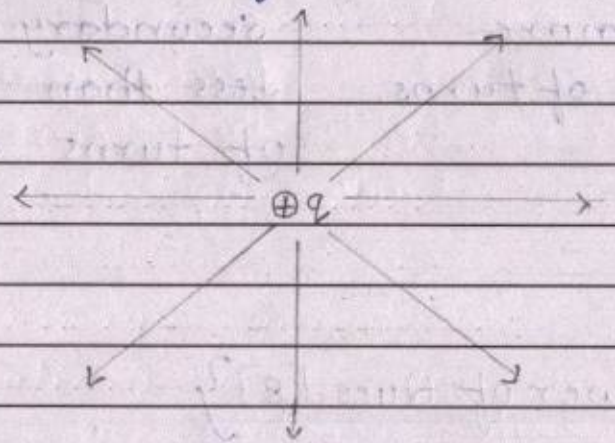
point in electric field lines gives the direction of resultant electric field at that point.



Electric field lines due to a positive charge.

B
S
E

{Answer of Ques-[7]} OR

Step-up transformer	Step-down transformer
(i) It increases the value of alternating voltage and decreases the strength of current.	It decreases the value of alternating voltage and increases the strength of current.

(ii) In step-up transformer number of turns in secondary coil is more than the number of turns in primary coil.	In step-down transformer the number of turns in secondary coil is less than the number of turns in primary coil.

B
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{Answer of Ques. [8]}

Ampere's circuital law :- According to Ampere's circuital law "the line integral of magnetic field in a closed loop is equal to the μ_0 times the total current enclosed in it."

i.e., $\oint \vec{B} \cdot \vec{dl} = \mu_0 I$

where I = current enclosed

and B = magnetic field.

{Answer of Ques. [9]} 'OR'

Gamma rays has highest frequency among all electro-magnetic waves.

Uses of Gamma rays :-

[1] It is used to kill unwanted cells in the treatment of cancer.

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{Answer of Ques. [10]} 'OR'

If a ray of light enters obliquely from an optically rarer medium to an optically denser medium then the velocity of light ray decreases. because,

$$_1\mu_2 = \frac{v_1}{v_2} \quad , v_2 = \frac{v_1}{_1\mu_2}$$

And frequency of light remains same because frequency depends on source, if source remains same then frequency remains same.

{Answer of Ques. [11]} 'OR'

Features of Nuclear force are as follows:-

(1) It is strongest force in nature, it is about

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100 times stronger than the electrostatic force.

(ii) It is attractive, non-central force and it is independent of charge that means force between proton-proton, proton-neutron and neutron-neutron are same.

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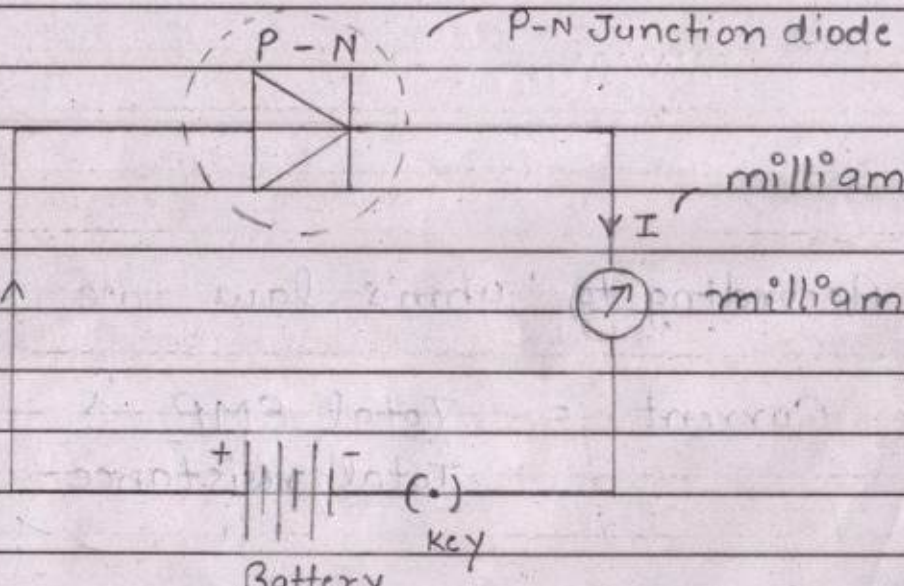
{Answer of Ques. (12)}



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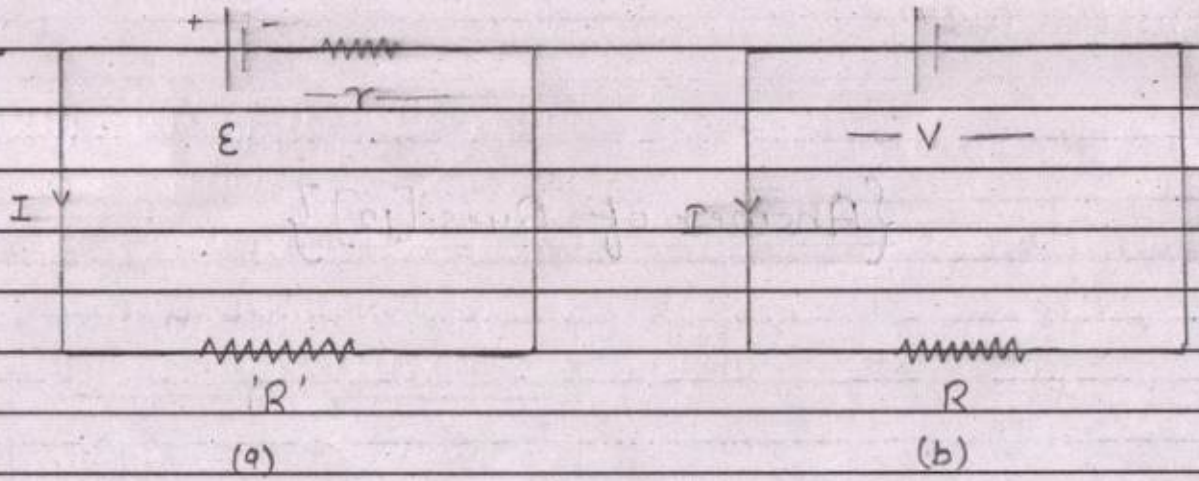
{Answer of Ques. [13]}

Consider a cell of EMF 'ε' and internal resistance 'r'. It is connected with the external circuit of resistance 'R'.



Now, According to ohm's law we know that

$$\text{Current} = \frac{\text{Total EMF}}{\text{Total resistance}}$$

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

Let at any instant of time applied external voltage be V then, from equation (i)

$$I = \frac{\mathcal{E}}{R+r}$$

$$\mathcal{E} = IR + Ir$$

$$\mathcal{E} = IR + Ir \quad \text{— (ii)}$$

According to Ohm's law we know

$$V = IR$$

Putting this value in equation (ii) we get

$$\mathcal{E} = V + Ir$$

or $$\boxed{V = \mathcal{E} - Ir}$$

This is required relation between EMF, terminal voltage and internal resistance of a cell.

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{Answer of Ques. [14]}

Given that,

length of solenoid = 2 metre

number of turns = 100

Current = 10 A

B = ?

A/q

By using the formula

$B = \mu_0 n I$

$B = 4\pi \times 10^{-7} \times \frac{N}{l} \times 10$ $\quad \left[\because n = \frac{\text{number of turns}}{\text{length}}\right]$

$B = \frac{4 \times 3.14 \times 10^{-7} \times 100 \times 10}{2}$

$B = 6.28 \times 10^{-7} \times 100 \times 10$

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

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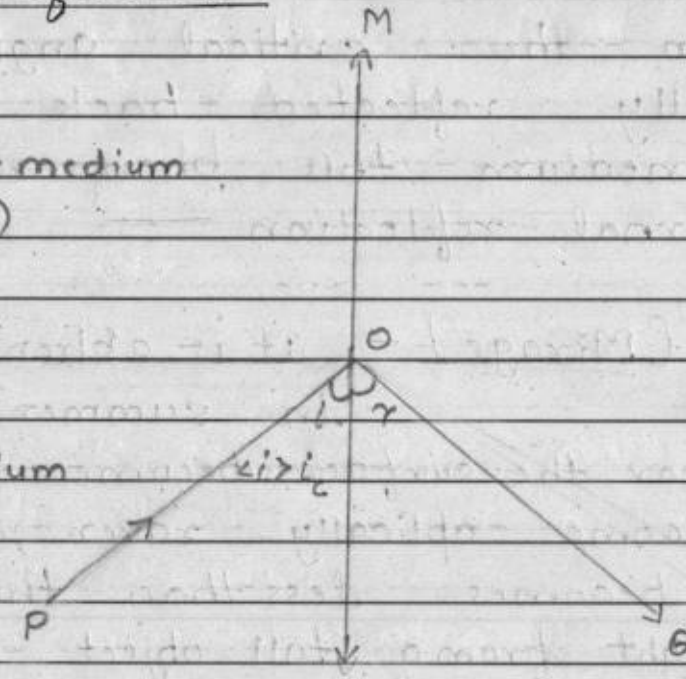
{Answer of Ques. [15]}

Total Internal reflection :-

Diagram :-



PO = incident ray

OQ = reflected ray

B S E

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Definition :- When a ray of light ~~in~~ is travelled from denser medium to rarer medium with the angle of incidence greater than the critical angle then the ray totally reflected back into the denser medium this phenomena is called total internal reflection.

Application :- [Mirage] - It is a phenomena in which in summer season the atmosphere near the surface become warm due to this it become optically rarer and its refractive index ~~de~~ becomes less than the upper atmosphere. When a light from a tall object is incident on ground then refractive index goes on decreasing and light suffers total internal reflection. And the surface near the tall object appears wet. and people's thought there is a pool.

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{Answer of Ques. [16]} OR

Characteristics of Photon are as following :-

[I] According to Planck's quantum theory light energy consists of small packets or bundle of energy called photon. These photons are electrically neutral.

[II] Photon traucl with speed of light i.e.) 3×10^8 m/s.

[III] Energy of photon is given by following formula.

$$E = h\nu$$

Here h = planck's constant
ν = frequency of electron

[IV] Energy of photon is measured in eV.

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{Answer of Ques. [19]} 'OR'

Given that, ~~$q_A = 2\mu C$~~
~~$q_B = -2\mu C$~~
~~$r = 40cm$~~
~~$\vec{E} = ?$~~

Given that,

Capacitance $C_1 = 3PF$
$C_2 = 4PF$
$C_3 = 5PF$
$C = ?$

A/q

By using formula
Net capacitance in parallel will be $= C_1 + C_2 + C_3$

$$C = C_1 + C_2 + C_3$$
$$C = (3 + 4 + 5)PF$$

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$C_{net} = 12\ pF$

$Q_1 = C_1 V$ [Since voltage is same in all capacitors]

$Q_1 = 3 \times 120 \times 10^{-12}$

$Q_1 = 360 \times 10^{-12}$

$Q_1 = 360\ pC$

$Q_2 = C_2 V = (4 \times 120)\ pC$

$= 480\ pC$

$Q_3 = 5\ pF \times 120\ V$

$= 600\ pC$

{Answer of Ques. [18]}

Consider a uniform magnetic field which is perpendicular inward to a plane of paper. A rod PQ is moving towards left with a velocity v.

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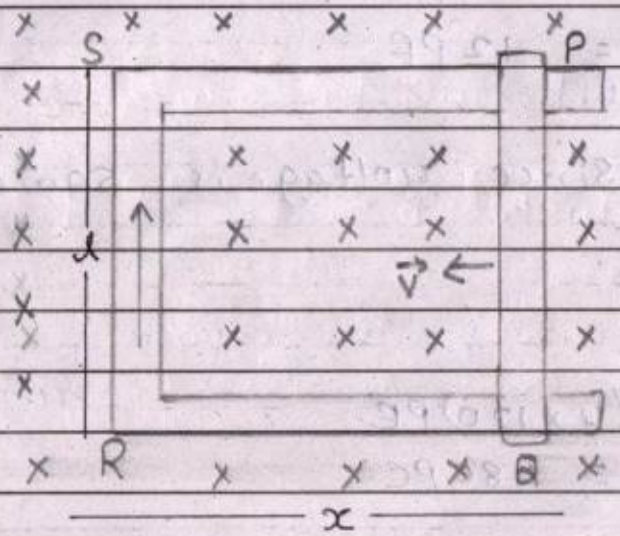

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Let at any instant rod PQ covers an area PQRS. Hence rod is moving then magnetic flux linked with rod at instant of time will be

$$\phi_B = B \cdot dA \cos\theta$$

$$= B \cdot lx \cos 0^\circ \quad [\text{where } lx = \text{area of } PQRS]$$

$$= Blx$$

$$\phi_B = Blx$$

From Faraday Second's law

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

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$$\mathcal{E} = -\frac{d}{dt} Blx$$

$$\mathcal{E} = -Bl\frac{dx}{dt}$$

Here $\frac{dx}{dt} = v$ = velocity. [It is a rate of change of displacement].

$$\mathcal{E} = -Blv$$

But we take in magnitude form.
Therefore.

$$\boxed{\text{EMF} = Blv} \text{ volt}$$

Hence required expression.

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{Answer of Ques. [19]} 'OR'

Simple microscope :- It is a device which is used to see small tiny particles in magnified form. It has a convex lens of small focal length.

B
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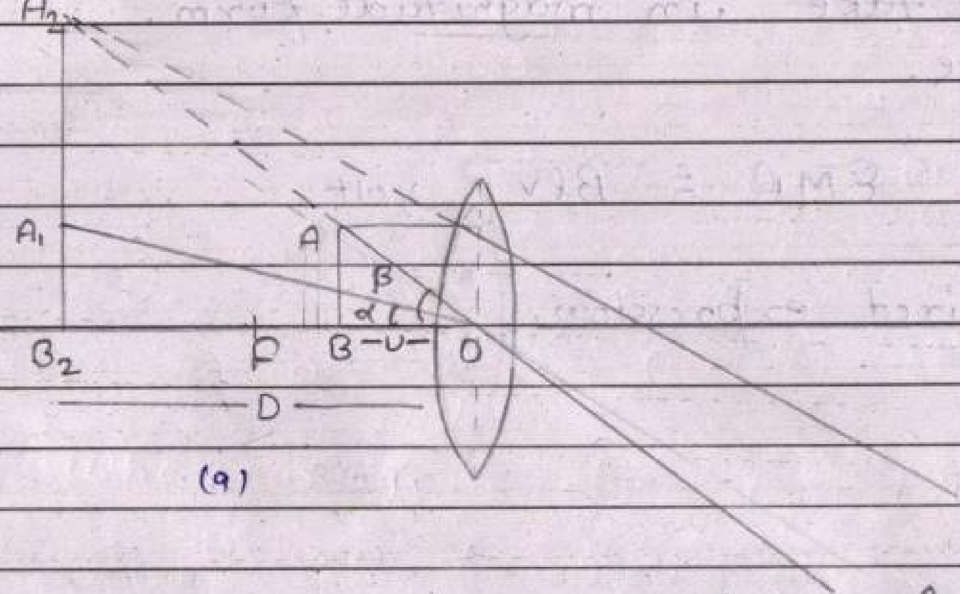
E

Ray Diagram. :-



(a)

When image is formed at least distance of distinct vision.

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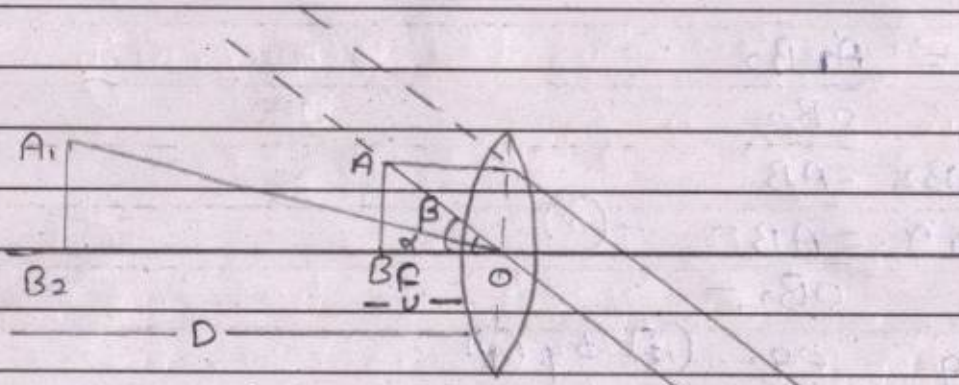

(b)

When image formed at infinity.

$$\text{magnification} = \frac{\text{visible angle subtended by image at eye}}{\text{angle subtended by object at eye}}$$

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

From diagram (a) and (b) it is clear that

$$\tan\beta = \frac{A_2B_2}{OB_2} = \frac{AB}{OB} \quad -(1)$$

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$$\tan\alpha = \frac{A_1B_2}{OB_2}$$

$\therefore A_1B_2 = AB$

$$\tan\alpha = \frac{AB}{OB_2} \quad -(11)$$

dividing eq. (12) by (11)

$$m = \frac{\frac{AB}{OB}}{\frac{AB}{OB_2}}$$

$$m = \frac{OB_2}{OB} \quad , \quad OB_2 = -D, \quad OB = -v$$

By using sign convention.

we get

$$m = \frac{D}{v} \quad -(1)$$

a) When image in formed at least distance of distinct vission.

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By lens formula.

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

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

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

Multiplying by D

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

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

$$\frac{D}{u} = 1 + \frac{D}{F}$$

Putting in eq. (1)

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

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When image formed at infinity in this case $v = f$

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

[Answer - 20] 'or'

Nuclear fusion :- It is a nuclear phenomena in which ~~two~~ ~~near~~ or more short nuclei combine together and release enormous energy and form a heavy nucleas. It is a slow process and required very high temperature and pressure. Sun is an important example of fusion. Per fusion released energy is more than nuclear fission.

Initiation of Nuclear fusion requires 10^9 K temperature.

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Reaction occuring in Sun is as following.

$$4\,{}_1^1H + 2e \longrightarrow {}_2^4He + 2\nu + 6\gamma + Q$$

It takes large amount of time to takes place.

Nuclear fission:- It is a nuclear phenomena in which a heavy nucleus when excitated gets splits into two or more nucleus. It is a quick process. It is are of two types.

(i) Controlled Nuclear fission.
(ii) Uncontrolled Nuclear fission.

Controlled Nuclear fission is utilised to produce electric power in nuclear reactor.
In it a large amount of energy released in nuclear fission.

Example :- Fission of Uranium.

$$^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{236}_{92}U \longrightarrow {}^{144}_{56}Ba + {}^{89}_{36}Kr + 3{}^{1}_{0}n + Q$$

Principle of atom bomb is based on principle of Nuclear fission.

Energy released in fission of Uranium = 200MeV