Q. No. 2 Part (i) **Carbon Cycle: Introduction:-** Carbon cycle is the geochemical cycle in which 'carbon' is recycle between living organisms and environment.

Major Steps:-

⇒ Carbon from environment is taken by plants.

⇒ The food containing carbon i.e glucose is taken by animals. Some of carbon is released with animals' waste.

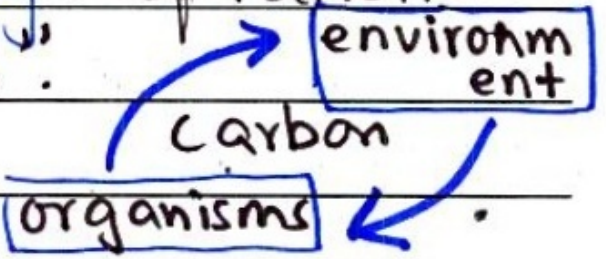
⇒ After these animals die, carbon becomes part of environment's

⇒ CO_2 also gets absorb into water in form of weak acids, it is used by aquatic plants and animals.

⇒ Carbon is released in form of CO_2 during respiration.

⇒ It is also added by "burning of fossils".

⇒ After death of aquatic life, carbon again becomes part of environment.



Q. No. 2 Part (ii)

External Fertilization	Internal Fertilization
Def: It takes place outside of the female body.	**Def:** It takes place inside of female body.
Number of gametes: Large number of gametes	**Number of gametes** Small number of gametes.
Risk: There is large risk of loss of gametes.	There is no risk of loss of gametes.
Environmental Changes ~~do~~ have ~~a~~ffect.	Environmental changes do not affect.
Occurrence: Occurs mostly in fishes, amphibians etc.	**Occurrence:** Occurs mostly in mammals etc.
→ No protection to gametes.	→ There is protection to gametes.

Q. No. 2 Part (iii)

Insect pollinated flowers: Definition: The flowers which are dependent on insects for pollination.

Characteristics of Insect Pollinated flowers:

Insect pollinated flowers have following traits.

⇒ **Production of nector:** These produce sweat fluid called **Nector**.

⇒ **Highly-coloured petals:** These have beautiful coloured petals to attract honey bees etc.

⇒ The ~~anthers~~ stigma are sticky so that pollen grains can get attached ~~to~~ from body of insects to stigma.

⇒ **Flowers are faced upwards:-** so insects can easily land on flowers.

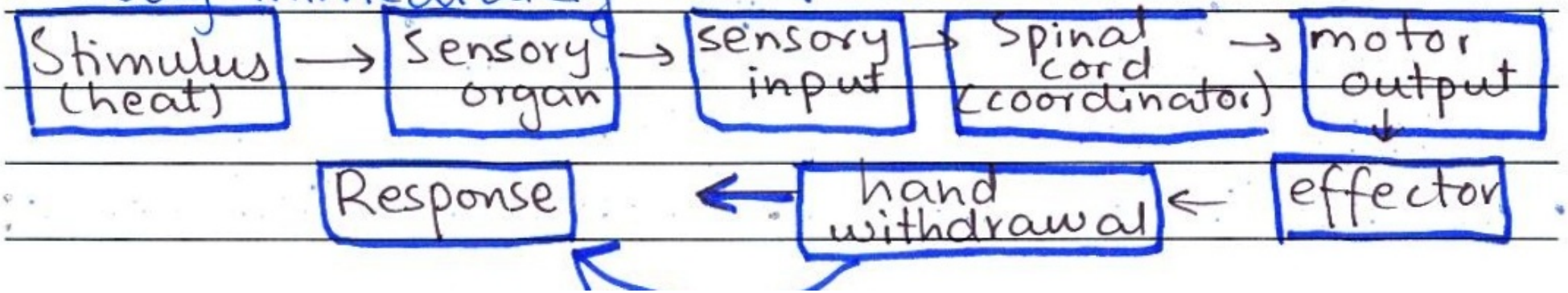
Q. No. 2 Part (iv) **Reflex action** refers to the quick and immediate response given in involuntary actions.

Path of nerve impulse:- For a given reflex action,

⇒ Receptors sense the stimulus. and sends sensory impulse through dorsal root to spinal cord. Spinal cord by "integration" forms the ~~response~~ message and through ventral root sends impulse to effector i.e muscle, through "motor output". As a result the muscle contracts (in case of touching a hot object).

Example: If we touch a hot object, we pull our hand away immediately.

Flow-Chart



Q. No. 2 Part (v) **Variations: Introduction:** It refers to the changes appearing in individuals of upcoming generations of a population.

Sources of variations: Variations occur due to following reasons:-

⇒ **Crossing-over** during meiosis leads to gene segment exchange and leads to variations.

⇒ **Fertilization:** of an egg with one out of millions of sperms also cause variations.

⇒ **Independent assortment** of alleles of a gene during gametes formation also lead to variations.

⇒ **Mutation** in the genetic makeup of individuals over time cause some changes in their genes.

⇒ **Geneflow** to the next generations also cause variations.

Q. No. 2 Part (vi)

BONE	CARTILAGE
Nature: Hard connective Tissue	**Nature:** Soft connective tissue
Cells: It's cells are called osteocyte.	**Cells:** It's cells are called chondrocyte.
Membrane: It's membrane is called periostium.	**Membrane:** It's membrane is called perichondrium.
Blood vessels: do penetrate ⇒ Has bone marrow.	These **do not** penetrate. ⇒ Does not have bone marrow.
Types: Spongy bone and Compact bone.	⇒ Elastic, Hyaline, Fibrous Cartilage.
⇒ Does not have groundsubstance.	⇒ Has ground substance.

Q. No. 2 Part (vii) **Biotechnology:** refers to utilization of living organism for benefit of man kind.

Importance in medicines: We are able to produce organic acids, and medicines. Through it, we have produced Thyroid Stimulating hormone, interferons. Thymosin (to treat brain cancer) and urokinase (to dissolve blood clots). We have resolved genetic diseases i.e Thalassemia through genetic engineering and produced Human Insulin in 1978 (1977).

Importance in food industry: We are able to produce tons of fermented products i.e wine, bread, soysauce. Fermentation is back-bone of baking, bread and wine making industries. We are able to produce single-cell protein that has 20-50 times more protein than corn.

Q. No. 2 Part (viii)

Vitamin A : Introduction:- It is also known as Retinol. It is a fat-soluble vitamin.

Role in vision: The two sensitive cells on retina are rods and cons. The rods are rod shaped and cones are cone-shaped. Rods are sensitive to dim light whereas, cones are sensitive to bright light. Vitamin A aids the rods cells to make rhodopsin (reddish-purple pigment) to see objects in dim light, Cones manufature iodopsin for colours identification. Vitamin A is the reason why we are able to see in dim light.

Deficiency:- Without vitamin A, rod cells would not work, and we will have "Night-Blindness".

Q. No. 2 Part (ix)

HOST	PARASITE
It is the organism which is harmed.	1) It is the organism which is benefited
Nutrients Derivation:-	2) **Nutrients Derivation:**
It gives nutrients.	= It derives nutrients.
Size: It is usually big in size.	3) **Size:** It is usually smaller in size.

Example: humans, animals. 4) Cascuta, plasmodium

Explanation: During parasitism, a parasite derives it's nutrients, food, shelter from an organism i.e host. The parasite which live inside of host body are called endoparasite and the one which live outside the host body are called ectoparasite.

Q. No. 2 Part (x)

a. **Adrenaline: Introduction:** It is released during "emergency situations".

Importance: It helps to prepare body to deal with flight and fight situation and it increases heart beat during such situations, It also dilates blood vessels. It is also called epinephrine, It is released by ~~Reno~~adrenal medulla, It dilates pupil.

b. **Parathormone** is released by parathyroid gland, It increases calcium level and phosphate level in blood by transporting it from bones. It works complementary to Calcitonin.

c. **Thyroxin** is responsible for increased metabolism, increase in heart beat, weight loss. It's under secretion cause lethargy, fatigue etc.

Q. No. 2 Part (xi) **Parthenogenesis: Introduction:** It is an asexual reproduction in which an unfertilized egg develops into an individual organism.

Example and explanation: Honey bee lays two types of eggs, one of which gets fertilized while the other does not, The unfertilized egg derelops into male drones and fertilized eggs develop into female worker bees and queen.

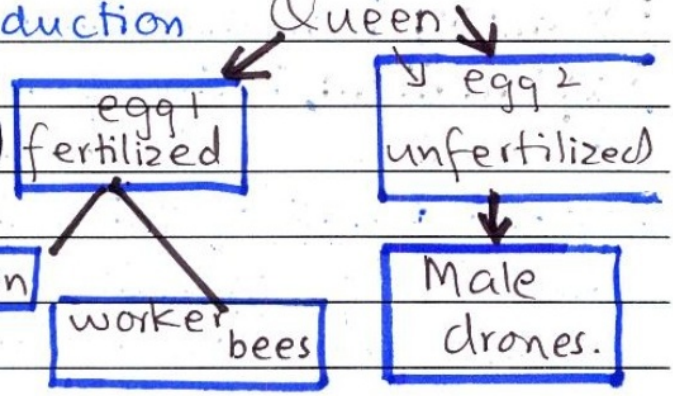
Reasons: It is asexual reproduction as :-

→ NO gametes are **fertilized**

→ **No variation.**

→ **No genetic** mate-rial mixing occurs.

To illustrate :



Use for rough work

BINARY FISSION :-

Definition:- It is the type of reproduction in which an organism divides into "two"

Most-common and simplest type of reproduction.

It is the simplest and most common type of reproduction.

⇒ It is an asexual reproduction.

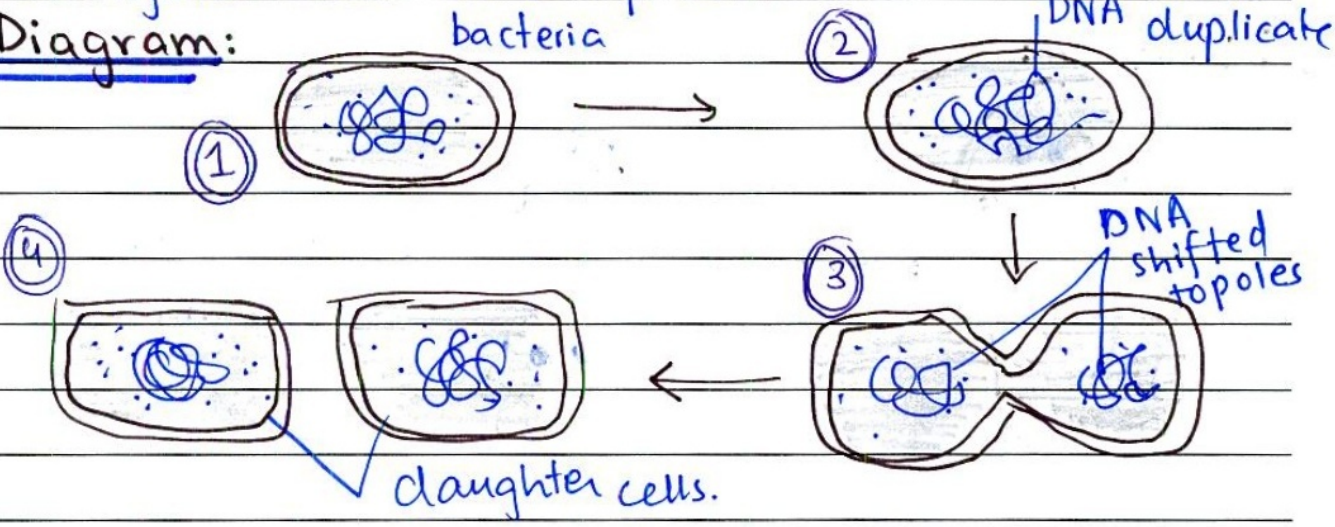
Explanation: During binary fission, the organism duplicates it DNA i.e genetic material and ultimately divides into two.

Occurrence: It occurs in bacteria, invertebrates and eukaryotes.

Binary Fission in Prokaryotes:

Prokaryotes are the organisms which lack nucleus. Bacterias firstly grow and start growing. Then it's genetic material is duplicates and each is shifted towards the opposite poles. Then the cell wall starts to divide in the middle. At last, two daughter cells are produced.

Diagram:

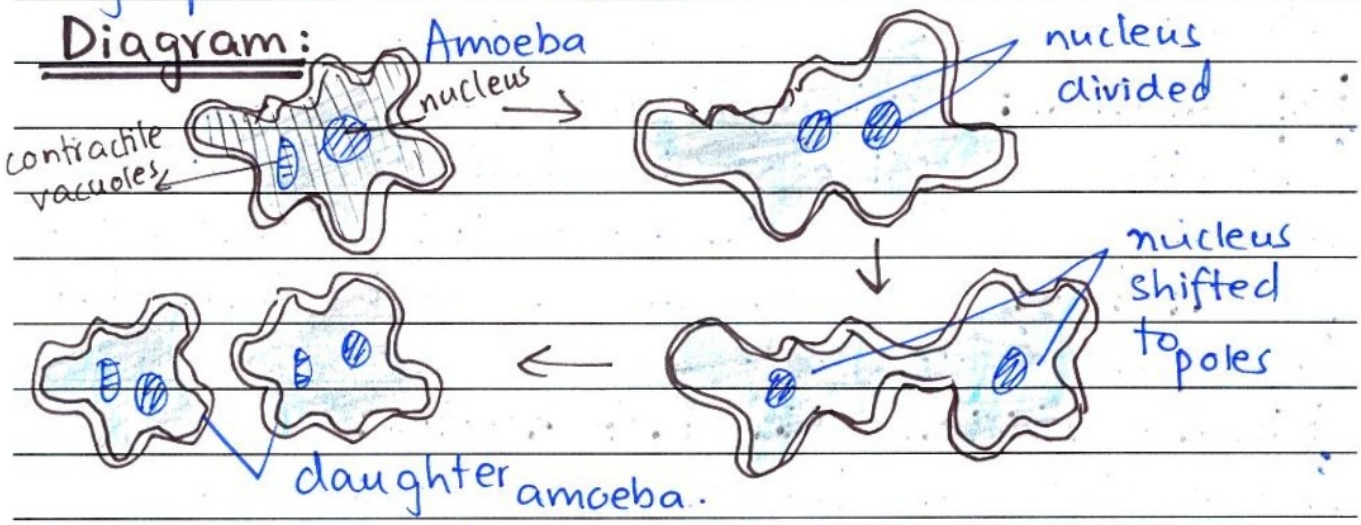


Binary Fission in Amoeba, Planarian:-

Amoeba:

Explanation: Amoeba starts to grow and increases in size, then it duplicates it's DNA and shifts nucleus to opposite poles of cytoplasm. After nuclear division, the cytoplasm also divides.

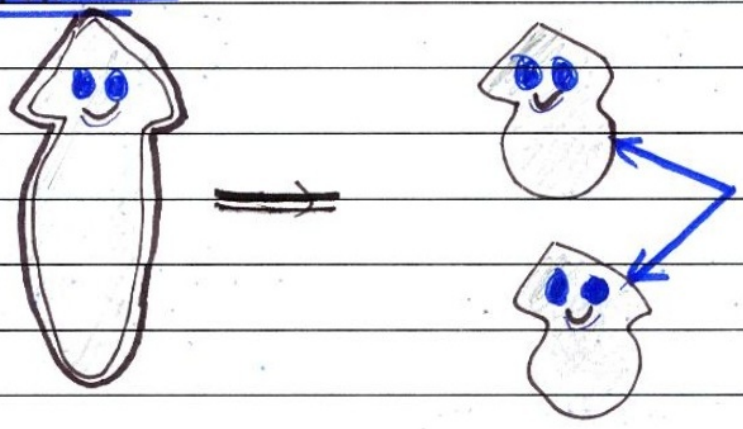
Diagram:



Planarian:- It is an invertebrate, that reproduce by binary fission.

⇒ Planarian grows in size and after specific growth-phase, it divides into two. Each new part again develops into an individual.

Diagram:



ANTIBIOTICS: Definition:- Antibiotics are types of medicinal drugs used to treat bacterial infections.

Types: Antibiotics may be bacteriostatic or bacteriocidal.

Bacteriostatic antibiotics inhibit the growth of bacteria. i.e Tetracyclines.

Bacteriocidal antibiotics kill the bacterias i.e Cephalosporins.

Broad-spectrum antibiotics are used to treat a wide-range of diseases i.e Sulphanomides

Narrow-spectrum antibiotics are used to treat specific diseases i.e penicillin

MAJOR GROUPS of antibiotics include:-

* Tetracyclines
* Sulphanomides
* Cephalosporins

***Tetracydines:-** These contain four-rings and are bacteriostatic in nature so these inhibit bacterial growth by affecting their protein synthesis.

$\Rightarrow$ These are broad-spectrum antibiotics.

Uses: These are used to treat tonsilitis, Urinary tract infections, sore throat etc.

Precautions: These should not be used for infants and children under 8 as these affect tooth development.

Sulphanomides :- These are bacteriostatic in nature so stops the growth of bacteria. It is done by affecting the folic acid synthesis in bacteria.

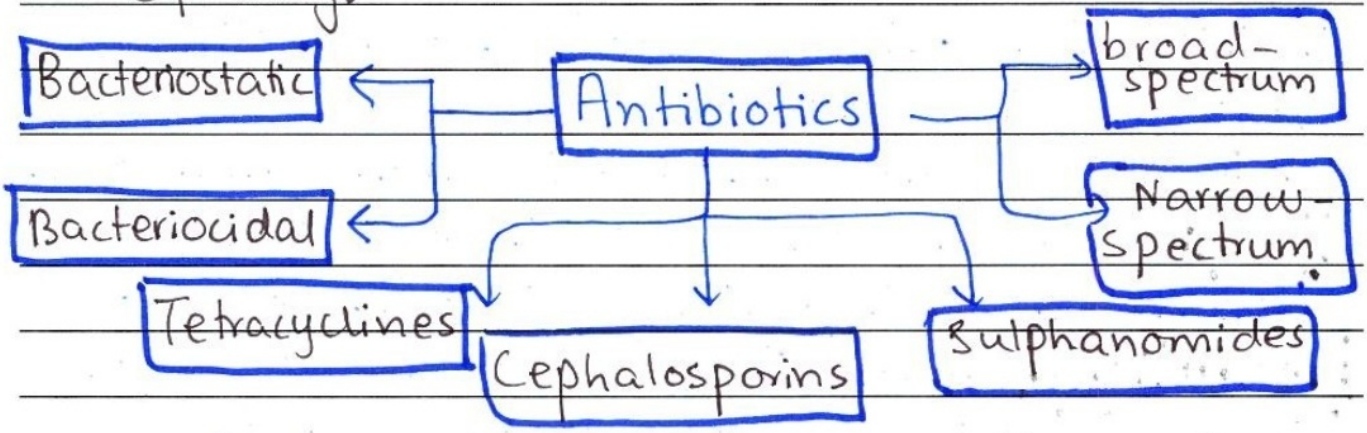
⇒ These are also **broad-spectrum** so can be used to treat a wide-range of issues.

Uses:- These are used for treating of several throat infections and also UTI.

Cephalosporins :- These are "bacteriocidal" and kill bacterias by stopping the synthesis of bacterial cell wall.

⇒ These are also **broad-spectrum antibiotics** (so can be used to treat many bacterial infections).

Uses:- These are used to treat pneumonia, throat infections and several infections of lungs.



AIR POLLUTION:

DEFINITION:- It is the contamination of air.

EXPLANATION:- When harmful substances become part of air, these disturb normal composition of air thus pollutes it. It is very dangerous as air is inhaled by every individual and living organisms.

CAUSES OF AIR POLLUTION: Some of the causes of air pollution are:-

- Cutting of trees i.e Deforestation.
- Burning of fossil fuels.
- Natural processes i.e Volcanic eruptions.
- Large amount of release of methane by cows, buffaloes and termites.
- Air-freshners.
- Volatile Organic Compounds (VOC's) and Chloro-Floro Carbons. (CFC's)
- Release of **SOx, NOx** from industries.
- Release of harmful gases from fertilizers and automobile engines.
- Over-population is indirectly causing air pollution.

##

Precautions (P.T.O)

STEPS TO CONTROL AIR POLLUTION:

We can control and limit air pollution by :-

=> Encouraging use of catalytic converters. These convert harmful gases i.e CO (carbon monoxide) into CO_2.

=> Growing of trees.

=> Minimizing use of air freshners.

=> Using of public transport instead of individual vehicles.

=> Shifting to renewable sources of energy. i.e wind, solar.

=> Using natural fertilizers to grow crops.

=> Limiting industrialization.

=> Shifting industries to far away areas.

=> i.e away from populated areas.

=> Spread awareness about this issue.

Effects of air pollution:

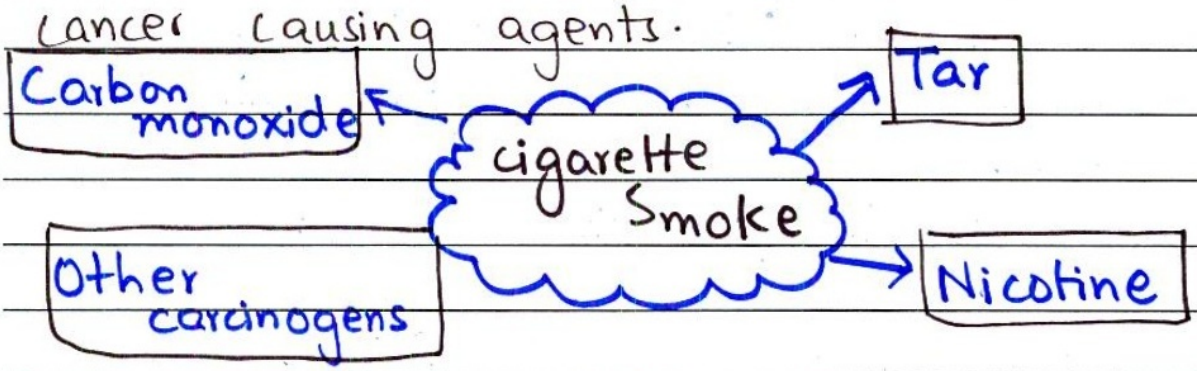
* Increase in global warming.
* Ozone depletion.
* Acid rain.
* Increase in lung infections and eye infections.

Conclusion:- In light of the facts stated above, it is important to resolve this issue, otherwise our future generations will suffer.

SMOKING : Introduction: It is the intake of cigarettes. It is an expensive and unethical habit.

Carcinogens in cigarettes: Cigarettes contain more than 7000 carcinogens out of which only 70 are known.

Cigarette smoke consist of carbon monoxide, tar, nicotine, metals like Arsenic and other cancer causing agents.



Effect on circulatory system:- Smoking hampers the working of normal circulatory system.

⇒ Carbon monoxide decreases the oxygen-picking capacity of haemoglobin.

⇒ We may encounter chronic heart diseases like Arteriosclerosis etc.

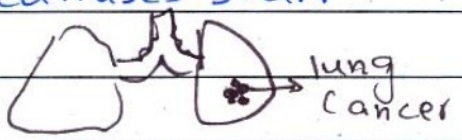
⇒ Smoking leads to increase in blood ~~preas~~ pressure.

⇒ Smoking may cause chest pain and ultimately a heart attack.

⇒ Smoking may cause blood clotting, and blood cancer (due to cancer-causing agents in cigarettes).

It also increases tooth loss by 2 to 3 times.

Lung Cancer: It occurs when cells of lungs divide in an uncontrolled manner, the tumour may spread to other parts due to metastatis. The cilias of air passage way are lost and calluses start appearing.



Effects on Lungs:- Smoking not only affects our ~~tuft~~ circulatory system but also alters the normal functioning of our Lungs.
It can occur in following ways:-

⇒ The lungs may loose elasticity.
⇒ Excess of secretion of pus in air passageways in response to the carcinogens present in cigarette.
⇒ Our ~~bronchial tubes or trac~~ trachea may loose cilia.
⇒ Smoking can cause Lung cancer.
⇒ Smoking causes Lung infections like Emphysema, Bronchitis, etc