Test

Page No. : VEDHA
Date : / /

Name- Bodke Anjali Kashinath
class - B.Sc.T.y
sem - IV
sub - Botany

Q.1 Explain the factor affecting growth

Factors affecting growth are as following:

1) Food :- The supply of food is directly proportional to the rate of growth and with dipricient food supply to the growing regions, the rate of growth decreases and ultimately stops.

2) Water :- The supply of water also has a direct relationship with the rate of growth because it is nesscary for metabolic activites of protoplasm and for increasing the tenseidity of the cell for cell enlargement.

3) oxygen :- oxygen increases growth because it helps in respiration to convert potential energy into kinetic energy needed for vitle the activity of plant including growth.

4) Temperature :- Temperature also affects growth directly or indirectly. Though growth occurs betn 4°c to 45c optimum activity takesplace at 28°c to 33°c.

5) Light :- Light affects variously ex: light intensity, quality and periodicity.

6) Intensity of light :- In general intensity light retards growth in plants. High light intensities induce dwarfing of plants very week light reduces the rate of overall growth and also photosynthesis.

7) quality of light :- The different colours the different colour affect the growth of life plant. In blue, whitete colour of light internodal growth and leaf or size of lamina becomes green in colour light reduces the explantation of leaves as compaired to complete spectrum of visible life.

The real colour of light favours elongation by the etaolated plants. infraired and ultaviilate are help to plant growth.

Howere the ultaviilate rays are nessecary for the development of pigments in the flowers.

8) Duration of light :- the effect of duration of light on the growth of vegetative and and reproductive structures is remarkeble in plants. The induction and suppression of flowering or dependant of duration of life.

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Biradar Mohini Dhanaji.

Class :→ B.Sc (S.Y)

Sem :→ III

Sub :→ Botany

Assignment - 1

Q.1 What is Root and explain modification of Root ?

→ The non-green underground portion of the plant body composed of roots is called as the root system. The root system is made up of a root and its lateral branches. There are two types of root system such.

1] Tap root system.
2] Tap root system.
3] Adventidition root system.

TAP ROOT SYSTEM : →

The root system in which the primary root is developed from the radical of the embryo is called tap root system.

2] The radicales grows into the primary root or tap root.
3] The lateral branches developed from the primary root are called as secondary roots.
4] The lateral branches developed from secondry root are called tertiary roots.
5] Tap root system is the charcteristic features of most of the dicot plants like Hibical pea.

* ADVENTITIOUS ROOT SYSTEM : →

system in which the roots are developed from any part of the

from any part of the plant other than The radicle is called Adventitious root system.

2] In most of the plants the primary root developed from the radicle is short lived and die soon.

3] The adventitious root are of equal size length and fibre like hence they are also called as fibrous roots.

4] The roots in adventitious root system may developed from the base of the stem and nodes.

5] The fibrous root system is commonly found in monocot plants like grasses maize, sugarcane & wheat.

on the basis of type of Roots, The root modifications for secondary functions are of two types such as

1] Tap root modification
2] Adventitious root modifications.

1] Tap Root Modification : →

There are two types of Tap root modification such as

1] tap root modification for storage
2] tap root modification for respiration

1] Tap root modification for storage

Tap Root.

i) Tap root modification for storage:→ The tap root or The primary root becomes thick and fleshy due to the storage of food materials. These are called root tubers or tuberous roots.

Conical root (Carrot) | Fusiform Root (Radish) | Napiform root (Beet root)

Tap root Modification for Storage

Tap root modification for storage are of three types based on their shapes such as conical root (Carrot), fusiform root

(Radish), Napiform root (Beetroot.)

* Modification of tap root for respiratio

In marshy salty places The soil aeration becomes poor due to water saturation. The plants growing in such marshy and salts places gives rise to certain erect root called the pneumatrophores or respiratory roots.
ex. Rhizophora, Avecennia etc

* ADVENTITOUS ROOT MODIFCATONS:→

Adventitious root modifications are three types such as following.

1] Adventitious root modification for storage:→

In some plants the adventitious root or the fibrous roots absorbs and stores the atmospheric moisture These plants do not have directly contact with the soil.

2] photosynthetic or Assimilatory Roots:→

In some plants the adventitias roots becomes green and carry on photosynthesis these root are called as photosynthesis or assimilatory roots are called as photosynthetic or assimilatory roots they absorb mositure, Co_2, sunlight and bring about the photosynthesis

② What is stem & explain modification of stem?

Stem:→ The negatively geotropic, positively phototropic, ascending and aerial organ of a plant body with nodes and internodes is called as stem.

* PARTS OF A TYPICAL STEM:→

- The stem have well developed nodes and internodes.
- The stem bears leaves, flowers and fruits
- The lateral branches of the stem are exogenous in origin i.e. they arise from the tissue which are in the periphery of the main axis (cortex).
- The buds are nothing but the young shoots, yet to develop.
- In some plants like Bryophyllum the buds are developed abnormally on the leaves called the epiphyllous buds or adventitious buds.

* FUNCTIONS OF STEM:→

The function of stems are of two types

1] PRIMARY FUNCTIONS OF STEM:→

The main functions performed by the stem are called as the primary functions. The primary functions are of two types. such as.

1] To gives support to the branches, leaves flowers and fruits.

2] To conducts water and minerous from the leaves to all the remaining parts of the plant body.

SECONDARY FUNCTIONS OF STEM :→

In addition to normal primary functions the stem performs certain additional functions by showing structural modifications called as the secondary functions. There are three types of structural modifications of stem to perform secondary functions such as

1] Aerial stem modifications
2] sub aerial stem modification
3] underground stem modifications

1] AERIAL STEM MODIFICAITONS: →

The structural changes in the aerial stem to perform secondary functions are called aerial stem modifications there are five types of aerial stem modifications such as

i] Tendrils : →

A stem modification in which the axillary bud

bud or extra axillary bud or apical bud or floral bud forms a thin, wiry and highly sensitive structure is called as the tendrils.

- Tendrils help plant to climb over the
- They are leaf less, coiled, structures with adhesive glands for fixation
- The tendrils formed from the axillary bud are very common, in plants like passiflora.

The tendrils formed from the floral bud are very common in plants like Antigonon.

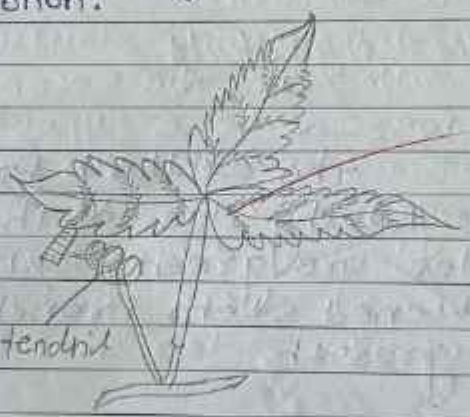

Fig:- Stem tendrils

(ii) **Thorns :→**

Hard, pointed, straight or curved structures developed at the nodal regions of the stem by the modification of axillary bud are called thorns

- Thorns provide protection to the plants.

in xerophytic conditions.

- The stem becomes flat like a leaf and performs photosynthesis as in opuntia

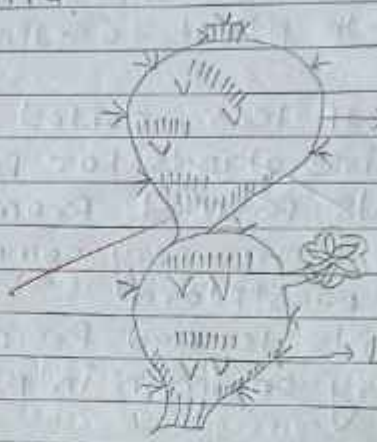

Fig :- phylloclade

iv) cladodeds :→

The axillary buds which becomes fleshy due to the cladodes are green, cylindrical or flattened stem branches of limited growth

Fig :- phylloclade & cladodoes

Q.3 Explain The structure of function of leaf ?

→ **Leaf :→**

The leaves are green, thin flat expinded structure, produce on the stem at the nodes are called as leaf.

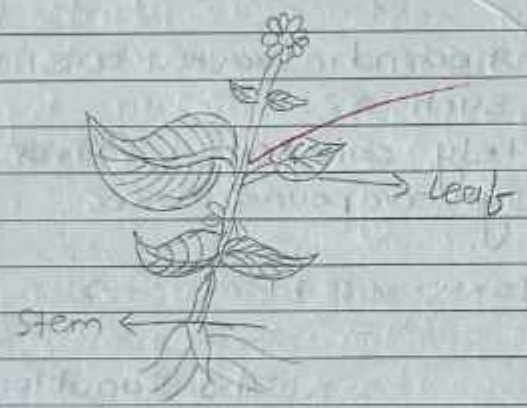

Fig. Structure of leaf

Type of leaf :→

There are two types of leaves such as.

1] simple leaves.
2] compound leaves.

1] **Simple leaf :→**

1] A leaf with entrie leaf lamina or with, highly incised leaf lamina, is called simple leaf.
2] The simple leaves are common in many plants leaves are like mango.

2] compound leaf :→ A leaf in which the lamina is highly incised and divide into a number of leaflets is called compound leaf

- the leaflets are borne on a common axis and they do not bear any axillary buds in their axills
- The leaflets are also called as pinnae
- The compound leaves are of two types such as.

1] pinnately compound leaves.
2] palmately compound leaves.

* FUNCTIONS OF LEAF :→

The functions of leaf are of types such as.

1] primary functions of leaf
2] secondary functions of leaf.

1] primary functions of leaf :→ The main functions performed by the leaf are called as the primary function

- The primary functions are of two types such as.

1] photosynthesis :→

The process in which the leaves with green pigments synthsis their food by making use of sunlight.

* Secondary functions of leaf :→

In addition to the normal primary functions, the leaves perform certain additional functions by showing structural modifications. called as secondary functions.

- There are eight types of strutual modification of leaves to perform secondary functions as.

1] leaf tendrils.
2] leaf hooks.
3] leaf spines.
4] phyllode.
5] scale leaves.
6] Reproductive leaves
7] Trap leaves.
8] leaf bladder.

1] leaf tendrils :→

1] Tendrils is a slender thin sensitive wing, leafless and called structure
2] It helps plants to climb over the object
3] In Lathyras the entire leaf is modified into tendril
4] In pisum terminal leaflets are modified into tendril.
- In Gloriosa leaf apex is modified intotendril

* SUB AERIAL STEM MODIFICATION:→

- The structural change in the stem to grow in the sub aerial conditions and to perform secondary functions are called the sub aerial stem modification.
- This type of modification is found in many herbaceous plants with a thin deviate and weak stem.
- They propagate quickly by vegatative
- The sub aerial stem modifications are of four types such as.

1] Runnear:→ 1] stem with long and thin internodes creping over the surface of the soil, is called the runnear, grasses, oxalis, Mercurial.

2] Sucker:→ 1] It is a modification runner.

2] In this type the runner originates as a lateral branch from the under ground axillary bud of an aerial shoot

3] Stolon:→ 1] A slender, horizontal runner which gives rise to new plant at it's tip on below the soild surface as in colocasia is called stolom.

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Date 2018-19

Name :- Sayyad sahil Anjum
class :- B.Sc. First year
Sub :- Botany
Paper :- II cell & molecular Biology.
Roll No :- 125.

1) Explain the ultra structure of Eukaryotic cell?

The eukaryotic cell (True-Good Acryotic nucleated) are much larger than prokaryotic cell these are two envelope system these are the true cells which occurs in the plants for algae to angiosperm in plant from protozoa to mammals these cell have different shape, size side phycology All the cell are composed of plasma membrane cytoplasm and is organells.

There are three type of eukaryotic cells viz plant cell, animal cell and fungal cell is similar except some difference is bet^n them.

1) Plant cell structure :—

an Eukaryotic animal cell consist of the following components viz plasma membrane cytoplasma nucleous.

cell wall :- It is the outermost layer of plant cell is did and rigid It's Some layer plant cell is dead and rigid. It is composed of carbohydrates such is cellulose pectin hemicellulose and lignin and certain fatty substances like waxes.

ultrastructurally :- It consist of micro fibrillar network in matrix made up of cell lose pectin rich amorphous substance lies in bet^n the walls of adjusting cell called a middle lamella . It is formed immediately after the divitional cell.

cytoplasm :- The plasma membrane is followed by the cytoplasm it distinguished in following structures.

plasma membrane is followed by the cell organic fluid called as matrix or cyto. this cytosol serves to suspent the great verity of small molecules viz glucose amino acid nucleotides, vitamins, minerals, oxygen and ions are concerned with cellular metabolism Cytosol are concerned with cellular metabolism . cytosol contains the containg fibers which maintain cell shape and mobility and provide anchoring points the Cytoplasmic there are three type of cytes cytolone

★ cytoplasmic organells :-

following are the cytoplasmic organells embedded in the cytoplasm

1) Golgi apparatus :-

It was first described by camillo Golgi in 1898 It is a cup shaped cytoplasmic organells located near the nucleous it consist of cell of smoth cisternae in parallel rows . It is surrounded by spherical membrane bound.

II) Endoplasmic reticulum :- It was first introduce dues by porter in 1953 the cytoplasm of most animal cell has an extensive membrane limited network called as endoplasmic reticulum

III) cytoplasmic vacuoles :- The cytoplasm contain numerous small and large size hollow fluid filled structure called as vacoles originated from endoplasmic reticulum & Golgi app. arand. It is lined by liaprotein membran it peeforms of the function of storge transmission an the maintance of internal pressure of the cell

IV) lysosomes :- The name lysosome was given by Duve in 1955 the cytoplasm of anional cell contain many tiny spheroid or irregulary shaped membrane bound vesicles known as lysosomes

V) peroxisomes :- there are tiny circular membrane bound organells containing crystal core of enzyme such as urate oxidase peroxidase : D-amino oxidase and Catalase Found in lives & kiddey cell.

VI mitochondria :- the oxygen consummion cellular organells are bounded by two units membrane the outer mitochondrial membrane resembles with the plasma membrane structure and chemical composition inner mitochondrial membrain contains proton pumps

VII) Ribosomes :- These are tiny spheroidal dense particles of 150-200 Å. Contain equal amount of protein and RNA. They may exist either in free state in the cytosol or attached to rough Endoplasmic reticulum.

VIII) microtubules :- microtubules are found in the cytoplasm of all types of eukaryotic cells except human erythrocyte. These are long.

1) cilia & flagella :-
cilia and flagella are thin like protoplasmic that project from the surface of a variety of eukaryotic cell. bacteria also passes structures referred as flagella.

2) Basal Bodies and centrioles :-
Basal bodies and centrioles are similar in structure and function acting nucleating centres microtubules grow centrioles are cylinder that measure 0.2 μm x 0.5 μm apess of both /each

Nucleus :- The nucleus is centrally located & spherical circular component which controls all vital activities of the cytoplasm

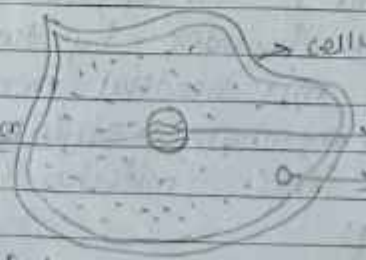
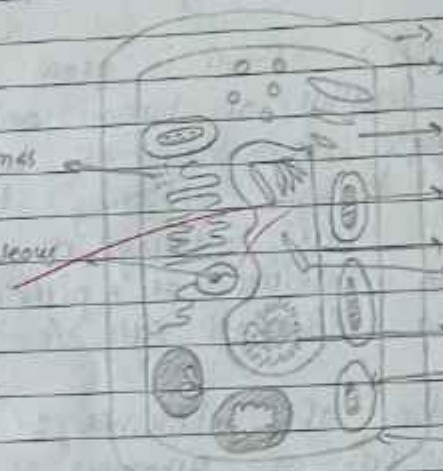


fig. Eukaryotic cell

1) Nucleoid: It is conspicuous darkly stained circular sub organelle It lacks any limiting membrane and the formed during interphase by DNA of nucleobas organizes



diagramic

2) Describe in details structure prokaryotic cell

→ The procaryotic cell are small simple microscopic and most primitive. The size of prokaryotic cell ranges from 1 to 10 μm. The prokaryotic cell come into existance i.e giant perhaps 3.5 billion years ago i.e stromatolites i.e giabnt cushions of extinct cyanobacteria or blue green algae or. Vicies prokaryotic cell are most primitive type of cell Austrelia From the morphological point of view In prokaryotic cell the nucleair material is not lined by nucleas membrane called as incipient nucleous or nucleoid. It contain a singal circulas chromosome Formed of a double Standeed DNA. In all prokaryotic cell the plasma membrane is surrounded by a cell wall the cell wall is comosed of animal sugars &

muramic acid but rarely cellulose these are internally filled with cytoplasma without cell or viz mitochondria, lysosomes golgi body, reticulum, plasmid etc. The prokaryotic cell contain ribosomes

1) Escherichia coli :- E.coli is gram negative monotrich -ous symbiotic bacillus of human and other vertebrate It is heterotropic some strain of E.coli recognize & bind fically to sugar containing target cellson the surface of gut lintiang of mamals e.g. mannose residues or epithelial cell of human gut or Colon Ane coli cells is but 2 µm

* Function of Ribosomes :-
Following are fu- of Ribosomes
1) Ribosomes synthesis of RNA. during translation the small cytoplasmic ribosomal subunit firstly binds to m-RNA stands & them to larger ribosomal subnit below it.
3) larger Ribosomal subnit allows t-RNA stands to bind to the m-RNA codon
4) The metallic ions of Ribosomes like Mg^{++} Ca^{++}, $Iron^{++}$ plays an active roll in translation
5) Ribosomes directly involved in the synthesis of proteins

2) cynobacteria or blue Green Algae :-
Ag like E.coli it is also gram negative bacteria it is also called as oxyphoto bacteria i.e oxygen yielding photosynthetic blue green algae It is one of the most primitive

and successful group of organisms on the earth these are 3.5 billion years old they from another group of prokaryotic organisms includes 1500 species of 85 genera & 75 species are found in India.

3)→ Describe ~~structure~~ of function of Ribosomes

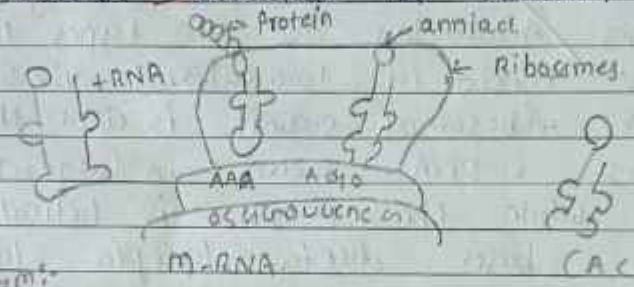


diagram:-

1) The ribosomes are oblet spheroid structure of 150-250 A° in diameter each ribosome is porously dented and composed of two subnits one Ribosome of Ribosome is large is size and large two types of Ribosomes i.e. 70S & 80S

2) the 70S Ribosomes :- The Ribosomes occurs in size than 80S type have sedimentation coefficient 70S with molecular weight 2.7×10^6 subnits viz 50S & 30S the 50S ribosomal subnits in larger in size has the size of 160° A to 180° A°. The 70S Ribosomes contain more RNA (40 - 60 %) and protein (36 - 37 %) It consist of three types of t-RNA, viz 23S r-RNA, 16S RNA, 5S t-RNA.

2) The 80^S Ribosomes :-

The Ribosomes have the secimentation coefficient of 80^S & molecuteas weight to $90^0 \times 10^6$ datons these Ribosomes occue in eukaeyotic cell of plant & animal the Ribosomes of mitochondeia & oblorphlast ase always smallas than 80^S ribosomes e.g 77^S ribosomes in mitochondeia of fungi 60^S, 77^S ribosomes chloeoplast ase 70^S types the 80^S ribosome consist of two subanits viz 60^S & 40^S the 60^S ribosomal subnit is done the 28s, 5s S 8S E-RNA occues in laege60ribosomal subnit while the E-RNA is helical & contain paieed bases due to haiepin loops · 1.6×10^6 datons the 18S- E-RNA hey 2100 nulleo otides & molecuiae weight is 0.6×10^6 dattons. & 28s RNA

3) SSs Ribosomes :- SSs ribosomes occue in mitochondeia of eukaeyotic cells. It consist of 35s laeges subnits & 25s smallas Ribosomal subunit. The SSs ribosomes lact 5s RNA occue in laeges subunit i.e. in 3ss subunit & 12s E-RNA occue in smallee subunit.

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Name :- Kamble Apeksha Babruwan

Class :- B.Sc. T.Y.

Subject :- chemistry

(physical + Inorganic chemistry)

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Q.1) State and explain Henry Law.

→ This distribution law is given by chemist Henry so called as Henry Law.

"The law states that at constant temperature the solubility of gas in liquid is directly proportional to the pressure of gas above it".

We can expressed as, $C = k \times p$

Where C is solubility of gas
k is Henry's constant
p is pressure of gas

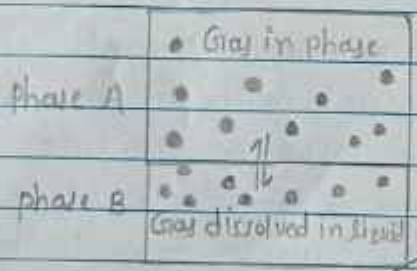

Fig - Illustration of Henry law.

Explanation :-

In a vessel containing liquid and gas in shaken at equilibra the gas can be regarded as distribution between the liquid phase B and gas phase A.

Let we can consider,

C_1 is Concentration of phase A
C_2 is Concentration of phase B

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Applying distribution law

$$\frac{c_1}{c_3} = K_D$$

K_D is distribution coefficient.

According to Henry law

Molar concentration of gas is proportional to its pressure P.

Hence,

$$\frac{C}{P} = K$$

$$C = K \times P$$

This is Henry's law equation.

Like distribution law, Henry's law applied for dilute solutions of gases which do not react with solvent. If a mixture of gases is in constant individual with liquid, only partial pressure not total pressure determines the mass of each gas dissolving in liquid. so we get the solubility of gas proportional to its partial pressure.

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Q.2) State Nernst's distribution law.

→ Nernst studied the distribution of solute between different appropriate pairs of solvents. He gave a generalization which governs the distribution of solute between non-miscible solvents.

Nernst distribution law: "If solute X having the same molecular condition distributes itself between two immiscible solvents A and B in such a way that the ratio of the concentration in the two solvents is a constant at a constant temperature in both solvents, independent of any other molecular species present."

$$\frac{[X]_A}{[X]_B} = K_D \quad \text{therefore,} \quad \frac{C_1}{C_2} = K_D$$

where,

C_1 is Concentration of X in solvent A

C_2 is Concentration of X in solvent B

K_D is distribution Coefficient or ratio of distribution.

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9.3) Describe Extraction with a solvent.

→ 1) The extraction of an organic substance from aqueous solution is imp application of distribution law.

2) The process is carried by shaking the aqueous solution with a immiscible organic solvent (ether in a separate funnel).

3) Most of the organic substance passing into ether layer.

4) on standing, the aqueous and ether layer seperate in funnel. The lower layer is run out leaving the ether layer behind.

5) this is then transferred to a distillation flask. Ether is distilled over while the organic substance is left as residue in the flask.

6) This process do repeated with aqueous layer left after the first extraction with fresh quantity of the solvent.

7) The greater ratio of distribution is in favor of the organic solvents, the greater will be the amount extracted in any one operation.

8) other solvent we can be used for extraction are hexane, benzene, acetone, chloroform, carbon disulphide, etc.

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Q.4) Give Applications of distribution law.

→ Distribution law has most application in laboratory & industry.

1) Solvent extraction: It is used for the separation of organic & aqueous solution.
2) Liquid - liquid chromatography (partition): This technique used for the separation of organic material.
3) In de-silverization of lead (parke's process)
4) Confirmatory test for liberation of Br & I.
5) Determination of polymerization (association) & as well as ionization (dissociation) in solvent.
6) Determination of solubility in different solvents.
7) Deducing the formula of a complex ion.
8) Distribution indicators.

Solute dissolve in mixture of water and

Q.5) Give Different types of organometalic Compounds.

→ Ionic organometalic compounds:-

Such compounds are formed when the negative charge on the hydrocarbon anion is delocalised over carbon atoms in the aromatic or unsaturated ring. $K^+ C_5H_5^-$, is a common example of this type where delocalization

Sign:

of negative charge is over all five carbon atoms of cyclopentadinyl anion give rise to stable complex. Some other ex- $Na^+ C_4Hg^-$, phenyl Sodium $Na^+ C_6H_5^-$.

II) Covalent organometalic compounds :-

Covalent organometalic compounds are formed by less electropositive metals. The bonding between metal and carbon of hydrocarbon may be single, double or triple. metal - carbon single bond EX- $(CH_3)_4Si$, Metal - carbon double bond EX- $(CO)_5W=C(CH_3)_2$. these Covalent organometalic compounds are soluble in organic solvents and insoluble in water.

III) Electron debficient organometalic Compounds :-

Compounds of Li, Be, Mg and Al with bridging alkyl groups are appear in this category. For ex- Dimeric trialkyl aluminium (Al_2Me_6), polymeric dimethyl beryllium $(BeMe_2)_n$, diethyl magnesium $(MgEt_2)_n$, etc. These Compounds posses high charge to mass ratio and thus have strongly polarising cation which results in polar covalent bonds.

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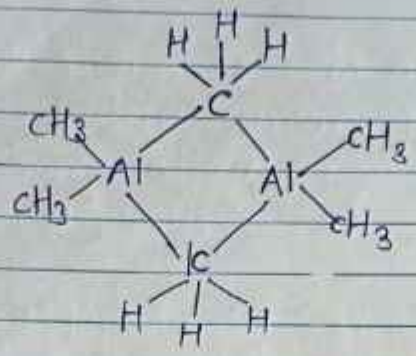
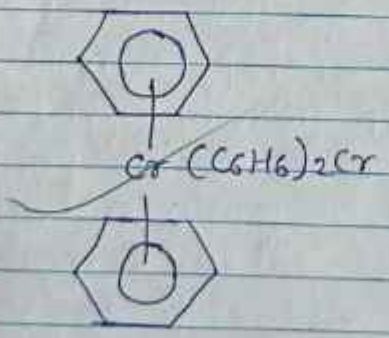


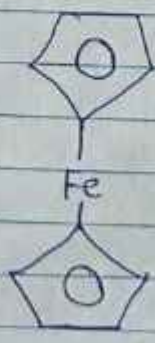
structure of dimeric Al_2Me_6

III) Transition metal organometalic compound:-

In these type of organometalic compounds, the transition metal forms bonds with more than one carbon atom of the same organic compound. The interaction occurs between p-orbitals of the organic ligands with the d or p-orbitals of metal atoms. The ligands which forms organo metalic compounds with transition metals are butadiene cyclopentadiene, benzene etc.



or $(C_6H_6)_2Cr$



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Expt. No.....

2018-19

Name : Pawade poonam Shahuraj

Subject : physical chemistry

Std : B.Sc. fy

Semester : II

Shivneri Mahavidhyalaya Shirur Anantpal.

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Teacher's Signature.....

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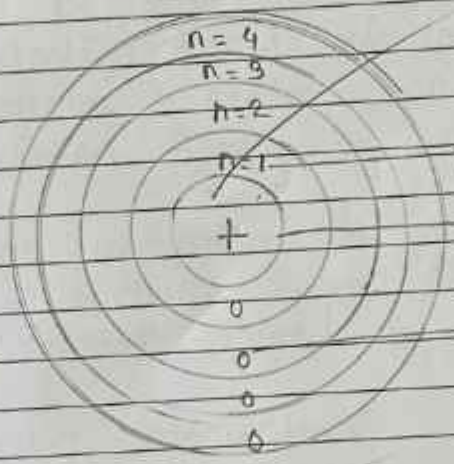
Q1. Explain in detail Bohr's atomic model.

→ The Bohr's Theory based on the poling contum theory and it explain the new model of atom which over come the drawback Ruther ford atomic theory he gave sum pasulat to explain.

- Atomic structure



1. Electron travels around the nucleus in specific parmatered and is known other in each orthi different energy and at dist hance from the nucleus the orbits or the latter disbats n is each number nit 3. 4 or K L M N as the distance from nucleus increases.

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2. While in this specific orbit and electron does not radiance or lose energy.
∴ In each of these orbit the energy of electron radiance of since that is nigther bases or gen energy Hence the specific orbit orble is electron on atom are refer to as stanery or simple energy lives.

3. An electron can move from on energy live to another by atom or fatom gumps only
∴ When electron reside of loss it energy that is ground state one gump in the highee exteeed stage by appobeing energy

4. The angular momentum of an electron orbiting arrounding nucleus is an it teegal multiple plans constan divided by 2π that is

Angular momentum

$$m\,ve = \frac{nh}{2\pi}$$

•

1. It fails to explain the atomic specteum of elements conting more than one electeons

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2. The indivial lines in hydrogen spectrum is hyper file spectrum could not explain by Bohr's theory.

3. It fail to explain the specting of atomic sumtm line (orbital spectal) in presons of magnetic file (Zeemal effect) and exteman electric file (Stak effect)

orbit	orbital
S	
P	
d	
f	

Q.2 Derive an expression for velocity & energy of an electron.

velocity of an electron

The radius of bohrs orbit $r = \frac{n^2h^2}{4\pi^2 mze^2}$

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But according to the Bohr's theory $mvr = \frac{nh^2}{2\pi}$

$$v = \frac{nh}{2\pi mr}$$

Value of r in the above the equation $v = \frac{nh}{2\pi m}$

$$2\pi M = \frac{n^2 h^2}{4\pi M z e^2}$$

$$v = \frac{ne^2}{n} \times \frac{2}{\pi}$$

After sub the value of all constant we get velocity of electron.

$$v = 2.16 \times 10^6 \times \frac{z}{m} \text{ m/sec}$$

Energy of an electron

The bohr's theory invable to deive an expression energy.

nth orbital

The expression deive for hydrogen for is given below

$$En = \left[\frac{2\pi^2 Mz^2 e^4}{n^2 h^2} \right]$$

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Where,

E N = energy of electron in n^{th} orbit

e z = atomic number

h = plans constant

m = mass of electron [9.10×10^{-2} g]

e = charge of electron [4.80294×10^{1} esu]

h = [6.6256×10^{-7} esu]

- For hydrogen energy of an electron

$$En = \left(\frac{2.178 \times 10^{-11}}{n^2} \right)$$

The value of energy of an electron in electron volt is

$$En = \frac{13.598}{n^2} \text{ evatom}^{-1}$$

According to the electron in the ground state i.e and in excated state n and n_2 given as.

$$En = \frac{2\pi^2 me^4}{n^2 h^2}$$

$$En_2 = \frac{2\pi^2 me^4}{(n_2)^2 h^2}$$

$$\Delta E - En_2 - En_1 = \frac{2\pi^2 me^4}{n^2} \left(\frac{1}{n^2} - \frac{1}{n^2} \right) \quad \text{①}$$

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But according to the plant constum theory

$$\Delta E = h\nu = \frac{hc}{\lambda} \quad \text{——} \quad (2)$$

c is velocity of light

from equation —— (1) & (2)

$$\frac{hc}{\lambda} = \frac{2\pi^2 e^4 m}{h^2}\left(\frac{1}{n^2} - \frac{1}{n_2^2}\right)$$

$$\frac{1}{\lambda} = \frac{2\pi^2 e^4 m}{h^3 c}\left(\frac{1}{n^2} - \frac{1}{n_2^2}\right)$$

OR

$$\frac{1}{\lambda} = R\left(\frac{1}{n^2} - \frac{1}{n_2^2}\right)$$

Volume of atee can be calculated, c, M, h, NC.

Q.3 Explain in detal the intermolecular forcess present in liquid state.

Intermolecular force of interaction in liquid state.

1. Dipole - dipole interaction :

A polar attraction like HCl gas a poetide ⊕ve & ⊖ vecharege at the end, Hence to ⊕ eand attract ⊖ end of dipo & here fore the attractive forcess from the liquid due to the two different process is known as dipole-dipole interaction.

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H-Cl ⟶ $H^{\delta+}-Cl^{\delta-}$ ⇌ $H^{\oplus}-Cl^{\ominus}$

$Cl^{\delta-}-H^{\delta+}$ ⇌ $Cl^{\ominus}\ H^{\oplus}$

2. London-london force of attraction:

The weak forcess between non-polar molecule or atom in which the electronic force of attraction present between the nucleus of one atom with the electon of the atom with the electon of the other atom this is called as indued dipole & Hyper interaction is temporary. It is very weak type of forcess of attraction.

Q.4 Define the following term & give it's unit

1. Surface Tension:

The surface in dypes acting along the surface of liquid at right angle to any line 1 cm in length.

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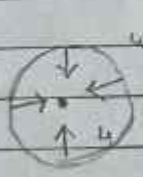
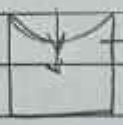
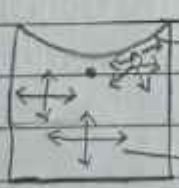
It is force in type in dyne acting along the surface of liquid at right angle to any one centimeter (1 cm) in length is known as surface tension.

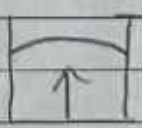
It is physical property of liquid which arises due to the intermolecular forceses of attraction between the liquid molecules the molecules which is a present (Bulk) is inner most part of the liquid (Bulk) is attracted equally in all direction by molecule which is at the forceses around it that is saturated of the forceses take place, But the molecule which is at the surface is not a molecule in all direction there is a not a molecule which is a only down ward force acting in it hence surface molecule is pulled is invaled direction thus there is a thenry of each molecule.

Hence, The some of water drops spherical in shap to minimies surface area.









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In the capillar tube or any vasel the some liquid concove save due to the presente of sueface tension.

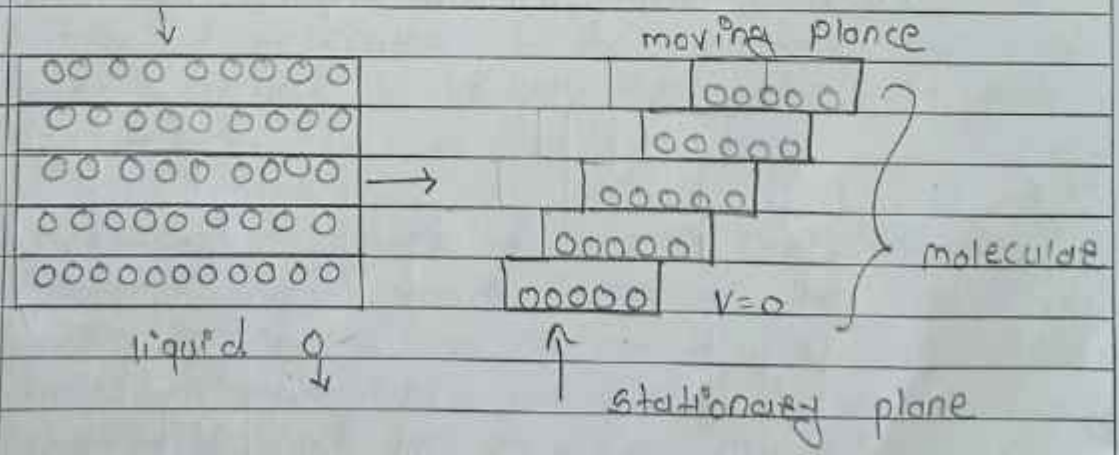
- Unit of sueface tension:

The sueface tension is denoted by (τ) In CGS system the unit of sueface tension dyne per cm^{-1}) in ST system the unit of sueface tension is Newton peemetes (NM^{-1})

2. Viscosity:

"Viscosity of liquid is a measure of it's fricti'onal registance".

A liquid may considered to be a molecular layer nerranged one ovee othee when shearing force is applied to a liquid it flows Howevee the forces of feiction between the layee afae registance to this.



The molecular layer in contant with stationary surface has a velocity & the successive layer about it move with increasing higher velocities in the direction of the flow

- Units of Viscosity :

Viscosity is denoted by later heta
In CGS system it's unit is gm cm^{-1} poise.

10^{-2} - Centipoise
10^{-3} - Milipoise

SI unit of viscosity is $kg\ m^{-1}\ s^{-1}$
1 poise = 1 gm cm^{-1}

3. Promotes :

1. change of lattice spacing - the lattice specing of the catalysis is changed thus enchanchive the spaces between the catalyst particles, the absorbed molecules of the reactant are further weakned & broken this make the reaction go faster.

2. Increases in number of peak & Cracakes the presence the promotes increases the number of pealks & cracks the concentration of the reactant molecules and hence the reate is a commo characteritics of heterogenous catalysis

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What is the effect of temperature on surface tension and explain the detail-as notion of surface tension by drop number method.

Effect of temperature on surface tension

Generally temperature increases than the surface tension also decreases that is $\gamma \propto \frac{1}{T}$ Because when temperature increases then kinetic energy of liquid molecules is also increases.

∴ Intermolecular forces of attraction on is decreased and hence inward foling force decreases surface tension decreases.

$$\therefore \gamma \left(\frac{M}{S}\right)^{\frac{2}{3}} = K\left(T_c - T - 6\right)$$

This equation shows the relationship between temperature & surface tension.

Where K = is constant that is temperature coefficient.

T_c = critical temperature

T = Any other temperature

$\left(\frac{M}{S}\right)^{\frac{2}{3}}$ represent molar surface energy of liquid

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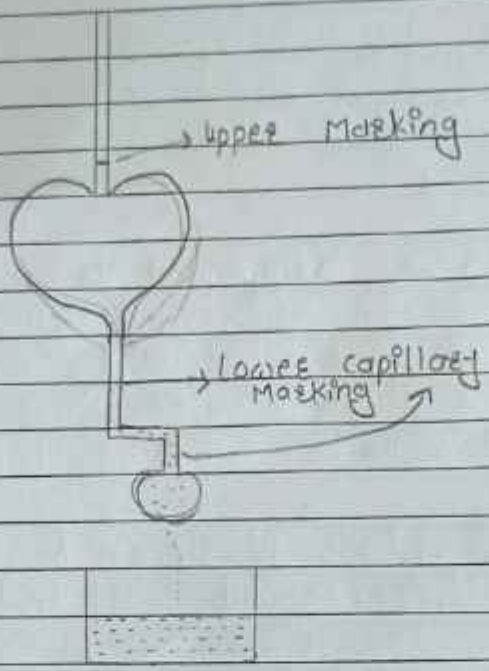

Fig: Stalagometer.

The surface tension of any liquid can be measure with the help to stalagament which consist of long loss tube having capillary add the end of stalagometer it also have upper & lower making with the help of stalagmometer the surface tension of liquid can be measure by two methods.

- Drop Number method:
  By counting the number drops of two different liquid at the same in termal at same volume.

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शैक्षणिक वर्ष - 2018-19

Date..... Page No.....1.....

प्रश्न. हर्बर्ट स्पेन्सरचा उत्क्रांतीवादाचा सिद्धांत स्पष्ट करा?

⇒ प्रस्तावना :-

ऑगस्त कॉम्टच्या नंतर महत्वाचा मानला जाणारा विचारवंत म्हणून हर्बर्ट स्पेन्सर यांचे नाव घेतले जाते. ब्रिटिश विचारवंत हर्बर्ट स्पेन्सर यांनी मांडलेल्या जैविक सेंद्रिय सिद्धांतामुळे जगभर प्रसिद्धी मिळाली. त्याप्रमाणे हर्बर्ट स्पेन्सर हा ऑगस्त कॉम्त यांनी मांडलेल्या उत्क्रांतीवादी विचाराचा पुरस्कर्ता मानला जातो. परंतु याबाबत विचारवंतांचे मतभेद दिसून येते.

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* जीवनपरिचय :-

हर्बर्ट स्पेन्सर यांचा जन्म 27 एप्रिल 1820 मध्ये इंग्लंडमधील डर्बी या शहरात झाला. त्यांच्या वडिलांचे नाव विल्यम जॉर्ज स्पेन्सर होते. हर्बर्ट स्पेन्सर यांचे कुटुंब प्रोटेस्टंट पंथीय होते. म्हणून त्यांच्यावर धार्मिक विचारांचा प्रभाव होता. हर्बर्ट स्पेन्सर यांनी अभियांत्रिकीची पदवी संपादन केली व या पदवीच्या आधारे 1837 मध्ये रेल्वेमध्ये इंजिनीअरची नोकरी केली. परंतु काही कारणास्तव त्यांना ती नोकरी सोडल्यानंतर कालांतराने त्यांनी द्य या वृत्तपत्रात वृत्तउपसंपादकाची नोकरी पत्करली. या काळामध्ये त्यांनी विविध ग्रंथांचे वाचन केले. त्याचप्रमाणे या काळामध्ये विविध ग्रंथांचे लेखन केले. त्यातील ग्रंथ पुढीलप्रमाणे :-

ग्रंथसंपदा :-

① 1864 - 1867 · जीवशास्त्रीय मूलतत्वे
· Principles of Biology

② 1870 - 1890 - peinciples of Ethic नीतिशास्त्र मूलतत्त्व
peinciples of sociology स. मूलतत्त्व
③ 1835 - study of sociology समाजशास्त्राची
④ 1884 - मनुष्याविरुद्ध ग्रन्थ

याशिवाय आमनिक स्थितीशास्त्र, मानसशास्त्राची मूलतत्त्वे अशा विविध लेखन त्यांनी केले. अशा या विचारवंताचे निधन ८ डिसेंबर 1903 मध्ये.

हर्बर्ट स्पेन्सरवरील प्रभाव :-

ऑगस्ट कॉम्टे यांच्यानंतर हर्बर्ट स्पेन्सर हा महत्त्वाचा विचारवंत मानला जातो. त्यांनी मांडलेल्या एकंदरित विचारावर विविध व्यक्तीचा आणि विचारवंताचा प्रभाव आढळून येतो. हर्बर्ट स्पेन्सर ने मांडलेल्या व्यक्तीवादी विचारसरणीवर त्यांच्या कुटुंबातील व्यक्ती प्रभाव असलेला दिसून येतो.

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① हर्बर्ट स्पेन्सरचा उत्क्रांतीचा सिद्धांत :-

पार्श्वभूमी :-

हर्बर्ट स्पेन्सर यांनी मांडलेल्या या सिद्धांतावर प्रामुख्याने ऑगस्ट कॉम्ट आणि डार्विनच्या विचाराचा प्रभाव आढळून येतो. या विचारातून हा सिद्धांत मांडला आहे.

हर्बर्ट स्पेन्सर यांच्यामते जे विश्व निर्माण झालेले आहे. या विश्व निर्मिती मागे एक विशिष्ट अशा प्रकारची शक्ती आली आहे.

* स्पेन्सरचा उत्क्रांतीवाद :-

हर्बर्ट स्पेन्सर यांनी उत्क्रांतीवादाची कल्पना नव्याने व वेगळ्या स्वरूपात मांडली. यामुळे हर्बर्ट स्पेन्सरला उत्क्रांतीवादाचे जनक असे म्हणतात. त्यांच्यामते उत्क्रांतीतूनच सामाजिक परिवर्तन होत असते.

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हर्बर्ट स्पेन्सरच्या उत्क्रांतीवादी सिद्धांताचे स्वरूप शास्त्रीय मुद्द्याच्या आधारे स्पष्ट करता येतील.

1. शक्ती ही निरंतर टिकणारी आहे.
2. पदार्थ हा अविनाशी असतो.
3. प्रत्येक पदार्थ कमीत कमी विरोध होईल तिकडे किंवा जास्तीत जास्त ओढ आहे तिकडे गतिमान होतो.

वरिल तीन घटकाप्रमाणे हर्बर्ट स्पेन्सर यांनी शास्त्रीय मुद्द्याच्या आधारे उत्क्रांतीवादी दृष्टीकोन मांडला आहे. हे तीन पुढीलप्रमाणे

~~1. भौतिक विश्वाचे स्वरूप~~
2. शक्तीचे स्वरूप
3. पदार्थाचे स्वरूप

या तीन घटकाचे विवेचन हर्बर्ट स्पेन्सर यांनी पुढीलप्रमाणे केले आहे.

① भौतिक स्वरूपाचे स्वरुपः—
हर्बर्ट स्पेन्सर
यांच्यामते शक्ती आणि पदार्थ या दोन घटकां
मुळे जगाची निर्मिती झाली. परंतु या
दोन घटकांपैकी कोणता घटक अगोदर
निर्माण झाला आहे, हे सांगता येणे
नसले तरीही हे दोन्ही घटक परस्परावर
अवलंबून असलेले दिसून येते.

② शक्तीचे स्वरुप :—
शक्तीचे स्वरू
हे पदार्थाच्या स्वरूपाप्रमाणेच असते. शक्ती
आणि पदार्थ या दोन घटकांपैकी कोणता
घटक अगोदर निर्माण झालेला आहे हे
सांगता येणे अशक्य आहे. शक्ती आणि
पदार्थ यांपैकी कोणता घटक अगोदर निर्माण
झाला आहे हे सांगता येत नसले तरीही
हे दोन्ही घटक परस्परावर अवलंबून
असलेले दिसून येतात.

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③ पदार्थाचे स्वरूप :-

पदार्थाचे स्वरूप हे शक्तीप्रमाणेच असते म्हणूनच पदार्थ हा स्थिर असू शकत नाही. म्हणूनच तो गतिमान नसतो किंवा पदार्थ हा नष्ट होत नाही. -हास होत नाही पदार्थ हा वेगवेगळ्या स्वरूपात निरंतर असलेला दिसून येतो.

या तीन मुद्द्याच्या आधारे हर्बर्ट स्पेन्सर यांनी उत्क्रांतीवादी सिद्धांत मांडला आहे. हा सिद्धांत मांडण्यासगोदर त्यांनी उत्क्रांती म्हणजे काय त्याची व्याख्या केली आहे.

उदा सुरुवातीला हे जग आकार विरहित मातीच्या ढिगाप्रमाणे होते. त्यात शक्ती होती. या शक्तीतून त्या पदार्थाला गती प्राप्त झाली.

स्पेन्सर यांना हा सिद्धांत दोन स्वरूपामध्ये मांडला.

① जीववादी स्वरूप
② आध्यात्मिक स्वरूप

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* मूल्यमापन टिका :-

① या सिद्धांतावर अशी टिका करण्यात येते कि हर्बर्ट स्पेन्सरने विकास किंवा प्रगती यांचा संबंध उत्क्रांतीशी जोडला आहे.

② हर्बर्ट स्पेन्सर यांच्या सिद्धांतून हे स्पष्ट होते कि उत्क्रांती ही एक सार्वत्रिक प्रक्रिया आहे. परंतु वास्तवता तशी नाही. कारण जगातील सर्व समाजांचा कलही एकाच पातळीवर आलेली दिसून येते.

③ हर्बर्ट स्पेन्सर यांच्या सिद्धांतावर बर्नेस यांनी अशी टिका केली की हर्बर्ट स्पेन्सर यांनी मांडलेला सिद्धांतात अनेक त्रुटी आहेत.

④ हर्बर्ट स्पेन्सरच्या सिद्धांतावर गिडिंग्स यांनी अशी टिका केली. कि हर्बर्ट स्पेन्सर यांचा हा सिद्धांत वास्तव कमी आहे. आणि दिशाभूल करणारा अधिक आहे.

⑤ या सिद्धांतावर अशी ही टिका करण्यात आली आहे कि हा सिद्धांत वास्तव कमी आणि मनोरंजक अधिक आहे.