Session 2020-21

Class- XII

Subject: Physics

Study Material

Follow the Instructions given below:-

Here's the Video link to the file:

Visit link: https://youtu.be/rJ_HehL8e7Y

See Chapter 3- Current electricity on DIKSHA at

Visit link:
https://diksha.gov.in/play/content/do_31300297295070003211 28?referrer=utm_source%3Ddiksha_mobile%26utm_content%3Ddo_31300297295070003211 28%26utm_campaign%3Dshare_content

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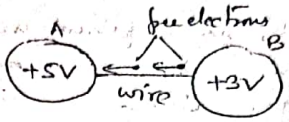
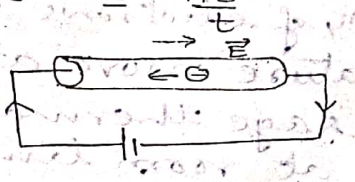
Current Electricity.

If the two bodies A and B are connected through a wire then free electrons will flow from body B to body A (Conventional current is from A to B). This flow of current will continue till the two bodies attain the same potential; once the two bodies attain the same potential, current flow ceases. ∴ the current will flow in a conductor or circuit if potential difference exists. The electric current is measured by the rate of flow of charge.



The charge flowing per second in an electric ckt is the measure of electric current in that ckt. It's a scalar quantity.

$\therefore i = \frac{q}{t}$ $\frac{\text{Coulomb}}{\text{sec}}$, or Ampere $= \frac{ne}{t}$



Note: If the rate of flow of charge varies with time, then current at any time (ie. instantaneous current) is given by $i = \frac{dq}{dt} = \lim_{\Delta t \to 0} \frac{\Delta q}{\Delta t}$

1 Ampere: One ampere of current is said to flow through a wire if at any cross section, one Coulomb of charge flows in one second.

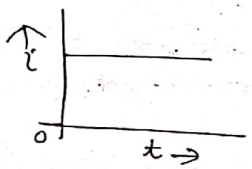
Current Density: The current density at a point in a conductor is the ratio of the current at that point in the conductor to the area of cross-section of the conductor at that point provided the area is held in a direction normal to the current.

$J = \frac{i}{A}$ $\frac{\text{Ampere}}{m^2}$, It's a vector quantity. $[AL^{-2}]$

Types of Electric Current:

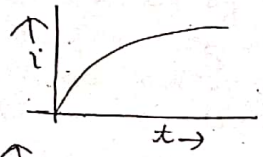
(1) Steady Current

When the magnitude of current does not change with time, it is called a steady current.



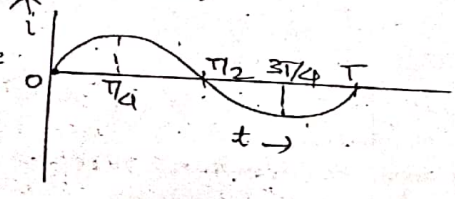
(2) Varying Current:

When the magnitude of current changes with time, it is called a varying current.



(3) Alternating Current:

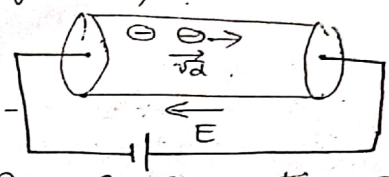
An alternating current is one whose magnitude changes continuously with time and direction changes periodically.



Drift velocity of free electrons: when we connect the ends of a metallic wire to a battery, a p.d. bet^n the ends of the wire is established. As a result of this p.d. (or electric field) each free electron experiences an electric force which accelerates the motion of the electron. However, the velocity of the electron does not increase continuously because electrons collide themselves again & again & with the ions of the metal and thus continues to loose the energy taken from the battery (appears in the form of heat). ∴ the p.d. of the battery does not give an accelerated motion to the electrons, but gives them a small constt vel ($= 10^{-4}$ m/sec) along the length of the wire towards the end at higher potential. This is called the drift velocity of the electrons. ⊛

Relation bet^n Electric Current & Drift velocity:

If n is the no. of electrons per unit volume the no. of electrons passing per second through a cross-section of the wire $= nA\vec{v}_d$.



∴ the charge passing through any cross-section of the wire in t sec, $q = (nA\vec{v}_d t).e$

$$\therefore \quad i = \frac{q}{t} = neA\vec{v}_d$$

$$\therefore \quad \boxed{J = \frac{i}{A} = ne\vec{v}_d} \qquad \therefore \quad \vec{J} = -ne\vec{v}_d$$

Electric Resistance: The obstruction offered with the flow of electric current is called electrical resistance. OR
The ratio of the p.d. to the current is called the electrical resistance of the conductor.

$$\therefore \quad R = \frac{V}{i} \quad \frac{\text{volt}}{\text{ampere}} = \text{ohm}$$

1Ω: A conductor is said to have a resistance of 1 ohm if a p.d. of 1 volt across its ends causes a current of 1 Amp to flow through it.

Note: The resistance is the electric friction offered by the conductor and causes production of heat with the flow of electric current. The moving free electrons collide with atoms or molecules of the conductor, each collision results in the liberation of a minute quantity of heat.

The resistance of a conductor R
$R \propto l$, the length of the conductor
$\propto 1/A$, the area of cross-section
$\therefore R \propto \frac{l}{A} \Rightarrow \boxed{R = \rho\frac{l}{A}}$

Where ρ is the specific resistance or Resistivity of the conductor. It depends on the nature of the material and temperature.

⊛ Drift velocity is defined as the average velocity with which free electrons in a conductor get drifted in a direction opposite to the direction of applied electric field. ⇒ Pg ③

Mobility: (μ) of a charge carrier is the ratio of its drift velocity (v_d) and the applied electric field (E),

$$\therefore \mu = \frac{v_d}{E} = \frac{e\tau}{m}$$

$$\mu = \frac{v_d}{E} = \frac{\frac{qE}{m}\tau}{E} = \frac{q\tau}{m}$$

$$\therefore \mu_e = \frac{e\tau}{m}$$

S.I. unit of mobility is $m^2 s^{-1} V^{-1}$ or $m s^{-1} N^{-1} C$

No. density of electrons is $10^{29}/m^3$, These electrons at room temperature move at random within the body of the conductor. The average thermal speed of the free electrons in random motion at room temp is of the order of 10^5 m/sec. The direction of motion of these free electrons are so randomly oriented that the average thermal vel of electrons is zero.

Now, if $l = 1m$, $A = 1m^2$ then $\rho = R$

Hence ρ of a material is the resistance offered by 1m length of wire of the material having area of cross-section of $1m^2$.

$$\rho = \frac{RA}{l} \quad \text{ohm-metre}$$

Conductance and Conductivity:

The reciprocal of resistance of a conductor is called its conductance (G). $\therefore G = \frac{1}{R}$ ohm^{-1} or mho or Siemen

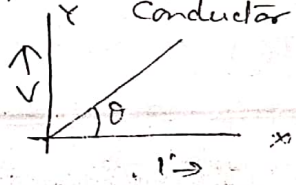
The reciprocal of resistivity of a conductor is called its conductivity.

$$\therefore \sigma = \frac{1}{\rho} = \frac{l}{RA} = \left(\frac{1}{R}\right)\cdot\frac{l}{A} = G\cdot\frac{l}{A} \quad \text{(siemen/metre)}$$

Ohm's law: The current (I) flowing through a conductor is directly proportional to the potential difference (V) across its ends provided the physical state of the conductor remains the same. (i.e., $T = \text{const}$)

$\therefore I \propto V$ or $V \propto I \Rightarrow V = RI$, R = Resistance of the conductor.

Those conductors which obey ohm's law are called ohmic conductors and which do not are called non-ohmic conductors.



Proof: $\because I = neAv_d$

Since the p.d. between the ends of the length l of the wire is V the intensity of electric field at every point of the wire is

$$E = \frac{V}{l}$$

& force exerted by the field on each free electron is $F = -eE = -\frac{eV}{l}$

$\therefore$ Acceleration $\vec{a} = \frac{\vec{F}}{m} = -\frac{eV}{ml} = \frac{-e\vec{E}}{m}$ ($\vec{F}$ and $\vec{E}$ are opposite to each other)

After collision with a +ve ion, an electron acquires a velocity component in a dirn opposite to electric field E. If the time interval b/w two successive collisions of an electron with the +ve ions be τ then increase in velocity of the electron be $a\tau$. If at any instant an electron has a thermal velocity u_1 in the absence of electric field, then in the presence of electric field its velocity will increase to $u_1 + a\tau_1$. Similarly, the velocities of the other electrons will be $u_2 + a\tau_2$, $u_3 + a\tau_3$ ....

The average velocity of all n electrons is the drift velocity v_d

$$\therefore v_d = \frac{(\bar{u}_1 + \bar{a}\tau_1) + (\bar{u}_2 + \bar{a}\tau_2) + (\bar{u}_3 + \bar{a}\tau_3) + \cdots + (\bar{u}_n + \bar{a}\tau_n)}{n}$$

$$\therefore \vec{v_d} = \frac{\bar{u}_1 + \bar{u}_2 + \cdots + \bar{u}_n}{n} + \bar{a}\,\frac{\tau_1 + \tau_2 + \tau_3 + \cdots \tau_n}{n}$$

$$= \vec{0} + \frac{n}{a}\tau = \vec{a}\tau$$

(average thermal velocity)

$$|\vec{v_d}| = a\tau = \frac{eE}{m}\tau = \frac{eV}{ml}\tau$$

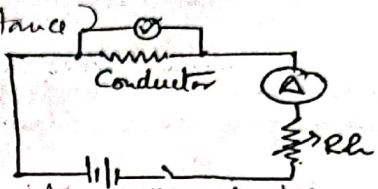
$\tau = \frac{\lambda}{c_{rms}}$ (4)

where τ represents the average time interval of electrons between two successive collisions called the Relaxation time ($\approx 10^{-14}$ sec). It is the ratio of mean free path for an electron and r.m.s velocity of the electrons. (mean free path / drift speed)

$\therefore v_d = \frac{eV\tau}{m\ell}$ $\quad \therefore i = neA\left(\frac{eV\tau}{m\ell}\right) = \frac{ne^2\tau}{m}\frac{A}{\ell}V$

$\therefore \frac{V}{i} = \frac{m}{ne^2\tau}\cdot\frac{\ell}{A} = R$ (electrical Resistance)

$\therefore \boxed{R = \frac{m\ell}{ne^2\tau A}}$ (6)



Specific Resistance: The ratio of the intensity of the electric field at any point within the conductor and the current-density at that point is called specific resistance.

$\therefore \rho = \frac{E}{J}$ $\quad$ But $E = V/\ell$ & $J = \frac{i}{A}$

$\therefore \rho = \frac{V/\ell}{i/A} = \frac{V}{i}\left(\frac{A}{\ell}\right) = R\cdot\frac{A}{\ell} = \frac{m\ell}{ne^2\tau A}\cdot\frac{A}{\ell}$

$\therefore \boxed{\rho = \frac{m}{ne^2\tau}}$ (after this define μ)

Specific Conductance: $\sigma = \frac{1}{\rho}$ $\quad$ But $\rho = \frac{E}{J} \Rightarrow J = \frac{E}{\rho} = \sigma E$

$\boxed{J = \sigma E}$ (Microscopic form of ohm's law)

Current density = Specific Conductance × electric field.

$\frac{E}{\rho} = \frac{I}{A} = neV_d$

$\therefore \frac{1}{\rho} = ne\mu$

$\Rightarrow \rho = \frac{1}{ne\mu}$

II Variation of ρ with temperature:

(i) In metals: $\therefore \rho \propto \frac{1}{n\tau}$, As the temperature increases the amplitude of vibrations of the +ve ions also increases. $\therefore \tau$ decreases Hence ρ increases.

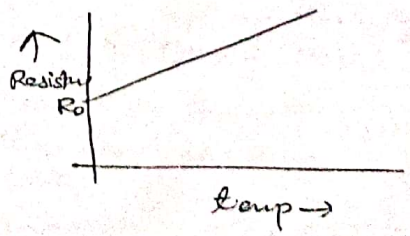
(ii) In semiconductors: In case of semiconductors, the value of n is very small. So as the temperature increases, n increases and hence τ decreases. But the increase in value of n is greater than the decrease in the value of τ. $\therefore \rho$ decreases.

(iii) In Insulators: Resistivity of an insulator decreases with the increase in the temp & vice-versa.

I Effect of temperature on Resistance:

Consider a metallic Conductor having resistance R_0 at 0°C and R_t at t°C.

$\therefore$ Increase in Resistance $R_t - R_0$



$R_t - R_0 \propto R_0$

$\propto t \quad \Rightarrow \quad R_t - R_0 \propto R_0 t$ ⑤

$\therefore \quad R_t - R_0 = \alpha R_0 t$

$\therefore \quad \boxed{\alpha = \frac{R_t - R_0}{R_0 \cdot t}}$ per °C, called temperature coefficient of Resistance.

Hence, temperature coefficient of resistance of a conductor is the increase in resistance per ohm original resistance per °C rise in temperature.

For metals, $\alpha \approx 1/273 \quad (\alpha > 0)$

$\therefore \quad R_t = R_0\left(1 + \frac{t}{273}\right) = R_0\left(\frac{T}{273}\right)$

$\therefore \quad \boxed{R_t \propto T}$

∴ The resistance of a pure metallic wire is directly proportional to its absolute temp.

(ii) In semi conductors R decreases with increase in temp ($\alpha < 0$)

(iii) In insulators R decreases exponentially with the rise in temp. ($\alpha < 0$)

Note: For Non-ohmic Conductors

i) The V-I graph is not linear

ii) The V-I graph may not pass through the origin ⊛

Colour Code of Carbon Resistors ⑤ There are generally four colour bands A, B, C, and D printed on the body of the carbon resistor. The first three bands give the value of the resistance while the fourth band tells about the tolerence in %.

0	1	2	3	4	5	6	7	8	9
B	B	R	O	Y	Great	Britain	Very	Good	Wife
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Black	Brown	Red	orange	yellow	Green	Blue	Violet	Gray	White

Suppose for a particular resistor 1st three colours are Red, Brown and orange. ∴ $21 \times 10^3 = 21k\Omega \pm$ tolerence

Fourth Band – Gold 5%

Silver 10%, No colour 20%.

For alloys like manganin, eureka and Constantan, the value of α is very small as compared to that for metals. Due to high resistivity and low temp. coeff of resistance, these alloys are used in making standard resistance coils.

- manganin (Cu – 84% + Mn – 12% + Ni – 4%)
- Constantan (Cu – 60% + Ni – 40% invariable ratio)
- Nichrome (Ni, Fe, Cr) (Ni – 60%, Cr = 12%, Mn = 2%, Fe = 26%)

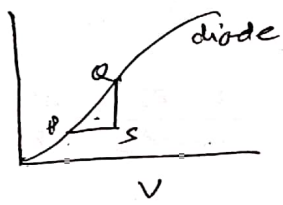
The value of α is different at different temp. Temp. coeff of resistance averaged over the temp. range $t_1°C$ to $t_2°C$ is

$$\alpha = \frac{R_2 - R_1}{R_1(t_2 - t_1)}$$

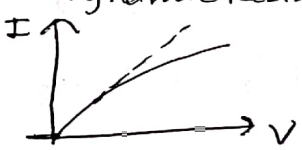
⇒ For liquid electrolytes, vacuum tubes, rectifiers (diodes) thermistors, diode valves, transistors, ohm's law does not hold

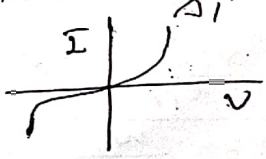
⊛ Non-ohmic :

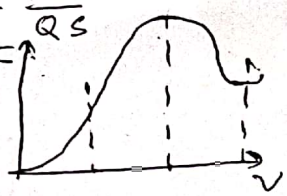
i



Dynamic Resistance $= \frac{\Delta V}{\Delta I} = \frac{PS}{QS}$







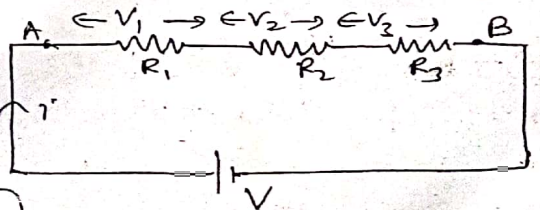
(LED)

$$\Rightarrow \rho = \rho_0 [1 + \alpha(T - T_0)]$$

$$\therefore \alpha = \frac{\rho - \rho_0}{\rho_0(T - T_0)} = \frac{d\rho}{\rho_0} \cdot \frac{1}{dT}$$

Combination of Resistors :

(i) Series Combination : Two or more resistors are said to be connected in series if they are connected one after the other such that the same current flows through all the resistors when some p.d. is applied across the combination.



$$\therefore V = V_1 + V_2 + V_3$$

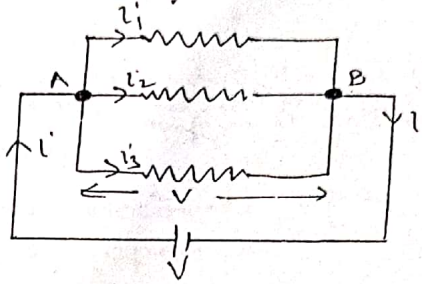
$$IR_s = IR_1 + IR_2 + IR_3$$

$$\Rightarrow R_s = R_1 + R_2 + R_3$$

for n-resistors – $\boxed{R_s = R_1 + R_2 + \cdots + R_n}$

has equivalent of series combination is equal to the sum of individual resistances.

(ii) Parallel Combination: Two or more resistances are said to be connected in parallel if one end of a resistor is connected to one end of the other resistor and the 2nd end of the 1st resistor is connected to second end of the other resistor such that the p.d. across each resistor is same as the applied p.d. across the combination.



$I = I_1 + I_2 + I_3$

$\frac{V}{R_p} = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3}$

$\therefore \frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$

For n resistors connected in parallel

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots + \frac{1}{R_n}$$

Note i) In parallel combinations, equivalent resistance is less than the least individual resistance.

ii) For two resistors R_1 & R_2 connected in parallel,

$$R_p = \frac{R_1 R_2}{R_1 + R_2}$$

A cell and Related terms: A cell is a device which provides the necessary p.d. to maintain a continuous flow of current in an electric ckt.

E.M.F. (Electromotive Force) It is defined as the p.d. between its terminals in an open ckt (i.e. when no current is drawn) OR simply open ckt voltage of a cell. OR the workdone by a cell to bring a unit +ve charge from one terminal to the other terminal of the cell is called the e.m.f. Its SI unit is joule/coul or volt (V).

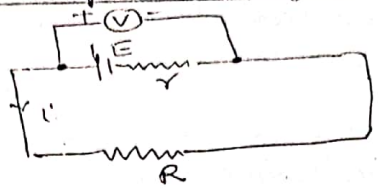
Terminal potential difference: It is defined as the p.d. between its terminals in a closed ckt (i.e. when current is drawn). Its SI unit is volt.

Note: Direction of current inside the cell is from -ve to +ve electrode whereas outside the cell it is from +ve to -ve electrode.

Internal Resistance of a cell: is the resistance offered by a cell to flow of current through it and is mainly due to nature of electrolytes and electrodes of a cell (r). Its SI unit is ohm. It depends upon (i) Distance between electrodes ($r \propto d$) (ii) the nature of the electrodes & electrolytes & (iii) area of the electrodes ($r \propto \frac{1}{A}$)

⇒

Relation bet^n e.m.f. and terminal potential difference



Current drawn from the cell

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

$$\Rightarrow E = iR + ir$$

$$= V + ir \qquad (V = iR = \text{Terminal p.d.})$$

$$\therefore \boxed{E = V + ir}$$

or $\boxed{V = E - ir}$ i.e. the terminal p.d. of the cell is less than the e.m.f. of the cell. The product ir is called the back emf as it acts against the emf E.

If the ckt is open $i = 0$, $V = E$

Thus, terminal p.d. bet^n the electrodes of the cell is equal to the e.m.f. of the cell in an open ckt.

Determination of Internal Resistance:

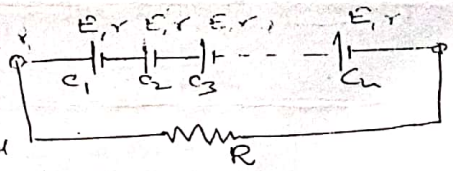
$E = iR + ir$ $\quad i = \frac{E}{R+r}$, $\quad$ But $V = iR$

$$\therefore r = \frac{E-V}{i} = \left(\frac{E-V}{V}\right) R$$

$$\therefore V = \frac{E}{R+r} \cdot R \Rightarrow \boxed{r = \left(\frac{E}{V} - 1\right) R}$$

Grouping of cells:

(1) Cells in Series:



Consider n-cells each of emf E and internal resistance r connected in series to an external resistance R.

$\therefore$ $E_{effective} = E + E + \ldots$ upto n times $= nE$

& $r_{eff} = r + r + \ldots$ upto n times $= nr$

$\therefore$ Current flowing in the ckt is given by

$$i = \frac{\text{Effective emf}}{\text{Equivalent resistance}} = \frac{nE}{R+nr}$$

$$\therefore \boxed{i = \frac{nE}{R+nr}}$$

Special cases: i) If $R >> nr$, then $R + nr \cong R$

$$\therefore \quad i = n\left(\frac{E}{R}\right) = n \text{ times the current due to a single cell}$$

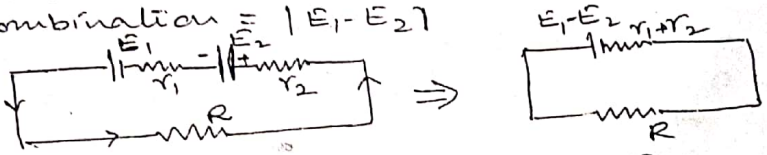
Thus in order to get a large amount of current from the cells connected in series, the external resistance should be very large as compared to the net internal resistance of the cells.

(*) Note: During charging of a cell, the +ve electrode of the cell is connected to +ve terminal of the battery charger and -ve electrode with -ve terminal of the charger. In this process current flows from +ve electrode to -ve electrode through the cell. $\quad \therefore V = E + ir \quad \therefore V > E$.

∴ If $R \ll nr$, then $R + nr \simeq nr$

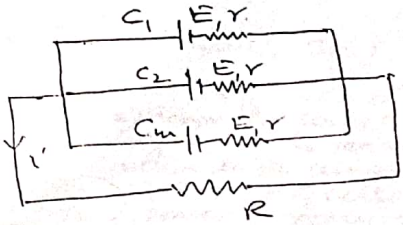
$\therefore i = \frac{nE}{nr} = \frac{E}{r}$ = is equal to the current due to a single cell. i.e. there is no use of such a Combination.

Note: When two cells of emf's E_1 & E_2 are connected such that the -ve terminals of both the cells are joined to each other. ($E_1 > E_2$), then equivalent emf of the combination $= |E_1 - E_2|$



(2) Cells in Parallel:

Consider n identical cells each of emf E and internal resistance r connected in parallel to an external resistance R



$\therefore E_{eff} = E$

& r_{eff}, $\frac{1}{r_{eff}} = \frac{1}{r} + \frac{1}{r} + \frac{1}{r}$ + ... upto n = $\frac{n}{r}$

$\therefore r_{eff} = \frac{r}{n}$

∴ the current flowing through the ckt is given by

$i = \frac{\text{Total emf}}{\text{Total Resistance}} = \frac{E}{\frac{r}{n} + R} = \frac{nE}{r + nR}$

Special Cases (i) If $R \gg r$ then $\frac{r}{n} + R \simeq R$

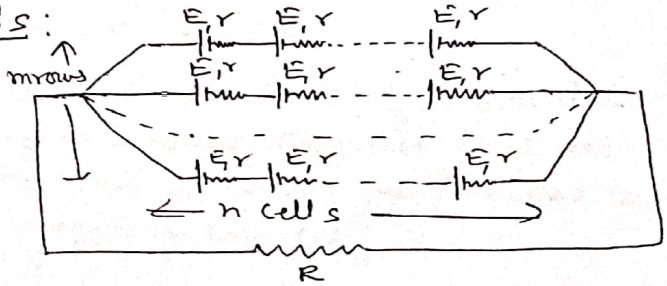
$\therefore i = \frac{nE}{nR} = \frac{E}{R}$ = Current due to a single cell.

(∴ Such an arrangement of cells is of no use)

(ii) If $R \ll r$, then $\frac{r}{n} + R \simeq r/n$

$\therefore i = \frac{E}{r/n} = n\left(\frac{E}{r}\right)$ = n times the current due to a single cell.

(3) Mixed Grouping of cells:



$\therefore E_{eff} = nE$

r_{eff}, $\frac{1}{r_{eff}} = \frac{1}{nr} + \frac{1}{nr}$ + ... m times

$\frac{1}{r_{eff}} = \frac{m}{nr}$

$\Rightarrow r_{eff} = \frac{nr}{m}$

The current flowing through the ckt is given by

$$i = \frac{\text{Total emf}}{\text{Total resistance}} = \frac{n\mathcal{E}}{R + \frac{nr}{m}} = \frac{mn\mathcal{E}}{mR + nr}$$

The current in the ckt will be maximum if $(mR + nr)$ is minimum or $mR = nr$

$$\text{or } R = \frac{nr}{m} = \text{Internal resistance of mixed grouping of cells.}$$

Thus in order to get the max. current in the ckt, the mixed grouping of cells must be done in such a way that the external resistance is equal to the effective internal resistance of all the cells.

$mR + nr = (\sqrt{mR} - \sqrt{nr})^2 + 2\sqrt{mnRr}$

should be min

$\therefore -2\sqrt{mR}\sqrt{nr} = 0 \Rightarrow mR = nr$

Note: 1) If the emf's and internal resistance of n cells connected in parallel are different then current of combination

$$i = \frac{\frac{E_1}{r_1} + \frac{E_2}{r_2} + \cdots + \frac{E_n}{r_n}}{1 + R\left(\frac{1}{r_1} + \frac{1}{r_2} + \cdots + \frac{1}{r_n}\right)}$$

2) Generally series combination is used when high emf is required, parallel is used when high current is required and mixed grouping of cells is used when high power is required in the ckt.

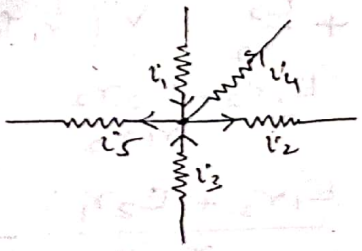
Complex Circuit: A complex or complicated electrical ckt may consist of many ckt elements like resistor, inductor, capacitor and source / sources of emf.

Kirchhoff's law

(1) First law (the jn. law or KCL)

It states that the sum of all the currents entering any point (junction) must be equal to the sum of all currents leaving that pt. (jn.). OR

The algebraic sum of all the currents meeting at a point (jn.) in a closed electrical ckt. is zero.



$$\Sigma I = 0$$

$$\therefore i_1 + i_3 = i_2 + i_4 + i_5$$

$$\text{or, } i_1 + i_3 + (-i_2) + (-i_4) + (-i_5) = 0$$

$$\text{or } i_1 + i_3 - i_2 - i_4 - i_5 = 0 \quad \text{or } \Sigma i = 0$$

Note: The first law is based on the law of conservation of charges i.e. a junction of a circuit can not act as source or sink of charge. Total rate of incoming charges is equal to the total rate of outgoing charges.

Grouping of cells

(1) Series

$V_{AB} = V_A - V_B = E_1 - ir_1$

$V_{BC} = V_B - V_C = E_2 - ir_2$

$\therefore V_{AC} = V_A - V_C = (V_A - V_B) + (V_B - V_C) = (E_1 - ir_1) + (E_2 - ir_2)$

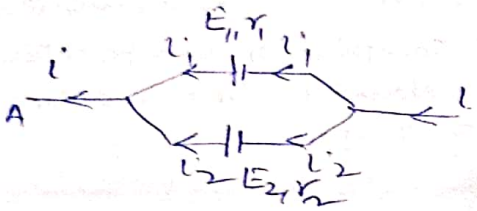
$= (E_1 + E_2) - i(r_1 + r_2)$

$\therefore V_{AC} = E_{eqt} - ir_{eqt}$

$\Rightarrow E_{eqt} = E_1 + E_2$ & $r_{eqt} = r_1 + r_2$

for n cells, $E_{eqt} = E_1 + E_2 + \cdots + E_n$, $r_{eqt} = r_1 + r_2 + \cdots + r_n$

(2) Parallel:



$i = i_1 + i_2$

$= \frac{E_1 - V}{r_1} + \frac{E_2 - V}{r_2}$

$i = \frac{E_1}{r_1} + \frac{E_2}{r_2} - V\left(\frac{1}{r_1} + \frac{1}{r_2}\right)$

$\therefore i = \frac{E_1 r_2 + E_2 r_2}{r_1 r_2} - V\left(\frac{r_1 + r_2}{r_1 r_2}\right)$

$\therefore V = \frac{E_1 r_2 + E_2 r_1}{r_1 + r_2} - i\frac{r_1 r_2}{r_1 + r_2}$

$\therefore V = E_{eqt} - ir_{eqt}$

$\Rightarrow E_{eqt} = \frac{E_1 r_2 + E_2 r_1}{r_1 + r_2}$ & $r_{eqt} = \frac{r_1 r_2}{r_1 + r_2}$

$\Rightarrow \frac{1}{r_{eqt}} = \frac{1}{r_1} + \frac{1}{r_2}$

$\therefore \frac{E_{eqt}}{r_{eqt}} = \frac{E_1 r_2 + E_2 r_1}{r_1 r_2} = \frac{E_1}{r_1} + \frac{E_2}{r_2}$

$\therefore$ for n cells $- \frac{E_{eqt}}{r_{eqt}} = \frac{E_1}{r_1} + \frac{E_2}{r_2} + \cdots + \frac{E_n}{r_n}$

& $\frac{1}{r_{eqt}} = \frac{1}{r_1} + \frac{1}{r_2} + \cdots + \frac{1}{r_n}$

while traversing a loop if -ve pole of the cell is encountered first, then its emf is -ve, otherwise +ve.

Kirchhoff's 2nd law (loop law or KVL): It states that the algebraic sum of the products of the currents and resistances of any closed part (loop) of an electrical ckt is equal to the algebraic sum of the e.m.f's acting in that part (loop) of the ckt.

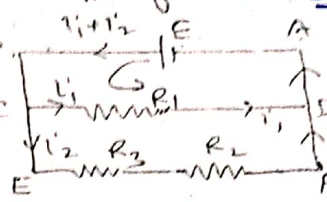
ie. $\sum iR = \sum E$

In closed loop ABCDA,

$i_1R_1 = E$

In closed loop DCEFD,

$i_2R_3 + i_2R_2 - i_1R_1 = 0$



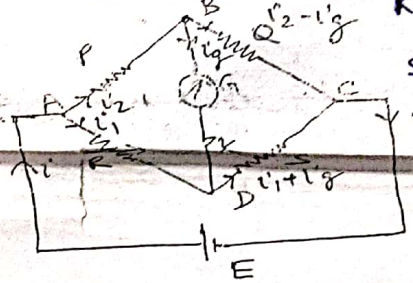
OR Around any closed loop of a network, the algebraic sum of changes in potential must be zero.

$\sum \Delta V = 0$

Note: i) Anticlockwise currents (or e.m.f's) are taken as positive in loop, the clockwise currents (or emf's) will be taken as negative in the loop.

ii) The loop law is based on the conservation of energy. Charges circulate around a closed loop in a particular dirn because of electrostatic force ⇒

Wheat stone Bridge: It is an arrangement of four resistances used for measuring one unknown resistance in terms of the other three known resistances. Here four resistances are so connected as to form a parallelogram. Across one diagonal a cell and across the other diagonal a galvanometer is connected.



R → variable (known)
S → unknown

Principle: When Key K is closed, galvanometer shows the presence of current i_g through the galvanometer. The resistance R is so adjusted so that the galvanometer shows no deflection. At this stage, the potential at points B and D is equal and hence no current flows through the galvanometer. At this stage, the bridge is said to be balanced and the ratio of P and Q is equal to the ratio of R and S.

Proof: Applying KVL in loop ADBA,

$i_1R - i_gG - i_2P = 0$ —(1), G = Resistance of the galvanometer

In closed loop BDCB,

$i_gG + (i_1+i_g)S - (i_2-i_g)Q = 0$ —(2)

When bridge is balanced, $i_g = 0$

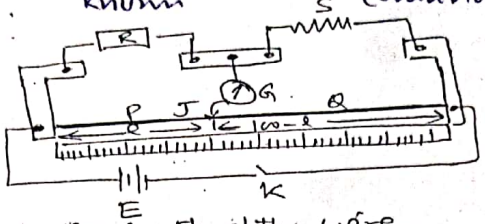
∴ (1) ⇒ $i_1R = i_2P$

(2) ⇒ $i_1S = i_2Q$

$$\frac{P}{Q} = \frac{R}{S}$$

Note: The bridge has high sensitivity when resistances in 4 arms are almost the same (same order).

Slide wire Bridge (meter Bridge): It is a practical or refined form of wheatstone bridge.



Working: close key (K) and adjust the known value of resistance R. Now move the jockey (J) over the wire AB so that galvanometer shows no deflection.

Let r be the resistance of the unit length of the wire,

then $P = rl$, & $Q = r(100 - l)$

∴ Applying the principle of wheatstone bridge

$$\frac{P}{Q} = \frac{R}{S} \quad \text{or} \quad S = \frac{Q}{P} \cdot R = \frac{r(100-l)}{rl} \cdot R$$

$$\therefore \boxed{S = \frac{(100-l)}{l} \cdot R}$$

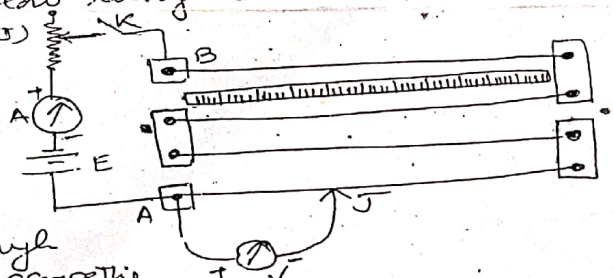
(iii) If R is nearly equal to S, balance point will be near the middle of slide wire.

Note i) Sensitivity of this bridge is the best when resistances of all the four arms are almost same.

(ii) To avoid inductive effect in the ckt of the metre bridge, key K of the cell should be pressed first and then the galvanometer key is to be pressed later on. ⇒ finding p.d,

Potentiometer: It is a device commonly used for comparing emf's and to measure internal resistances of cells.

It consists of a long uniform manganin or constantan wire AB fixed on a wooden board. Practically this long wire AB consists of 10 equal parts each 1m long (all connected). A steady current is allowed to flow through the wire AB. A sensitive voltmeter (V) through a jockey (J) is connected.



Principle: The (fall of potential) p.d. across any part of a wire is directly proportional to the length of that portion when a const^t current flows through the wire. Let V be the p.d. across this portion of wire of length l, resistance R and uniform area of C.S A. If I be the current flowing through the wire Then

$$\because V = IR \quad \& \quad R = \rho \frac{l}{A} \qquad \therefore V = I\rho \frac{l}{A} = \left(\frac{I\rho}{A}\right) l = K \cdot l$$

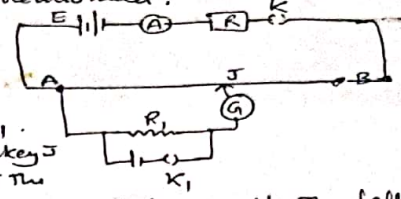
where $K = \frac{I\rho}{A}$ = const^t

$$\therefore V = Kl \quad \text{or} \quad \boxed{V \propto l}$$ (Principle of the potentiometer)

Note: (i) $K = \frac{V}{l}$ = potential gradient

(ii) The potentiometer uses a null (no deflection) method, hence it does not depend on the accuracy of the galvanometer reading. (iii) A potentiometer can be made more sensitive by decreasing its pot. gradient. (The sensitiveness of potentiometer means the smallest p.d. that can be measured with it) The same can be achieved a) by increasing the length of potentiometer wire b) by reducing the current in the potentiometer wire with the help of rheostat.

Determination of pot. diff. using potentiometer:



(1) Close Key K and adjust R from resistance box so that the fall of potential across the wire is greater than the p.d. to be measured.

(2) Close Key K_1, the current flows through R_1. A p.d. is developed across R_1. Adjust jockey J where galvanometer shows no deflection. Note the length AJ (= l). It is so when pot. diff across R_1 is equal to the fall of potential across the wire of length l.

pot. diff. across R_1, $V = Kl$ —— (i)

If r is the resistance of potentiometer wire of length L, then current through the wire $I = \frac{E}{R+r}$

$\therefore$ Pot. drop across potentiometer wire $= Ir = \left(\frac{E}{R+r}\right) \cdot r$

$\therefore$ Fall of pot. per unit length is $K = \frac{(E/R+r)\cdot r}{L}$

$\therefore$ from (i), $V = \left(\frac{E}{R+r}\right)\frac{r}{L} l$

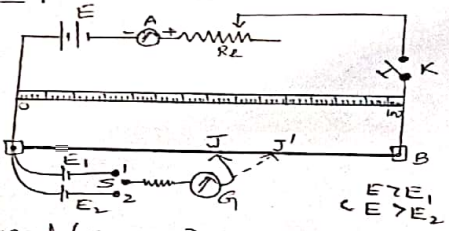
Applications of potentiometer. (13)

(1) To Compare the e.m.f's of two cells:

Checking of connections:

(i) Close the switch S_1 and press the jockey at A. Note the direction of deflection of the galvanometer.

(ii) Now press the jockey at B and again note the direction of the deflection. If the direction of deflection is to the other side, then connections are correct.



(iii) Similarly with the switch S_2 closed (S_1 open).

Procedure: 1) Close the switch S_1 so that the cell having e.m.f. E_1 is brought in the ckt. By moving jockey J to different points on wire find a point (say J) such that the galvanometer shows no deflection. $\therefore$ $E_1 = V_{AJ}$ But $V_{AJ} \propto l_1$ or $V_{AJ} = Kl_1$

i.e. there is no current in the arm AE, J. It means the potential of one terminal of the cell = potential of the pt. A and potential of one terminal of the cell = potential of the pt. J.

$\therefore$ $E_1 = Kl_1$ —— (i)

2) Open the switch S_1 and close the switch S_2. Again find the point J' so that galvanometer gives no deflection.

$\therefore$ $E_2 = V_{AJ'}$ But $V_{AJ'} \propto l_2$ or $V_{AJ'} = Kl_2$

$\therefore$ $E_2 = Kl_2$ —— (ii)

Dividing (i) by (ii), we get $\boxed{\frac{E_1}{E_2} = \frac{l_1}{l_2}}$

Note: i) EMF of the main battery (E) should be higher than the emf of each of the two cells being compared to obtain the balance point.

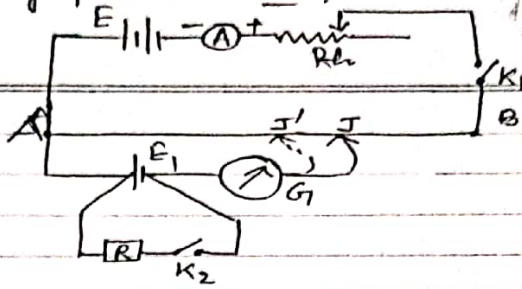
ii) Sometimes a high resistance is used in series with the galvanometer to prevent too much current from flowing through it.

(2) Determination of internal resistance of a cell using potentiometer (Not in CBSE 2018 onwards)

Difference b/w a potentiometer and an ordinary voltmeter

Potentiometer	Ordinary voltmeter
(1) It acts like an ideal voltmeter of infinite resistance	(1) It is an ordinary instrument of finite resistance.
(2) It works on null deflection method	(2) It works on deflection method.
(3) Accurate device	(3) Approximate device
(4) Its sensitivity is very high.	(4) Its sensitivity is low
(5) It is of large size	(5) It is of small size.
(6) No current is drawn from a cell whose emf is very high	(6) Some current is drawn from the cell whose emf is to be measured.

Determination of r of a cell using potentiometer:



(1) Close K_1 (K_2 open), find J on the wire such that the (G) shows no deflection. At this stage p.d. across A and J is equal to e.m.f. of the cell (E_1)

$$\therefore E_1 = V_{AJ} \propto l_1$$

$$E_1 = K l_1 \quad \text{——(1)}$$

(2) Now close the key K_2 so that a known resistance (R) is connected across the cell. Similarly obtain the point J' such that (G) shows no deflection. The terminal p.difference V

$$V = V_{AJ'} \propto l_2$$

$$V = K l_2 \quad \text{——(2)}$$

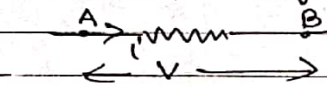
$$\therefore \frac{E_1}{V} = \frac{l_1}{l_2}$$

Now since $r = \left(\frac{E_1}{V} - 1\right) R = \left(\frac{l_1}{l_2} - 1\right) R$ ✓

Electric Energy: From Joule's law, electric energy (E) can be understood as the heat energy (H) produced in a conductor of resistance (R) when a current (i) flows through it for a given time (t). i.e. $E = H = i^2 R t$

The work done by a source to maintain a current in an electrical ckt is known as electric energy. Here work done to carry the charge q from A to B is $W = Vq = Vit$

$$\therefore \boxed{E = Vit} = (iR)it = i^2 R t = \frac{V^2}{R} t$$



Units: S.I. unit is Joule. 1 Joule = 1 Volt × 1 amp × 1 sec = 1 VAS

Commercial unit or B.O.T. unit is KWh or unit.

1 Unit = 1 KWh = 1000 Watt hr
= 1000 × 3600 watt sec
= 3.6×10^6 Joule

Electric Power: is defined as the rate of doing electric work OR It is the product of applied voltage and current flowing through the circuit.

$$\therefore P = Vi = i^2 R = \frac{V^2}{R}$$

Units: S.I. unit is Watt (= Volt amp.)

Electric power is said to be 1 watt if 1 ampere current flows through an electrical circuit when a p.d. of 1 volt is applied across it.

1 H.P. = 746 Watt.

Relation bet^n E & P: $\because E = Vit = Pt \Rightarrow P = \frac{E}{t}$

By.: M.M. Sinha

CLASS -XII
ASSIGNMENT (CURRENT ELECTRICITY)

For Practice

Type A. On Definition of current

1. If 2.25×10^{20} electrons pass through a wire in one minute, find the magnitude of the current flowing through the wire. (*P.S.S.C.E. 2002*) [Ans. 0·6 A]
2. How many electrons pass through a lamp in 5 minutes, if the current through it is 0·1 A ? [Ans. 1.875×10^{20}]
3. A soulution of sodium chloride discharges 6.1×10^{16} Na^+ ions and 4.6×10^{16} Cl^- ions in 2 s. Find the current passing through the solution. [Ans. 8.56×10^{-3} A]
4. An electron moves in a circle of radius 0·15 m with a constant speed of 3.6×10^6 m s^{-1}. What electric current does this correspond to ? [Ans. 6.1×10^{-13} A]
5. The amount of charge passing through the cross-section of a wire in time t is given by
$$q = a t^2 + b t + c$$
(*a*) What are the dimensional formulae of constants a, b and c ?
(*b*) If the values of constants a, b, c are 3, 5 and 2 in SI units, find the value of current at $t = 3$ s.
[Ans. (*a*) [I T^{-1}], [I] and [I T] ; (*b*) 23 A]

Type B. On Drift velocity

6. A current of 5 A is passing through a metallic wire of area of cross-section 4×10^{-6} m^2. If the number density of electrons in the wire is 5×10^{26} m^{-3}, find the drift velocity of electrons. (*Roorkee 1991*) [Ans. 1.563×10^{-2} m s^{-1}]
7. A conductor with a cross-section of 10^{-4} m^2 carries an electric current of 1·2 A. If the number of the free electrons are 5×10^{28} m^{-3}, calculate the electron drift velocity. Charge on the electron, $e = 1.6 \times 10^{-6}$ C. [Ans. 1.5×10^{-6} m s^{-1}]
8. A copper wire of diameter 1·0 mm carries a current of 0·2 A. Copper has 8.4×10^{28} atoms per cubic metre. Find the drift velocity of electrons, assuming that one charge carrier of 1.6×10^{-19} C is associated with each atom of the metal. (*I.S.C.E. 1997*) [Ans. 1.895×10^{-5} m s^{-1}]
9. A 10 C charge flows through a wire in 5 minutes. The radius of the wire is 1 mm. It contains 5×10^{22} electrons per centimetre^3. Calculate the current and drift velocity. [Ans. 3.33×10^{-2} A, 1.325×10^{-6} m s^{-1}]
10. What is the drift velocity of electrons in a silver wire of length 1 m, area of cross-section 3.14×10^{-6} m^2 and carrying a current of 10 A. Given, charge on electron $= 1.6 \times 10^{-19}$ C, Avogadro number $= 6.02 \times 10^{23}$, atomic weight of silver = 108 and density of silver $= 10.5 \times 10^3$ kg m^{-3}. [Ans. 3.4×10^{-4} m s^{-1}]

Type C. On Electron mobility

11. A potential difference of 6 V is applied across a conductor of length 0·12 m. Calculate the drift velocity of electrons, if the electron mobility is 5.6×10^{-6} m^2 V^{-1} s^{-1}. [Ans. 2.8×10^{-4} m s^{-1}]
12. A current of 1 A flows through a wire of length 0·24 m and area of cross-section 1·2 mm^2, when it is connected to a battery of 3 V. Find the number density of free electrons in the wire, if the electron mobility is 4.8×10^{-6} m^2 V^{-1} s^{-1}, Given that charge on electron $= 1.6 \times 10^{-19}$ C. [Ans. 8.68×10^{28} m^{-3}]

Type D. On Current density

13. A current of 2·4 A flows through a wire of cross-sectional area 1·5 mm^2. Find the current density in the wire. If the wire contains 8×10^{28} free electrons per cubic metre, calculate the drift velocity of electrons. [Ans. 1.6×10^6 A m^{-2} ; 1.25×10^{-4} m s^{-1}]
14. When a potential difference of 1·8 V is applied across a wire of length 0·15 m and area of cross-section 0·2 mm^2, a current of 2 A flows through the wire. If the number density of free electrons in the wire is 6.8×10^{28} m^{-3}, calculate the average relaxation time. Given, charge on electron $= 1.6 \times 10^{-19}$ C and mass of electron $= 9.1 \times 10^{-31}$ kg. [Ans. 4.36×10^{-16} s]
15. An aluminium wire of diameter 0·24 cm is connected in series to a copper wire of diameter 0·16 cm. The wires carry an electric current of 10 A. Find (*a*) current density of free electrons in the aluminium wire and (*b*) drift velocity of electrons in the copper wire. Given that number of density of free electrons in copper $= 8.4 \times 10^{28}$ m^{-3}. [Ans. (*a*) 2.21×10^6 A m^{-2} (*b*) 3.7×10^{-4} m s^{-1}]

Type E. On Ohm's law

16. A potential difference of 10 V is applied across a conductor of resistance 1 kΩ. Find the number of electrons flowing through the conductor in 5 minutes. (*H.P.S.S.C.E. 2007*) [Ans. 1.875×10^{19}]
17. A potential difference of 3 V is applied across a conductor of resistance 1·5 Ω. Calculate the number of electrons flowing through the conductor in 1 s. Given, charge on electron, $e = 1.6 \times 10^{-19}$ C. (*P.S.S.C.E. 2009 S*) [Ans. 1.875×10^{19}]

Type F. On Resistivity

18. The resistance of 100 cm of a thin strip of a metal is found to be 2·5 Ω. The cross-section of the strip is a rectangle of 2 mm × 0·5 mm. Calculate resistivity of the material of strip. (*Karnataka 1976*) [Ans. 2.5×10^{-6} Ω m]
19. Calculate the resistivity of the material of a wire 2 m long, 0·4 mm in diameter and having a resistance of 4 Ω. (*H.P.S.S.C.E. 1999 S ; P.S.S.C.E. 1994*) [Ans. 2.513×10^{-7} Ω m]
20. A rheostat has 100 turns of a wire of radius 0·4 mm having resistivity 4.2×10^{-7} Ω m. The diameter of each turn is 3 cm. What is the maximum value of resistance it can introduce ? [Ans. 7·875 Ω]
21. Given that resistivity of copper is 1.68×10^{-8} Ω m. Calculate the amount of copper required to draw a wire 10 km long having resistance 10 Ω. The density of copper is 8.9×10^3 kg m^{-3}. [Ans. 1,495·2 kg]
22. Find the relaxation time for free electrons in copper, if the density of free electrons is 8.4×10^{28} m^{-3}. Given that resistivity of copper at room temperature $= 1.7 \times 10^{-8}$ Ω m ; mass of electron $= 9.1 \times 10^{-31}$ kg and charge on electron $= 1.6 \times 10^{-19}$ C. [Ans. 2.49×10^{-14} s]
23. A wire of resistance 2 Ω and resistivity 1.1×10^{-6} Ω m is stretched, so that its length becomes three times of its original length. Determine its new resistance and new resistivity. (*P.S.S.C.E. 1999 S*) [Ans. 18 Ω ; unchanged]
24. A wire has a resistance of 32 Ω. It is melted and drawn into a wire of half of its original length. Calculate the resistance of the new wire. What is the percentage change in resistance ? (*C.B.S.E. 1997*) [Ans. 75 % (decrease)]

CLASS -XII
ASSIGNMENT (CURRENT ELECTRICITY)

The resistance of the side AB is 40 Ω, of the side BC 60 Ω and of the side CA 100 Ω. Calculate the effective resistance between the points A and B. *(I.I.T. 1975)* [Ans. 32 Ω]

54. Find the potential difference ($V_A - V_B$) between points A and B in the network shown in Fig. 1.85. [Ans. 1 V]

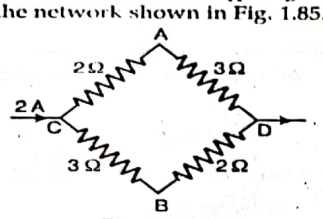


Fig. 1.85

55. Calculate the equivalent resistance of the network shown in Fig. 1.86 between points A and B. [Ans. 12·73 Ω]

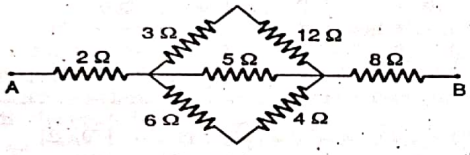


Fig. 1.86

56. What is the net resistance between points A and B in the circuit shown in Fig. 1.87 ? *(H.P.S.S.C.E. 2007 ; P.S.S.C.E. 1993)* [Ans. 5 Ω]

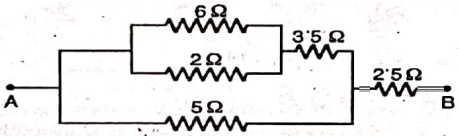


Fig. 1.87

57. Determine the strength of current flowing through the circuit shown in Fig. 1.88. *(P.S.S.C.E. 2003)* [Ans. 1·2 A]

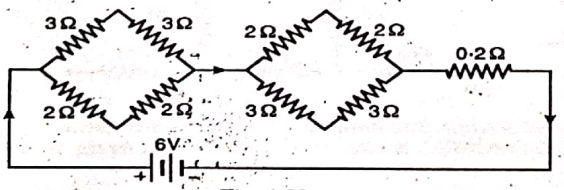


Fig. 1.88

58. The letter A is constructed with resistance wires of resistance 1 Ω each as shown in Fig. 1.89. Find the effective resistance between the points M and N. *(H.P.S.S.C.E. 2010)* [Ans. 2·67 Ω]

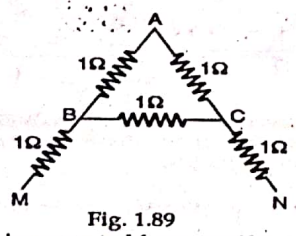


Fig. 1.89

59. The letter A is connected from a uniform wire of resistance 1 Ω cm^{-1}. The sides of the letter are each 20 cm long and cross-piece in the middle is 10 cm long, while the apex angle is 60°. Find the resistance of the letter between two ends of the legs. *(H.P.S.S.C.E. 1998)* [Ans. 26·67 Ω]

60. The letter A consists of a uniform wire of resistance 1 Ω cm^{-1}. The sides of the letter are 40 cm long and the crosspiece 10 cm long divides the sides in the ratio 1 : 3 from the apex. Find the resistance of the letter between the two ends of the legs. *(P.S.S.C.E. 1998 S)* [Ans. 66·67 Ω]

61. Calculate the effective resistance of the network shown in Fig. 1.90 :

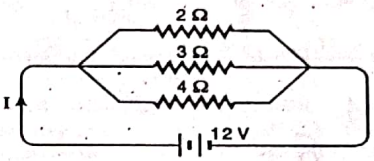


Fig. 1.90

Hence, calculate total current flowing through the circuit. *(H.P.S.S.C.E. 2010)* [Ans. 12/13 Ω, 11·1 A]

62. Calculate the equivalent resistance of the network shown in Fig. 1.91 between points A and B. [Ans. 8 Ω]

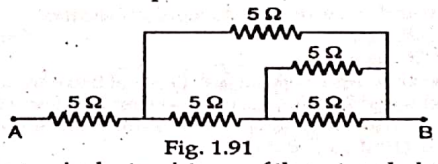


Fig. 1.91

63. Find the equivalent resistance of the network shown in Fig. 1.92 between points A and B. [Ans. 4·8 Ω]

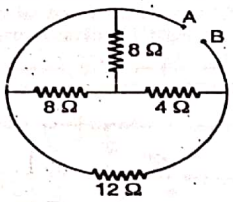


Fig. 1.92

64. Find the equivalent resistance of the network shown in Fig. 1.93 between points A and B. [Ans. 2·5 Ω]

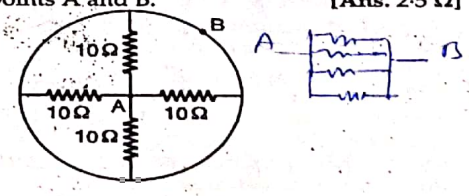


Fig. 1.93

65. Find the charge on the capacitor shown in Fig. 1.94. [Ans. 10 μC]

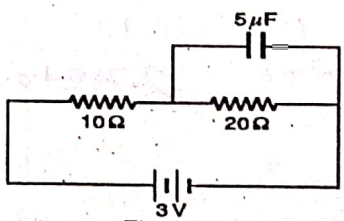


Fig. 1.94

Biology (chapter 2)

https://youtu.be/t_78sQl1xJk

👆 Link for class 12 biology for tutorial.
Instructions for the students of class 12 biology:
1. Open the provided link in youtube.
2. Go through the explanation content in the video.

See Biology on DIKSHA at
https://diksha.gov.in/play/content/do_31298667587672473612 0?referrer=utm_source%3Ddiksha_mobile%26utm_content%3Ddo_31298667860479180811 2%26utm_campaign%3Dshare_content

Get DIKSHA app from:
https://play.google.com/store/apps/details?id=in.gov.diksha.app&referrer=utm_source%3D7139114c12c8b2003b1735f6bbbf9571941ffc1a%26utm_campaign%3Dshare_app

👆link for class 12 biology assignment.
👉Instructions for the students:
1. Try to understand the structure and parts of the flowers.
2. Try to understand the mechanism at different stage of sexual reproduction in plants i.e. Pre. fertilization, fertilization and Post fertilization changes.
3. Try to solve the questions of the related topics.

JAGAT TARAN
GOLDEN JUBILEE SCHOOL

Session- 2020-21

Class: XII

Subject: Chemistry

Video Link:

Open the link given below:

Visit link: 1- https://youtu.be/1VElCP7_GFI For Chapter 'Solution'.

Visit link: 2- https://youtu.be/paRg8Q9Y1t8 For Chapter 'Electrochemistry'.

Visit link: 3- https://diksha.gov.in/play/content/do_31298622589963468 Study Materials For Both Chapters.

n8191?referrer=utm_source%3Ddiksha_mobile%26utm_content%3Ddo_3129862268184
49408195%26utm_campaign%3Dshare_content

link for class12 study material

https://youtu.be/1VElCP7_GFI
link for class 12 chemistry tutorial.
https://diksha.gov.in/play/content/do_31298622589963468819 1?referrer=utm_source%3Ddiksha_mobile%26utm_content%3Ddo_31298622681844940819 5%26utm_campaign%3Dshare_content

Instructions for class 12 Chemistry students,

(1) Open video on Chapter 'Solution' on YouTube. (2) Download study material of this chapter on Diksha App using given link.

(3)Try to understand all topics suchas different Ways to express concentration, colligative properties, Van't Hoff factor, abnormal molecular masses Of solute etc.

(4) Note down important points, formulae, graphs derivations in your copy.

(5) Try to solve questions, numerical given in the Study material.

(6) Maintain a proper record in your copy.

Instructions for class12

(1) Download video on chapter 'Electrochemistry' on You tube.

(2) Download study material on Diksha app.

(3) Try to understand topics of this chapter.

(4) Note Down important points,

(5) Solve questions and numerical of this chapter in in your copy.

Session- 2020-21

Class: XII

Subject: Computer Science

Video Link:

Open the link given below:

Instructions for class 12 Computer students,

1. Open video on chapter networking on you tube.

2. Go through the explanation content in the video.

Try to solve following questions.

Visit link: https://youtu.be/68GX50R-vIM

Session 2020-21

Class- XII

Subject: Computer Science

COMPUTER ASSIGNMENT (COMPUTER NETWORK)

1. ABC is a Mumbai based organization which is expanding its office setup to Chennai. At Chennai they are planning to have 3 different blocks for Admin, Training and Accounts related activities. Each block has a number of computers which are required to be connected in a network for communication, data and resource sharing .

As a network consultant , you have to suggest the best network related solution for them, for issues/problem raised by them in (i) to (iv) as per the distance between various blocks/location and other given parameters.

Shortest distance between various locations.

Admin to Accounts	300 m
Accounts to Training	150 m
Admin to Training	200 m
Mumbai to Chennai office	1300 m

Number of computers installed.

Training	150
Accounts	30
Admin	40

(i) Suggest the most appropriate location to house the server in the Chennai office. Justify your answer.

(ii) Suggest the best wired medium and draw the cable layout to connect various block I Chennai.

(iii) Suggest a device / software and its placement that would provide data security for the entire network of the Chennai.

(iv) Suggest a device and the protocol that shall be needed to provide wireless Internet access to all smart phones/laptops user in Chennai.

2. Software development company has set up his new center at Raipur for its office and web based activities. It has four blocks of buildings named Block A, Block B, Block C and Block D.

	Number of computers installed
Block A	25
Block B	50
Block C	125
Block D	10

Shortest distance between various blocks in meters.

Block A to Block B	60m
Block B to Block C	40m
Block C to Block A	30m
Block D to Block C	50m

(i) Suggest the most suitable place (ie. block) to house the server to this company with the suitable reason.

(ii) Suggest the type of network to connect all the blocks with suitable reason.

(iii) The company is planning to all the blocks through a secure and high speed wired medium. Suggest a way to connect all the blocks.

(iv) Suggest the most suitable wired medium for effectively connecting each computer installed in every block out of the following network cables:
Coaxial cable
Ethernet cable
single pair telephone cable

Economics Class XII

Continue on the Merit Nation App downloaded earlier. Under Macro Economics select Chapter 3 - Money And Banking and Chapter 4 - Determination Of Income And Employment .

For Chapter 3 -
Go through the videos to understand the topic.
Read the Concepts and make short notes in your class notebook.Attempt all the questions in Test 2 in your assignment notebook.

Repeat the same process for Chapter 4.

Download the app here:
https://play.google.com/store/apps/details?id=com.meritnation.school

Last modified: 19:22

Session- 2020-21

Class: XII

Subject: English

Video Link:

Open the link given below:

Visit link: https://youtu.be/qeOGoKLfWvI

English

https://youtu.be/k4PeUWd3TG8
: Link for class 12 English.
1.Open the link in YouTube.
2.Go through the instructions given for writing a formal letter.
3.Study the example given thoroughly.
4.Write out the letter in your notebook.
5.Try to write out similar letters on two other topics.

Last modified: 19:56

Poetry

1

My Mother at Sixty-Six

—Kamala Das

Chapter Sketch

Introduction

The poem has been written in lyrical idiom and it brings out the complex subtleties of human relationships. The poet, who had gone to meet her mother, is returning home. Her mother accompanies her to the airport. On the way, her mother dozes off. The poet is very upset, seeing her mother's pale face which is withering day by day. The significant thing about the poem is that the whole poem is in a single sentence punctuated by commas. This indicates a single line of thought peppered with occasional observations of the real world.

Explanation and Analysis of the Poem

Driving from my.....of their homes.

The poet had gone to her hometown to visit her mother. On Friday morning, she was returning. She was driving down to the airport at Cochin. Her mother had accompanied her to the airport to see her off. On the way, when the poet turned to her old mother, she saw that her mother had dozed off and her mouth was slightly open. Her face was pale and lifeless, just like a dead person's face. The poet was pained to see her mother's face, which was an image of ageing and decay. She suddenly realised that old age had crept upon her mother. It was a reality she found hard to accept.

The poet was very disturbed and alarmed to see the condition of her mother. To change her thoughts, she looked the other way. She saw lush green trees which were speeding away in the opposite direction. This was so because the car was moving at a great speed. This was a grim reminder of the fact that time had passed at a fast pace. She also saw a group of children who were coming out of their home in a jiffy. They represented the exuberance and vigour of youth. Perhaps they also made her nostalgic, as they reminded her of the time when her mother was young. Their youth was a contrast to her mother's senility and declining years.

Ans. (a) In her childhood, the poet was insecure about losing her mother, just as all young children often are.

(b) The poet's parting words were, "See you soon, Amma", which are suggestive of the hope that they will meet again.

(c) The poetic device used in these lines is simile, where the mother's dull and lifeless face is compared to a late winter's moon.

(d) The poet smiled and smiled (meaning that she smiled continuously) because she was trying to hide her real feelings. She feared the fact that she might not see her mother again, which left her almost in tears.

2. *Read the extracts given below and answer the questions that follow.*

..... but soon
put that thought away and
looked out at young
trees sprinting, the merry children spilling
out of their homes.....

(a) What thought did the poet drive away from her mind?

(b) What did she see when she looked out of the car?

(c) How do you know that the joyful scene didn't help her drive away the painful thought from her mind?

(d) What are the merry children symbolic of? **(Compartment 2014; Modified)**

or

(a) Which thought did the poet put away?

(b) What do the 'sprinting trees' signify?

(c) What are "the merry children spilling out of their homes", symbolic of?

(d) Why does the poet make use of the images of 'young trees sprinting' and 'merry children spilling'? **(Delhi 2014; Modified)**

or

(a) Who looked out at the young trees?

(b) Which thought did she put away?

(c) What do young sprinting trees signify?

(d) Why are the trees described as sprinting? **(Delhi 2008)**

Ans. (a) The poet drove away the painful thought of the distressing reality that her mother was getting old and she might die anytime.

(b) When she looked out of the car, she saw young trees on the roadside, which appeared to be moving. She also saw a group of children, merrily rushing out of their homes to play.

(c) As the poet passed through security check at the airport and happened to look at her mother, she was again haunted by the same fear of losing her to death. This shows that the joyful scene earlier didn't help drive away the painful thought from her mind.

(d) The merry children are symbolic of the exuberance of youth. The energetic and lively children present a contrast to the poet's mother who has grown old and pale.

or

Ans. (a) The poet put away the thought of the distressing reality of her mother getting old and of her impending death.

(b) The 'sprinting trees' signify time that has passed at a fast pace.

3. What do the parting words of Kamala Das and her smile signify? **(Compartment 20**

or

What do the parting words of the poet and her smile signify? **(All India 201**

Ans. The poet's parting words and her smile are a facade to hide her feelings of insecurity. Th pale and senile appearance of her mother brings back her childhood fear of losing h mother. She can definitely experience the pangs of separation, yet she bids her farewell in pleasant manner. She reassures her mother that all will be well and they would meet again.

4. Why has the poet's mother been compared to the "late winter's moon"? **(Delhi 201**

or

Why has Kamala Das compared her mother to a "late winter's moon"? **(Foreign 201**

Ans. The poet has used this simile as 'the late winter's moon' looks too hazy and lacks brightne and lustre. Similarly, the mother, who is now sixty-six, is pale and has a shrunken and ash face. She is devoid of the effervescence and exhilaration of youth.

5. Why are the young trees described as 'sprinting'? **(Delhi 2012, 201**

Ans. The poet is travelling in a speeding car and the roadside trees seem speeding past sprinting in the opposite direction. The poet has contrasted the 'young trees' which ar moving fast to her mother, who is old and slow.

6. What were the poet's feelings at the airport? How did she hide them? **(All India 201**

Ans. The poet was torn apart by the feeling whether she would see her mother alive the next time or not. She hid her feelings by smiling reassuringly at her mother.

7. What do the parting words of the poet Kamala Das to her mother signify? **(All India 2012, 2009, 200**

Ans. The parting words of Kamala Das to her mother signify her anxiety and fear about her mother's frail health. They also express the hope that her mother would survive till they meet again.

8. Why has the poet brought in the image of the merry children spilling out of their homes? **(Foreign 200**

Ans. The young children spilling out of their homes represent the exuberance and vigour of youth. They are in complete contrast to the poet's mother. Perhaps the poet has used the image to bring out the pangs of old age.

But after the ..... smile and smile

After reaching the airport and going through security check, the poet, who was standing a few yards away from her mother, once again looked at her mother's lifeless, deteriorating, faded face which seemed dull and colourless like a late winter's moon. Just as the late winter's moon cannot be seen clearly because of mist and fog, the poet's mother looked lifeless and shorn of all brightness. Once again she was pained on seeing her mother's deteriorating condition and was torn apart by the fear of whether she would see her mother alive another time. She put away such despondent thoughts and very optimistically bid her mother goodbye saying "Amma, see you soon." She smiled reassuringly at her mother and kept smiling at her cheerfully.

Literary Devices Used in the Poem

- **Simile**
  her face ashen like that of a corpse
  wan, pale as a late winter's moon
- **Repetition**
  thought away ..... thought away
  smile and smile and smile
- **Symbols and Imagery**
  young trees sprinting, merry children spilling,
  winter's moon

Previous Years'

Examination Questions

Extract Based Questions (4 Marks)

1. ***Read the extract given below and answer the questions that follow.***

I looked again at her, wan, pale
as a late winter's moon and felt that old
familiar ache, my childhood's fear,
but all I said was see you soon, Amma,
all I did was smile and smile and smile.....

(Foreign 2014; Modified)

(a) What was the poet's childhood fear?

(b) What were the poet's parting words?

(c) What is the poetic device used in these lines?

(d) Why did the poet smile and smile?

(c) The merry children epitomise bubbly youth. They represent the exuberance and livelin of young age.

(d) The poet makes use of these images to emphasise the contrast between old age youth.

or

Ans. (a) The poet Kamala Das looked out at young trees.

(b) Seeing her aged mother, she felt insecure about the fact that she might be separated fr her mother. The poet was also feeling guilty for neglecting her. She wondered if s would see her mother alive next time. Howeyer, she soon put these thoughts away.

(c) The young sprinting trees symbolise happiness, strength and vigour which are characteristics of youth in contrast to the dullness of old age.

(d) As the poet looked outside the window of her moving car, the trees appeared to moving fast in the opposite direction. So, they are described as sprinting.

3. *Read the extract given below and answer the questions that follow.*

Driving from my parent's
home to Cochin last Friday
morning, I saw my mother, beside me
doze, open mouthed, her face ashen like that
of a corpse and realised with pain
that she was as old as she looked ...

(a) Where was the poet driving to?

(b) Why was her mother's face looking like that of a corpse?

(c) What did the poet notice about her mother?

(d) Why was the realisation painful?

Ans. (a) The poet was driving to Cochin airport from her parent's home. **(All India 2013; Modified**

(b) Her mother's face had lost all its glow and colour. It was nearly lifeless. That is why it was looking like a corpse's face.

(c) The poet noticed that her mother was sleeping with her mouth open. Her face looke like that of a corpse. She suddenly realised that her mother had become very old.

(d) The realisation that her mother had grown very old was painful because it brought wit it the distressing thought that she was also nearing her death, whose cruel hands would separate the poet from her mother.

4. *Read the extract given below and answer the questions that follow.*

.....and
looked but soon
put that thought away and
looked out at young
trees sprinting, the merry children spilling
out of their homes, ...

(a) Name the poem and the poet.

(b) What did the poet realise? How did she feel?

(c) What did she do then?

(d) What did she notice in the world outside?

(Foreign 2010; Modified

Ans. (a) The name of the poem is 'My Mother at Sixty-Six' and the poet is Kamala Das.

(b) The poet realised that her mother was getting old and was nearing her impending death. She felt afraid of losing her mother, the same fear which she used to face in her childhood.

(c) The poet at once turned her face away from the harsh reality and looked out of the window to divert her mind.

(d) The poet saw green trees sprinting by. She also saw a group of children who were exuberant, enthusiastic and were merrily coming out of their houses.

5. *Read the extract given below and answer the questions that follow.*

..... and felt that old
familiar ache, my childhood's fear,
but all I said was, see you soon, Amma,
all I did was smile and smile and smile.....

(a) What was the childhood fear that now troubled the poet?

(b) What do the poet's parting words suggest?

(c) Why did the poet smile and smile?

(d) Explain, "that old familiar ache."

(Delhi 2009; Modified)

Ans. (a) As a child the poet was insecure about losing her mother and the same fear has come again now when her mother has grown old.

(b) The poet, while parting, smiled and said to her mother that she would see her soon. This expression of her suggests that though she was aware that her mother was quite old and weak, yet she could not do anything about it. She could not even communicate her true feelings to her mother.

(c) The poet smiled and smiled only because she wanted to hide her fears from her mother. She was reassuring herself and also her mother that they would meet again.

(d) "That old familiar ache" refers to the agony and pain of separation from her mother that the poet felt in her childhood, as she feared that she might lose her mother.

Short Answer Type Questions (3 Marks, 30-40 Words)

1. How does Kamala Das try to put away the thoughts of her ageing mother?

(Delhi 2014; Modified)

Ans. Kamala Das finds the thoughts of her ageing mother very painful and disturbing. It is hard for her to accept the fact of her mother growing old, as it brings back to her mind her childhood fear of losing her mother. She makes a deliberate effort to drive or put away such thoughts by looking out of the moving car, at the trees 'sprinting' and the joyful young children rushing out of their homes.

2. What was the poet's childhood fear?

(All India 2014)

or

What were Kamala Das, fears as a child? Why do they surface when she is going to the airport?

(All India 2011)

Ans. As a child Kamala Das was insecure about losing her mother just as all young children often are. The same feelings are evoked inside her while she is on the way to the airport, as she sees her mother's pale face, which is a sign of her old age and impending death.

Session- 2020-21

Class: XII

Subject: Geography

Video Link:

Open the link given below:

Visit link: https://youtu.be/sCLsCHqCixo

Geography

Instruction for class 12th Geography students.

1. Open the link on YouTube Geography NCERT class 12.
2. See the explanation videos of chapter 1 in the book-- India: People and Economy. Chapter name- Population-- Distribution, Density, Growth and Composition.
3. Try to understand the terms and explanation of the chapter and note down different points in your notebook.
4. Write answers of the questions given in the assessment. Do more possible question answers.
5. Make a proper record in your notebook.

Last modified: 08:46

CLASS XII GEOGRAPHY ASSIGNMENT

Book- India People and Economy

Chapter 1 Population- Distribution, Density, Growth and Composition

Q1. Mention the factors which effect the uneven distribution of population.

Q2. Which areas have higher density of population, and why?

Q3. Define Density of population.

Q4. What is the population density of India according to 2011 census?

Q5. Which state has the lowest density of the population in the country and what is the density?

Q6. What is Physiological Density?

Q7. What is Agriculture Density?

Q8. What is meant by Growth of population?

Q9. What are the major components or causes of population change?

Q10. What is meant by Natural growth and Induced growth of population?

Q11. When was the National Youth Policy of Government of India launched?

Q12. Who is a main worker and marginal worker according to Census of India?

……..End…….

Session 2020-21

कक्षा – 12

विषय – हिंदी

पाठ – वितान -1 (सिल्वर वैडिंग)

निर्देश -

1- **लिंक को खोले ।**

https://youtu.be/y1IrEXmei6M को ध्यान पूर्वक सुनें और समझे ।

2- **पाठ्य सामग्री** के लिए इस लिंक को खोलें और पढ़ें । https://www.cbsetuts.com/ncert-solutions-class-12-hindi-core-poorak-paathyapustak-silvar-vaiding/ .

3- **पाठ** अध्ययन के तत्पश्चात् निम्नलिखित **प्रश्नों के उत्तर पुस्तिका में दें।**

प्रश्न 1 – सिल्वर वैडिंग वर्तमान युग में बदलते जीवन – मूल्यों की कहानी है, सोदाहरण सिद्ध कीजिए ।

प्रश्न 2 – `सिल्वर वैडिंग `की मुख्य समस्या क्या है?

प्रश्न 3 – यशोधर पंत पर किशन दा के प्रभाव की समीक्षा कीजिए ।

कक्षा – 12

विषय – हिंदी

पाठ – 2 (बाजार दर्शन)

निर्देश -

1- **लिंक को खोले ।**

https://youtu.be/GLVO1HIh30s पाठ - 2 बाजार दर्शन (लेखक – जैनेन्द्र कुमार) को ध्यान पूर्वक सुनें और समझे ।

2- **पाठ्य सामग्री** के लिए इस लिंक को खोलें और पढ़ें ।
https://www.cbsetuts.com/ncert-solutions-class-12-hindi-core-gadhy-bhag-bajar-darshan/ .

3- **पाठ** अध्ययन के तत्पश्चात् निम्नलिखित **प्रश्नों के उत्तर पुस्तिका में दें।**

प्रश्न 1 - बाजार जाते समय आपको किन-किन बातों का ध्यान रखना चाहिए? बाजार दर्शन पाठ शीर्षक के आधार पर उत्तर दीजिए ।

प्रश्न 2 – "बाजार दर्शन" पाठ का उद्देश्य स्पष्ट कीजिए ।

प्रश्न 3 – प्रेमचंद के ईदगाह का हामिद बाजार की सार्थकता को सिद्ध करता है।बाजार दर्शन के आधार पर बताइए ।

प्रश्न 4 –निम्नलिखित पर बाजार दर्शन पाठ के आधार पर टिप्पणी करे:-

1 – मन खाली हो। **2 – मन खाली न हो।**

3 – मन बंद हो। **4 – मन में नकार हो।**

CBSE Class 12 History
Part-I: CHAPTER 2
KINGS, FARMERS AND TOWNS: Early States and Economics
(C 600 BCE - 600 CE)
Revision Notes

Key concept in nutshell

Several developments in different parts of the subcontinent (India) the long span of 1500 following the end of Harappan Civilization:-

- Rigveda was composed along the Indus and its tributaries.
- Agricultural Settlements emerged in several parts of the subcontinent.
- New mode of disposal of the dead like making megaliths.
- By C 600 BCE growth of new cities and kingdoms.
- 600 BCE major turning point in early Indian history.
- Growth of sixteen Mahajanapadas. Many were ruled by kings.
- Some known as ganas or sanghas were oligarchies
- Between the 600 BCE and 400 BCE Magadha became the most powerful Mahajanapada.
- Emergence of Mauryan Empire Chandragupta Maurya (C 321 BCE) founder of the empire extended control upto Afghanistan and Baluchistan.
- His grandson Ashoka, the most famous ruler conquered Kalinga.
- Variety of sources to reconstruct the history of the Mauryan Empire archaeological finds especially sculpture, Ashoka's Inscriptions, Literary sources like Indica account.

New Notions of Kingship

- By C 200 BCE emergence of new chiefdoms and kingdoms in several parts of the subcontinent.
- Cholas, Cheras and Pandyas in Tamilakam, known from Sangam text.
- Most of these states including Satavahanas and Shakas had control over long distance trade networks.
- Kushanas (C First century BCE to first century CE) ruled over a vast kingdom

extending from central Asia to North West India.

- Their history has been reconstructed from Inscriptions, Coins and sculptures which convey a sense of the notions of kingship.
- History of the Guptas (4th century CE) has been reconstructed from literatures, coins and inscriptions including Prashastis.
- What did subjects think about their rulers? Historians have tried to know this by examining stories contained in the Jatakas and Panchatantra.
- Strategies for increasing agricultural production
- use of plough with iron plough share, introduction of transplantation and use of irrigation through wells, tanks, less commonly canals.
- Land grants to religious institutions or Brahmanas, to extend agriculture to new areas or to win allies by making grants of land.
- Emergence of urban centres such as Pataliputra, Ujjayani, Puhar, Mathura etc.
- In the towns different types of people used to live such as washing folk, weavers, scribes, carpenters, potters, religious teachers, merchants, kings.
- Artisans and traders organized themselves in guild or shrenis.
- Trade both in the subcontinent and with east and north Africa, West Asia, South East Asia, China.
- India used to export spices, fine pearls, ivory, silk cloth, medicinal plants.
- Exchanges were facilitated by the introduction of the coinage. Punch marked coins made of silver and copper were amongst the earliest to be minted and used. The first gold coins were issued (CE)by the Kushanas.
- James Prinsep an officer in the mint of the East India Company was able to decipher Ashokan Brahmi in 1838.
- Limitations of Inscriptional evidence letters are very faintly engraved, damaged or letter missing, not sure about the exact meaning of the words.

1. **Prinsep and Piyadassi**
    - In the 1830s **James Prinsep**, an officer in the mint of the East India Company, deciphered Brahmi and Kharosthi, two scripts used in the earliest inscriptions and coins. He found that most of these mentioned a king referred to as **Piyadassi** – meaning “pleasant to behold”.
    - There were a few inscriptions which also referred to the king as Asoka, one of the most famous rulers known from Buddhist texts.

2. **The Earliest States:**
    - **The sixteen mahajanapadas**: The sixth century BCE is an era associated with early states, cities, the growing use of iron, the development of coinage, etc.
    - Early Buddhist and Jaina texts mention, amongst other things, sixteen states known as **mahajanapadas**. Although the lists vary, some names such as **Vajji, Magadha, Koshala, Kuru, Panchala, Gandhara** and **Avanti** occur frequently. Clearly, these were amongst the most important mahajanapadas.
    - While most mahajanapadas were ruled by kings, some, known as ganas or sanghas, were oligarchies where power was shared by a number of men, often collectively called rajas.
    - Each mahajanapada had a capital city, which was often fortified.
    - From c. sixth century BCE onwards, Brahmanas began composing Sanskrit texts known as the **Dharmasutras**. These laid down norms for rulers (as well as for other social categories), who were ideally expected to be **Kshatriyas**.
    - some states acquired standing armies and maintained regular bureaucracies. Others continued to depend on militia, recruited, more often than not, from the peasantry.
    - **First amongst the sixteen: Magadha:** Between the sixth and the fourth centuries BCE, Magadha (in present-day Bihar) became the most powerful mahajanapada.
    - It was a region where agriculture was especially productive. Besides, it was also rich in natural resources and animals like elephant, which ws an important part of the army, could be procured from the forest spreads of the region. Ganga and its tributaries provided a means of cheap and convenient communication.
    - Magadha attributed its power to the policies of individuals: ruthlessly ambitious kings of whom **Bimbisara, Ajatasattu** and **Mahapadma Nanda** are the best known, and their ministers, who helped implement their policies.
    - **Rajagaha** (the Prakrit name for presentday Rajgir in Bihar) was the capital of Magadha initially. In the fourth century BCE, the capital was shifted to Pataliputra, present-day Patna.
3. **An Early Empire**
    - The growth of Magadha culminated in the emergence of the **Mauryan Empire**.
    - **Chandragupta Maurya**, who founded the empire (c. 321 BCE), extended control as far northwest as Afghanistan and Baluchistan, and his grandson **Asoka**, arguably

the most famous ruler of early India, conquered Kalinga (present-day coastal Orissa).

- **Sources of Mauryan Empire**: Account of Megasthenes (a Greek ambassador to the court of Chandragupta Maurya) called Indica, Arthashastra probably composed by Kautilya or Chanakya, the minister of Chandragupta, later Buddhist, Jaina and Puranic literature. Besides,the inscriptions of Asoka (c. 272/268-231 BCE) on rocks and pillars are often regarded as amongst the most valuable sources.
- **Dhamma**: Ashoka used the inscriptions to proclaim what he understood to be dhamma, which included respect towards elders, generosity towards Brahmanas and those who renounced worldly life, treating slaves and servants kindly, and respect for religions and traditions other than one's own. According to him, this would ensure the well-being of people in this world. Special officers known as dhamma mahamatta, were appointed to spread the message of dhamma.
- **Administering Centres**: There were five major political centres in the empire – the capital **Pataliputra** and the provincial centres of **Taxila**, **Ujjayini, Tosali** and **Suvarnagiri.**
- It is likely that administrative control was strongest in areas around the capital and the provincial centres. These were wisely chosen as both Taxila and Ujjayini being situated on important long-distance trade routes, while Suvarnagiri (literally, the golden mountain) was possibly important for tapping the gold mines of Karnataka.
- Communication along both land and riverine routes was vital for the existence of the empire.
- Megasthenes mentions a committee with six subcommittees for coordinating military activity.
- In the nineteenth century, the emergence of the Mauryan Empire was regarded as a major landmark, as India was under colonial rule during that time.
- Some of the archaeological finds associated with the Mauryas, including stone sculpture, were considered to be examples of the spectacular art typical of empires.
- Nationalist leaders in the twentieth century regarded Ashoka as an inspiring figure as the inscriptions suggested that was more powerful and industrious, as also more humble than later rulers who adopted grandiose titles.

4. **New Notions of Kingship**
    - By the second century BCE, new chiefdoms and kingdoms emerged in several parts of the subcontinent.
    - This development was mainly seen in the Deccan and further south, including the chiefdoms of the **Cholas**, **Cheras** and **Pandyas** in Tamilakam (the name of the ancient Tamil country, which included parts of present-day Andhra Pradesh and Kerala, in addition to Tamil Nadu), proved to be stable and prosperous.
    - Many chiefs and kings, including the **Satavahanas** who ruled over parts of western and central India (c. second century BCE-second century CE) and the **Shakas**, a people of Central Asian origin who established kingdoms in the north-western and western parts of the subcontinent, derived revenues from long-distance trade.
    - **Divine kings**: One means of claiming high status was to identify with a variety of deities. The **Kushanas** (c. first century BCEfirst century CE), who ruled over a vast kingdom extending from Central Asia to northwest India followed this strategy. They adopted the title devaputra, or "son of god", installed colossal statues in shrines.
    - By the fourth century there is evidence of larger states, including the Gupta Empire. These states dpended on **samantas**, men who maintained themselves through local resources including control over land.
    - The Prayaga Prashasti (also known as the Allahabad Pillar Inscription) composed in Sanskrit by Harishena, the court poet of Samudragupta, arguably the most powerful of the Gupta rulers (c. fourth century CE).
5. **A Changing Countryside**
    - Popular perception: Anthologies such as the Jatakas and the Panchatantra gave a glimpse of subject-king relation. For instance, one story known as the Gandatindu Jataka describes the plight of the subjects of a wicked king.
    - Kings frequently tried to fill their coffers by demanding high taxes, and peasants particularly found such demands oppressive.
    - Certain strategies aimed at increasing production to meet growing demand for taxes also were adopted. For example, the shift to plough agriculture, which spread in fertile alluvial river valleys such as those of the Ganga and the Kaveri from c. sixth century BCE. Also production of paddy was dramatically increased

by the introduction of transplantation.

- Another strategy adopted to increase agricultural production was the use of irrigation, through wells and tanks, and less commonly, canals.
- The benefits of increased production led to a growing differentiation amongst people engaged in agriculture as it was not equally distributed.
- The stories of Buddhist tradition refers to the term '**gahapati'** which was often used in Pali texts to designate the second and third categories. Tamil literature mentions large landowners or vellalar, ploughmen or uzhavar and slaves or adimai.
- With rising differences questions of control over land must have become crucial, as these were often discussed in legal texts.
- During early centuries of common era, grants of land were made and many of which were recorded in inscriptions. For instance, according to Sanskrit legal texts, women were not supposed to have independent access to resources such as land.
- Land grants provide some insight into the relationship between cultivators and the state.

6. **Towns and Trade**
    - Major towns were located along routes of communication. Some such as Pataliputra were on riverine routes. Some were near the coast, from where sea routes began. Many cities like Mathura were bustling centres of commercial, cultural and political activities.
    - A wide range of artefacts have been recovered from the excavations in these areas. These include fine pottery bowls and dishes, with a glossy finish, known as Northern Black Polished Ware, probably used by rich people, and ornaments, tools, weapons, vessels, figurines, made of a wide range of materials – gold, silver, copper, bronze, ivory, glass, shell and terracotta.
    - By the second century BCE, we find short votive inscriptions in a number of cities. Sometimes, guilds or shrenis, organisations of craft producers and merchants, are mentioned as well.
    - From the sixth century BCE, land and river routes criss-crossed the subcontinent and extended in various directions. Rulers often attempted to control the routes, possibly by offering protection for a price.

- Those who traversed these routes included peddlers who probably travelled on foot and merchants who travelled with caravans of bullock carts and pack-animals.
- Spices, especially pepper, were in high demand in the Roman Empire, as were textiles and medicinal plants, and these were all transported across the Arabian Sea to the Mediterranean.
- Exchanges were facilitated by the introduction of coinage. Punch-marked coins made of silver and copper (c. sixth century BCE onwards) were amongst the earliest to be minted and used.
- Attempts were made to identify the symbols on punch-marked coins with specific ruling dynasties.
- The first coins to bear the names and images of rulers were issued by the Indo-Greeks, who established control over the north-western part of the subcontinent c. second century BCE.
- The first gold coins were issued c. first century CE by the Kushanas. The widespread use of gold coins indicates the enormous value of the transactions that were taking place. Some of the most spectacular gold coins were issued by the Gupta rulers. From c. sixth century CE onwards, finds of gold coins taper off.
- Coins were also issued by tribal republics such as that of the Yaudheyas of Punjab and Haryana (c. first century CE).
- Hoards of Roman coins have been found from archaeological sites in south India. It is obvious that networks of trade were not confined within political boundaries: south India was not part of the Roman Empire, but there were close connections through trade.

7. **How Are Inscriptions Deciphered?**
   - **Brahmi:** Most scripts used to write modern Indian languages are derived from Brahmi, the script used in most Asokan inscriptions. It was only after decades of painstaking investigations by several epigraphists that James Prinsep was able to decipher Asokan Brahmi in 1838.
   - **Kharosthi:** Kharosthi is the script used in inscriptions in the northwest. The coins of Indo-Greek kings, who ruled over the area (c. second-first centuries BCE), contain the names of kings written in Greek and Kharosthi scripts. European scholars who could read the former compared the letters. With Prinsep identifying

the language of the Kharosthi inscriptions as Prakrit, it became possible to read longer inscriptions as well.

- **Epigraphists** and **historians** after examining all these inscriptions, and finding that they match in terms of content, style, language and palaeography, come to a conclusion. Historians have to constantly assess statements made in inscriptions to judge whether they are true, plausible or exaggerations.

Time Line 2 Major Advance in Epigraphy	
Eighteen Century	
1784	Founding of the Asiatic Society (Bengali)
Nineteenth century	
1810s	Colin Mackenzie collects over 8,000 inscriptions in Sanskrit and Dravidian languages
1838	Decipherments of Asokan Brahmi by James Prinsep
1877	Alexander Caunningham publishes a set of asokan inscriptions
1886	First issue of Epigraphia carnatica, a journal of south Indian inscriptions
1888	First issue of Epigraphia Indica
Twentieth Century	
1965-66	D.C Sircar publishes Indian Epigraphy and Indian Epigraphical Glossary

- **Limitations:** However, it is probably evident that there are limits to what epigraphy can reveal. Sometimes, there are technical limitations, or inscriptions may be damaged or letters missing.
- Besides, it is not always easy to be sure about the exact meaning of the words used in inscriptions.
- Although several thousand inscriptions have been discovered, not all have been

deciphered, published and translated.

- Thus epigraphy alone does not provide a full understanding of political and economic history. Also, historians often question both old and new evidence.

Timeline:

Major Political and Economic Developments

c.600-500 BCE -- Paddy transplantation; urbanisation in the Ganga valley; mahajanapadas; punch-marked coins
c. 500-400 BCE -- Rulers of Magadha consolidate power
c. 327-325 BCE -- Invasion of Alexander of Macedon
c. 321 BCE -- Accession of Chandragupta Maurya
c. 272/268-231 BCE -- Reign of Asoka
c. 185 BCE -- End of the Mauryan empire

c. 200-100 BCE -- Indo-Greek rule in the northwest; Cholas, Cheras and Pandyas in south India; Satavahanas in the Deccan
c. 100 BCE-200 CE -- Shaka (peoples from Central Asia) rulers in the northwest; Roman trade; gold coinage
c. 78 CE? -- Accession of Kanishka
c.100-200 CE -- Earliest inscriptional evidence of land grants by Satavahana and Shaka rulers

c. 320 CE -- Beginning of Gupta rule
c. 335-375 CE -- Samudragupta
c. 375-415 CE -- Chandragupta II; Vakatakas in the Deccan
c. 500-600 CE -- Rise of the Chalukyas in Karnataka and of the Pallavas in Tamil Nadu
c. 606-647 CE -- Harshavardhana king of Kanauj; Chinese pilgrim Xuan Zang comes in search of Buddhist texts
c. 712 -- Arabs conquer Sind

CBSE Class 12 History
Important Questions
Chapter 2
Kings Farmers and Towns

(4 MARKS)

1. Discuss factors responsible for the rise of Magadha.

Ans. Powerful rulers- Bimbisara and Ajatasattu

Availability of iron.

Fertile soil

Availability of elephants in forest.

Strong capital - Rajgir and Pataliputra

2. Describe five features of Mahajanapadas?

Ans. Maximum Mahajanapadas ruled by kings but some ruled by Ganas or Sanghas.

Each had its own capital often fortified.

Permanent army recruited from the peasantry regular bureaucracies.

Function of kings to collect taxes and tributes from people.

3. Explain main features of Ashoka's Dhamma?

Ans. Respect to elders, love for young and kindness to servants.

Religious tolerance to other religions.

Liberal policies towards Brahmanas, Shramanas.

Appointment of Dhamma mahamattas.

4. Important changes in agriculture during the period between 600 BCE to 600 CE.

Ans. For increase of agricultural production use of plough with iron tipped ploughshare.

Introduction of transplantation of crop (paddy).

Irrigation by wells, ponds and canals.

Hoe agriculture in semi-arid parts of Punjab, Rajasthan and hilly tracks in North-Eastern and Central Parts.

Land lords and heads of village were more powerful and had control over farmers.

Land grants by kings to extend agriculture to new areas.

5. How do inscription help in reconstruction of history?

Ans. Knowledge about the rulers and their achievements.

Scripts and language of that time.

Extent of the empire.

Social and religious condition of kingdom.

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Session- 2020-21

Class: XII

Subject: Maths

Video Link:

Open the link given below:

Visit link: 1- https://www.youtube.com/playlist?list=PLr6TOxpiWwuH4O4IBqwCpjns-8l8zWDQu

Visit link: 2- https://www.youtube.com/playlist?list=PLr6TOxpiWwuF-_hzysJ6bXGPaJZuB6iHO

Maths

Instructions for the class 12 mathematics students.
1. Download the video from the given link above.
2. Video is related with chapter 3 & 4 Matrices and Determinants.
3. Try to understand the key points given in PDF file.
4. Note down important points and solve the exercise given in ncert book.
5. Practice the problems given in PDF file.
6. Make a proper record.

Last modified: 19:27

Key Notes

Chapter-3

Matrices

- A matrix is an ordered rectangular array of numbers or functions.
- A matrix having m rows and n columns is called a matrix of order m × n.
- $[a_{ij}]_{m\times 1}$ is a column matrix.
- $[a_{ij}]_{1\times n}$ is a row matrix.
- An m × n matrix is a square matrix if m = n.
- $A = A = [a_{ij}]_{m\times n}$ is a diagonal matrix if $a_{ij} = 0$, when $i \neq j$
- $A = \left[a_{ji}\right]_{n\times n}$ is a scalar matrix if $a_{ij} = 0$ when $i \neq j$, $a_{ij} = k$ (k is *some constant), when I=j.*
- $A = \left[a_{ij}\right]_{n\times n}$ is an identity matrix, if $a_{ij} = 1$, *when* $i = j$, $a_{ij} = 0$, *when* $i \neq j$.
- A zero matrix has all its elements as zero.
- $A = \left[a_{ij}\right] = \left[b_{ij}\right] = B$ if (i) A and B are of same order, (ii) for all possible values of i *and* j.
- $kA = k\left[a_{ij}\right]_{m\times n} = \left[k\left(a_{ij}\right)\right]_{m\times n}$
- $-A = (-1)A$
- $A - B = A + (-1)B$
- $A + B = B + A$
- $(A + B) + C = A + (B + C)$, where A, B and C are of same order.
- $k(A + B) = kA + kB$, where A and B are of same order, k is constant.
- $(k + l)A = kA + lA$, where k and l are constant.
- *If* $A = [a_{ij}]_{m\times n}$ *and* $B = [b_{jk}]_{n\times p}$, *then* $AB = C = [c_{ik}]_{m\times p}$, where $C_{tl} = \sum_{j=i}^{n} a_{ij}b_{jk}$

  (i) $A(BC) = (AB)C$,

(ii) $A(B + C) = AB + AC$,

(iii) $(A + B)C = AC + BC$

- *If* $A = \left[a_{ij}\right]_{m\times n}$, *then* A' *or* $A^T = \left[a_{ji}\right]_{n\times m}$
- (i) $(A')' = A$,
- (ii) $(kA)' = kA'$,
- (iii) $(A + B)' = A' + B'$,
- (iv) $(AB)' = B'A'$
- A is a symmetric matrix if $A' = A$.
- A is a skew symmetric matrix if $A' = -A$.
- Any square matrix can be represented as the sum of a symmetric and a skew symmetric matrix.
- Elementary operations of a matrix are as follows:
- (i) $R_1 \leftrightarrow R_j$ or $C_1 \leftrightarrow C_j$

  (i) $R_1 \rightarrow kR_i$ or $C_1 \leftrightarrow kC_1$

  (i) $R_1 \leftrightarrow R_j + kR_j$ or $C_1 + kC_j$
- If A and B are two square matrices such that $AB = BA = I$, then B is the inverse matrix of A and is denoted by A^{-1} and A is the inverse of B.
- Inverse of a square matrix, if it exists, is unique.

Chapter-4

Determinant

- Determinant of a matrix $A=[a_{11}]_{1\times1}$ is given by $|a_{11}|=a_{11}$
- Determinant of a matrix $A\begin{matrix}a_{11} & a_{12}\\ a_{21} & a_{22}\end{matrix}$ is given by

$$|A|=\begin{vmatrix}a_{11} & a_{12}\\ a_{21} & a_{22}\end{vmatrix}=a_{11}\ a_{22}\ -a_{12}\ \ a_{21}$$

- Determinant of a matrix $A\begin{matrix}a_1 & b_1 & c_1\\ a_2 & b_2 & c_2\\ a_3 & b_3 & c_3\end{matrix}$ is given by (expanding along (R_1)

$$|A|=\begin{vmatrix}a_1 & b_1 & c_1\\ a_2 & b_2 & c_2\\ a_3 & b_3 & c_3\end{vmatrix}=a_1\begin{vmatrix}b_2 & c_2\\ b_3 & c_3\end{vmatrix}-b_1\begin{vmatrix}a_2 & c_2\\ a_3 & c_3\end{vmatrix}+c_1\begin{vmatrix}a_2 & b_2\\ a_3 & b_3\end{vmatrix}$$

- **For any square matrix A, the |A| satisfy following properties.**
- $|A'| = |A|$, where A' = transpose of A.
- If we interchange any two rows (or columns), then sign of determinant changes.
- If any two rows or any two columns are identical or proportional, then value of determinant is zero.
- If we multiply each element of a row or a column of a determinant by constant k, then value of determinant is multiplied by k.
- Multiplying a determinant by k means multiply elements of only one row (or one column) by k.
- *If* $A=\left[a_{ij}\right]_{3\times3}$ *,then* $|k.A|=k^3|A|$
- If elements of a row or a column in a determinant can be expressed as sum of two or more elements, then the given determinant can be expressed as sum of two or more determinants.

Key Notes

- If to each element of a row or a column of a determinant the equimultiples of corresponding elements of other rows or columns are added, then value of determinant remains same.
- Area of a triangle with vertices (x_1, y_1), (x_2, y_2) *and* (x_3, y_3) is given by

$$\Delta = \frac{1}{2}\begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix}$$

- Minor of an element aij of the determinant of matrix A is the determinant obtained by deleting i^{th} row and j^{th} column and denoted by M_{ij}
- Cofactor of aij of given by Aij = (– 1)i+ j Mij
- Value of determinant of a matrix A is obtained by sum of product of elements of a row (or a column) with corresponding cofactors. For example, $|A| = a_{11} A_{11} + a_{12} A_{12} + a_{13} A_{13}$.
- If elements of one row (or column) are multiplied with cofactors of elements of any other row (or column), then their sum is zero. For example, $a_{11} A_{21} + a_{12} A_{22} + a_{13} A_{23} = 0$
- $A\ (adj\ A) = (adj\ A)\ A = |A|\ I$, where A is square matrix of order n.
- A square matrix A is said to be singular or non-singular according as $|A| = 0\ or\ |A| \neq 0$.
- If AB = BA = I, where B is square matrix, then B is called inverse of A. Also $A^{-1} = B\ or\ B^{-1} = A\ and\ hence\ \left(A^{-1}\right)^{-1} = A$.
- A square matrix A has inverse if and only if A is non-singular.
- $A^{-1} = \frac{1}{|A|}(\text{adj } A)$
- If $a_1x + b_1y + c_1z = d_1$
- $a_2x + b_2y + c_2z = d_2$
- $a_3x + b_3y + c_3z = d_3$
- then these equations can be written as A X = B, where

4 - Determinants

Key Notes

- $$A = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = X \begin{bmatrix} x \\ y \\ z \end{bmatrix} \text{ and } B = \begin{bmatrix} d_1 \\ d_2 \\ d_3 \end{bmatrix}$$
- Unique solution of equation AX = B is given by $X = A^{-1}B$, *where* $|A|\ 0 \neq 0$.
- A system of equation is consistent or inconsistent according as its solution exists or not.
- For a square matrix A in matrix equation AX = B
- $|A| \neq 0$, there exists unique solution
- |A| = 0 and (adj A) B ≠ 0, then there exists no solution
- $|A| = 0\ and\ (adj\ A)\ B = 0$, then system may or may not be consistent.

CHAPTER 3 & 4

MATRICES AND DETERMINANTS

VERY SHORT ANSWER TYPE QUESTIONS (1 Mark)

1. If $\begin{bmatrix} x+3 & 4 \\ y-4 & x+y \end{bmatrix} = \begin{bmatrix} 5 & 4 \\ 3 & 9 \end{bmatrix}$, find x and y.

2. If $A = \begin{bmatrix} i & 0 \\ 0 & -i \end{bmatrix}$ and $B = \begin{bmatrix} 0 & i \\ i & 0 \end{bmatrix}$, find AB.

3. Find the value of $a_{23} + a_{32}$ in the matrix $A = [a_{ij}]_{3 \times 3}$

   where $a_{ij} = \begin{cases} |2i - j| & \text{if } i > j \\ -i + 2j + 3 & \text{if } i \leq j \end{cases}$

4. If B be a 4×5 type matrix, then what is the number of elements in the third column.

5. If $A = \begin{bmatrix} 5 & 2 \\ 0 & 9 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 6 \\ 0 & -1 \end{bmatrix}$ find $3A - 2B$.

6. If $A = \begin{bmatrix} 2 & -3 \\ -7 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 2 & -6 \end{bmatrix}$ find $(A + B)'$.

7. If $A = [1 \quad 0 \quad 4]$ and $B = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ find AB.

8. If $A = \begin{bmatrix} 4 & x+2 \\ 2x-3 & x+1 \end{bmatrix}$ is symmetric matrix, then find x.

9. For what value of x the matrix $\begin{bmatrix} 0 & 2 & -3 \\ -2 & 0 & -4 \\ 3 & 4 & x+5 \end{bmatrix}$ is skew symmetrix matrix.

10. If $A = \begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix} = P + Q$ where P is symmetric and Q is skew-symmetric matrix, then find the matrix Q.

11. Find the value of $\begin{vmatrix} a+ib & c+id \\ -c+id & a-ib \end{vmatrix}$

12. If $\begin{vmatrix} 2x+5 & 3 \\ 5x+2 & 9 \end{vmatrix} = 0$, find x.

13. For what value of k, the matrix $\begin{bmatrix} k & 2 \\ 3 & 4 \end{bmatrix}$ has no inverse.

14. If $A = \begin{bmatrix} \sin 30^\circ & \cos 30^\circ \\ -\sin 60^\circ & \cos 60^\circ \end{bmatrix}$, what is $|A|$.

15. Find the cofactor of a_{12} in $\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix}$.

16. Find the minor of a_{23} in $\begin{vmatrix} 1 & 3 & -2 \\ 4 & -5 & 6 \\ 3 & 5 & 2 \end{vmatrix}$.

17. Find the value of P, such that the matrix $\begin{bmatrix} -1 & 2 \\ 4 & P \end{bmatrix}$ is singular.

18. Find the value of x such that the points $(0, 2)$, $(1, x)$ and $(3, 1)$ are collinear.

19. Area of a triangle with vertices $(k, 0)$, $(1, 1)$ and $(0, 3)$ is 5 unit. Find the value (s) of k.

20. If A is a square matrix of order 3 and $|A| = -2$, find the value of $|-3A|$.

21. If $A = 2B$ where A and B are square matrices of order 3×3 and $|B| = 5$, what is $|A|$?

22. What is the number of all possible matrices of order 2×3 with each entry 0, 1 or 2.

23. Find the area of the triangle with vertices $(0, 0)$, $(6, 0)$ and $(4, 3)$.

24. If $\begin{vmatrix} 2x & 4 \\ -1 & x \end{vmatrix} = \begin{vmatrix} 6 & -3 \\ 2 & 1 \end{vmatrix}$, find x.

25. If $A=\begin{bmatrix} x+y & y+z & z+x \\ z & x & y \\ 1 & 1 & 1 \end{bmatrix}$, write the value of det A.

26. If $A=\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$ such that $|A| = -15$, find $a_{11}C_{21} + a_{12}C_{22}$ where C_{ij} is cofactors of a_{ij} in $A = [a_{ij}]$.

27. If A is a non-singular matrix of order 3 and $|A| = -3$ find $|adj\ A|$.

28. If $A=\begin{bmatrix} 5 & -3 \\ 6 & 8 \end{bmatrix}$ find $(adj\ A)$

29. Given a square matrix A of order 3×3 such that $|A| = 12$ find the value of $|A\ adj\ A|$.

30. If A is a square matrix of order 3 such that $|adj\ A| = 8$ find $|A|$.

31. Let A be a non-singular square matrix of order 3×3 find $|adj\ A|$ if $|A| = 10$.

32. If $A=\begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$ find $\left|(A^{-1})^{-1}\right|$.

33. If $A=[-1 \quad 2 \quad 3]$ and $B=\begin{bmatrix} 3 \\ -4 \\ 0 \end{bmatrix}$ find $|AB|$.

SHORT ANSWER TYPE QUESTIONS (4 MARKS)

34. Find x, y, z and w if $\begin{bmatrix} x-y & 2x+z \\ 2x-y & 3x+w \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$.

35. Construct a 3×3 matrix $A = [a_{ij}]$ whose elements are given by

$$a_{ij} = \begin{cases} 1+i+j & \text{if } i \geq j \\ \dfrac{|i-2j|}{2} & \text{if } i < j \end{cases}$$

36. Find A and B if $2A + 3B = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 0 & -1 \end{bmatrix}$ and $A - 2B = \begin{bmatrix} 3 & 0 & 1 \\ -1 & 6 & 2 \end{bmatrix}$.

37. If $A = \begin{bmatrix} -1 \\ 2 \\ 3 \end{bmatrix}$ and $B = \begin{bmatrix} -2 & -1 & -4 \end{bmatrix}$, verify that $(AB)' = B'A'$.

38. Express the matrix $\begin{bmatrix} 3 & 3 & -1 \\ -2 & -2 & 1 \\ -4 & -5 & 2 \end{bmatrix} = P + Q$ where P is a symmetric and Q is a skew-symmetric matrix.

39. If $A = \begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$, then prove that $A^n = \begin{bmatrix} \cos n\theta & \sin n\theta \\ -\sin n\theta & \cos n\theta \end{bmatrix}$ where n is a natural number.

40. Let $A = \begin{bmatrix} 2 & -1 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 5 & 2 \\ 7 & 4 \end{bmatrix}$, $C = \begin{bmatrix} 2 & 5 \\ 3 & 8 \end{bmatrix}$, find a matrix D such that $CD - AB = O$.

41. Find the value of x such that $\begin{bmatrix} 1 & x & 1 \end{bmatrix} \begin{bmatrix} 1 & 3 & 2 \\ 2 & 5 & 1 \\ 15 & 3 & 2 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \\ x \end{bmatrix} = 0$

42. Prove that the product of the matrices

$$\begin{bmatrix} \cos^2\theta & \cos\theta\sin\theta \\ \cos\theta\sin\theta & \sin^2\theta \end{bmatrix} \text{ and } \begin{bmatrix} \cos^2\phi & \cos\phi\sin\phi \\ \cos\phi\sin\phi & \sin^2\phi \end{bmatrix}$$

is the null matrix, when θ and ϕ differ by an odd multiple of $\frac{\pi}{2}$.

43. If $A = \begin{bmatrix} 5 & 3 \\ 12 & 7 \end{bmatrix}$ show that $A^2 - 12A - I = 0$. Hence find A^{-1}.

44. If $A=\begin{bmatrix}2 & 3\\ 4 & 7\end{bmatrix}$ find $f(A)$ where $f(x) = x^2 - 5x - 2$.

45. If $A=\begin{bmatrix}4 & 3\\ 2 & 5\end{bmatrix}$, find x and y such that $A^2 - xA + yI = 0$.

46. Find the matrix X so that $X\begin{bmatrix}1 & 2 & 3\\ 4 & 5 & 6\end{bmatrix}=\begin{bmatrix}-7 & -8 & -9\\ 2 & 4 & 6\end{bmatrix}$.

47. If $A=\begin{bmatrix}2 & 3\\ 1 & -4\end{bmatrix}$ and $B=\begin{bmatrix}1 & -2\\ -1 & 3\end{bmatrix}$ then show that $(AB)^{-1} = B^{-1}A^{-1}$.

48. Test the consistency of the following system of equations by matrix method :

$3x - y = 5;\ 6x - 2y = 3$

49. Using elementary row transformations, find the inverse of the matrix $A=\begin{bmatrix}6 & -3\\ -2 & 1\end{bmatrix}$, if possible.

50. By using elementary column transformation, find the inverse of $A=\begin{bmatrix}3 & 1\\ 5 & 2\end{bmatrix}$.

51. If $A=\begin{bmatrix}\cos\alpha & -\sin\alpha\\ \sin\alpha & \cos\alpha\end{bmatrix}$ and $A + A' = I$, then find the general value of α.

Using properties of determinants, prove the following : Q 52 to Q 59.

52. $\begin{vmatrix}a-b-c & 2a & 2a\\ 2b & b-c-a & 2b\\ 2c & 2c & c-a-b\end{vmatrix}=(a+b+c)^3$

53. $\begin{vmatrix}x+2 & x+3 & x+2a\\ x+3 & x+4 & x+2b\\ x+4 & x+5 & x+2c\end{vmatrix}=0$ if a, b, c are in A.P.

54. $\begin{vmatrix}\sin\alpha & \cos\alpha & \sin(\alpha+\delta)\\ \sin\beta & \cos\beta & \sin(\beta+\delta)\\ \sin\gamma & \cos\gamma & \sin(\gamma+\delta)\end{vmatrix}=0$

55. $\begin{vmatrix} b^2+c^2 & a^2 & a^2 \\ b^2 & c^2+a^2 & b^2 \\ c^2 & c^2 & a^2+b^2 \end{vmatrix} = 4a^2b^2c^2.$

56. $\begin{vmatrix} b+c & c+a & a+b \\ q+r & r+p & p+q \\ y+z & z+x & x+y \end{vmatrix} = 2\begin{vmatrix} a & b & c \\ p & q & r \\ x & y & z \end{vmatrix}.$

57. $\begin{vmatrix} a^2 & bc & ac+c^2 \\ a^2+ab & b^2 & ac \\ ab & b^2+bc & c^2 \end{vmatrix} = 4a^2b^2c^2.$

58. $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix} = x^2(x+a+b+c).$

59. Show that :

$$\begin{vmatrix} x & y & z \\ x^2 & y^2 & z^2 \\ yz & zx & xy \end{vmatrix} = (y-z)(z-x)(x-y)(yz+zx+xy).$$

60. (i) If the points (a, b) (a', b') and $(a-a', b-b')$ are collinear. Show that $ab' = a'b$.

(ii) If $A = \begin{bmatrix} 2 & 5 \\ 2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & -3 \\ 2 & 5 \end{bmatrix}$ verity that $|AB| = |A||B|$.

61. Given $A = \begin{bmatrix} 0 & -1 & 2 \\ 2 & -2 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 0 & 1 \\ 1 & 0 \\ 1 & 1 \end{bmatrix}$. Find the product AB and also find $(AB)^{-1}$.

62. Solve the following equation for x.

$$\begin{vmatrix} a+x & a-x & a-x \\ a-x & a+x & a-x \\ a-x & a-x & a+x \end{vmatrix} = 0.$$

63. If $A = \begin{bmatrix} 0 & -\tan\frac{\alpha}{2} \\ \tan\frac{\alpha}{2} & 0 \end{bmatrix}$ and I is the identity matrix of order 2, show that,

$$I + A = (I - A)\begin{bmatrix} \cos\alpha & -\sin\alpha \\ \sin\alpha & \cos\alpha \end{bmatrix}$$

64. Use matrix method to solve the following system of equations : $5x - 7y = 2$, $7x - 5y = 3$.

LONG ANSWER TYPE QUESTIONS (6 MARKS)

65. Obtain the inverse of the following matrix using elementary row operations

$$A = \begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}.$$

66. Use product $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}\begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$ to solve the system of equations

$x - y + 2z = 1$, $2y - 3z = 1$, $3x - 2y + 4z = 2$.

67. Solve the following system of equations by matrix method, where $x \neq 0$, $y \neq 0$, $z \neq 0$

$$\frac{2}{x} - \frac{3}{y} + \frac{3}{z} = 10, \quad \frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 10, \quad \frac{3}{x} - \frac{1}{y} + \frac{2}{z} = 13.$$

68. Find A^{-1}, where $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$, hence solve the system of linear equations :

$$x + 2y - 3z = -4$$

$$2x + 3y + 2z = 2$$

$$3x - 3y - 4z = 11$$

69. The sum of three numbers is 2. If we subtract the second number from twice the first number, we get 3. By adding double the second number and the third number we get 0. Represent it algebraically and find the numbers using matrix method.

70. Compute the inverse of the matrix.

$$A = \begin{bmatrix} 3 & -1 & 1 \\ -15 & 6 & -5 \\ 5 & -2 & 5 \end{bmatrix}$$ and verify that $A^{-1} A = I_3$.

71. If the matrix $A = \begin{bmatrix} 1 & 1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix}$ and $B^{-1} = \begin{bmatrix} 1 & 2 & 0 \\ 0 & 3 & -1 \\ 1 & 0 & 2 \end{bmatrix}$, then compute $(AB)^{-1}$.

72. Using matrix method, solve the following system of linear equations :

$$2x - y = 4,\ 2y + z = 5,\ z + 2x = 7.$$

73. Find A^{-1} if $A = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$. Also show that $A^{-1} = \frac{A^2 - 3I}{2}$.

74. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ by using elementary column transformations.

75. Let $A = \begin{bmatrix} 2 & 3 \\ -1 & 2 \end{bmatrix}$ and $f(x) = x^2 - 4x + 7$. Show that $f(A) = 0$. Use this result to find A^5.

76. If $A = \begin{bmatrix} \cos\alpha & -\sin\alpha & 0 \\ \sin\alpha & \cos\alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$, verify that $A \,.\, (adj\ A) = (adj\ A) \,.\, A = |A|\ I_3$.

77. For the matrix $A=\begin{bmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{bmatrix}$, verify that $A^3-6A^2+9A-4I=0$, hence find A^{-1}.

78. Find the matrix X for which

$$\begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix}.X.\begin{bmatrix} -1 & 1 \\ -2 & 1 \end{bmatrix}=\begin{bmatrix} 2 & -1 \\ 0 & 4 \end{bmatrix}$$

79. By using properties of determinants prove the following :

$$\begin{vmatrix} 1+a^2-b^2 & 2ab & -2b \\ 2ab & 1-a^2+b^2 & 2a \\ 2b & -2a & 1-a^2-b^2 \end{vmatrix}=(1+a^2+b^2)^3.$$

80. $$\begin{vmatrix} (y+z)^2 & xy & zx \\ xy & (x+z)^2 & yz \\ xz & yz & (x+y)^2 \end{vmatrix}=2xyz(x+y+z)^3.$$

81. $$\begin{vmatrix} a & a+b & a+b+c \\ 2a & 3a+2b & 4a+3b+2c \\ 3a & 6a+3b & 10a+6b+3c \end{vmatrix}=a^3.$$

82. If x, y, z are different and $\begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix}=0$. Show that $xyz=-1$.

83. If x, y, z are the 10^{th}, 13^{th} and 15^{th} terms of a G.P. find the value of

$$\Delta=\begin{vmatrix} \log x & 10 & 1 \\ \log y & 13 & 1 \\ \log z & 15 & 1 \end{vmatrix}.$$

84. Using the properties of determinants, show that :

$$\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix} = abc\left(1+\frac{1}{a}+\frac{1}{b}+\frac{1}{c}\right) = abc+bc+ca+ab$$

85. Using properties of determinants prove that

$$\begin{vmatrix} -bc & b^2+bc & c^2+bc \\ a^2+ac & -ac & c^2+ac \\ a^2+ab & b^2+ab & -ab \end{vmatrix} = (ab+bc+ca)^3$$

86. If $A = \begin{bmatrix} 3 & 2 & 1 \\ 4 & -1 & 2 \\ 7 & 3 & -3 \end{bmatrix}$, find A^{-1} and hence solve the system of equations

$3x + 4y + 7z = 14$, $2x - y + 3z = 4$, $x + 2y - 3z = 0$.

Session 2020-21

Class- XII

Subject: Physical Education

Video Links

Follow the Instructions given below:-

Here's the Video link to the file:

Visit link: 1 https://youtu.be/tmpATO03hOg

Visit link:2 https://youtu.be/skdDKo5tkUw

Instructions for the class 12 Physical Education students.

1. Download the video from the given link above.

2. Video is related with units 1 and 2.

3. Try to understand the key points given in PDF file.

4. Note down important points and solve the exercise

given in saraswati publication book.

5. Practice the problems given in PDF file.

6. Make a proper record.

Session- 2020-21

Class: XII

Subject: Political Science

Video Link:

Open the link given below:

Visit link: https://youtu.be/MUZ2vWtn_sY

Political Science

Class 12 Politics in India Since Independence
Chapter 2.
Era of One Party Dominance

Open the video 1 and listen to the explanation carefully continue listening to the videos by clicking till the entire chapter is covered

Answer the questions given in your copy.

Answer very short questions (1 mark)

1. When was the Indian constitution adopted, signed and enforced ?
2. When was the first general elections conducted ? Who was the first chief election commissioner?
3. What is Electoral Roll ?
4. Which party came to power in Kerela in 1957 ?
5. When was Bhartiya Jana Sangh party formed and who was its founder?

Answer in brief. (4 marks)

6. Why is the election of 1952 considered as a landmark election
7. Give reasons why Congress dominated first three general elections ?
8. What was the nature of congress dominance ?

What is an opposition party ? What is its role ?

10. How is the nature of congress domination different from one party rule

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