Q. No. 2 Part (i) Describe importance of negative feed-back with examples.

Ans → **Negative feedback**: when output of a process inhibits the process, it is called negative feedback. It is a estabilished process.

→ Importance: It maintains homeostasis. It brings body conditions to normal.

• **Examples**:

1. **Insulin**: when glucose level rises in blood, pancreas secretes insulin which stimulates absorption and conversion of glucose into glycogen. It is stored in liver or skeletal muscles. As a result, glucose level decreases (normal) (output), it inhibits insulin secretion.

2. **Glucagon**: When glucose level in blood decreases, pancreas secretes glucagon which stimulates liver to breakdown glycogen into glucose. Glucose level returns to normal, (output) it inhibits glucagon secretion.

Q. No. 2 Part (i) Differentiate between bacteriostatic & Bactericidal antibiotics.

Ans.

Bacteriostatic antibiotics	Bactericidal antibiotics
• Bacteriostatic antibiotics inhibit the growth of bacteria.	Bactericidal antibiotics kill bacteria.
• Their action is reversible.	Their action is irreversible.
• If taken in large doses, it can act like bactericidal antibiotic.	If taken in small doses, it can act like bacteriostatic antibiotic.
• Examples: ◦ Tetracycline ◦ Sulphonamide	Examples: ◦ Penicillin ◦ Cephalosporin
• Work: It works by inhibiting folic acid or protein synthesis in bacteria.	Work: It works by interrupting cell wall formation in bacteria.

(Section B)

Q. No. 2 Part (ii) Compare hydrophytes and xerophytes.

Ans:

Hydrophytes	Xerophytes
• Hydrophyte plants live in fresh water (partially/fully).	Xerophytes plants live in dry environment (deserts, etc)
• They have broad leaves.	Mostly, leaves modify into spines.
• They have large number of stomata for transpiration.	They have sunken / less stomata to prevent transpiration.
• They do not face the problem of water shortage.	They have many measures to prevent water shortage.
• Example: Water lily is a hydrophyte.	Example: Cactus is a xerophyte.

Q. No. 2 Part (iii) Briefly explain, (Any Two)

(a) **Glomerulus:**

Glomerulus is a Tuft of blood capillaries surrounded by Bowman's capsule. The efferent arteriole exiting from glomerulus form network of capillaries around nephron. Pressure filtration occurs in glomerulus by which waste products, salts, and water are removed from glomerulus by blood pressure.

(c) **Selective reabsorption:**

99% water and essential solutes are re-absorbed by nephron. (which were previously removed from blood stream). Proximal convoluted Tubule re-absorbs solutes. Descending loop of henle absorbs water, ascending limb absorbs salts. More water is re-absorbed by distal convuled Tubules. Glucose, amino acids are completely re-absorbed.

Q. No. 2 Part (✓) What are micropyle and embryo. Describe their importance.

Ans ★ **Micropyle:** Micropyle is a minute opening in the integument of ovule.

- **Importance:** It absorbs water which is necessary for seed germination. Protoplasm becomes saturated, cells of embryo activate and seed is burst. It facilitates radical and plumule.

★ **Embryo:** After fertilization by which zygote is formed by sperm and egg, mitosis in zygotes produces embryo (seed).

- **Importance:** Embryo contains radicle, plumule, and cotyledons. Roots emerge from radicle, shoots from plumule. The new plant gets food from cotyledon or endosperm surrounding embryo.

Q. No. 2 Part (viii) Diagram A and B are disorders of eye.

(a) • A : Nearsightedness (Myopia)
• B : Farsightedness (Hyperopia, Hypermetropia).

(b) • Myopia : Nearsightedness can be rectified by using concave lens.
• Hyperopia : Farsightedness can be rectified by using convex lens.

(c) • Myopia : Nearsighted person can see nearby objects clearly but can't focus on distant objects.
• Hyperopia : Farsighted person can see distant (far away) objects easily but can't focus on nearby objects.

Q. No. 2 Part (ix) How are bacteria developing resistance against antibiotics?

Ans- * **Bacteria resistance:**

- Overuse of antibiotics can make bacteria resistant to them.
- Mutation in DNA during replication of cells.
- Sometimes, the internal mechanism of bacteria stops working of antibiotic.
- Misuse of antibiotics i.e. using antibiotics for viral infections or other diseases, they aren't efficient for.
- Bacteria transfer resistance to one another by plasmids during conjugation.

CUTTING LINE

Q. No. 2 Part (x) Describe causes, symptoms, treatment of arthritis.

Ans: • **Arthritis:** Arthritis is the inflammation of joints.

• **Causes:** • It affects over-weight individuals.
• More intake of chicken, meat. • Aging
• Less intake of water.

• **Symptoms:** • Inflammation in weight bearing joints like hips, knees etc. • Stiff joints
• Acute pain in joints

• **Treatment:** • Using anti-inflammatory drugs.
• Moderate exercise • Rest
• Improving diet
• Replacement of joints through surgery

Q. No. 2 Part (xii) A joint is shown.

(a) Scapula joint: It is the joint of shoulder blade. It is freely-moveable joint.

(b) It is located in both shoulder blades.
(Freely moveable joints are also present in hips)

(c) It causes backward, forward, and sideways movement.
- It gives more mobility to skeleton.
- Since, freely move-able joints are present in shoulders, and hips, we can freely move around our arms and legs.
- Arms can lift heavy weights.

Q. No. 2 Part (xiii) What are Temporary parasitism, endoparasites and commensalism?

Ans. • **Temporay parositism:** Parasites present over surface of body are called parasites. They are temporary because they take nutrients from host and then can be removed. E.g: Lice, mosquito

• **Endoparasite:** These parasites derive nutrients from host and live inside them. They can sometimes cause death. E.g: Tapeworm

• **Commensalism:** It is a symbiotic relationship in which one species is benefited and the other is neither benefited nor harmed. example: Sucker fish attaches to shark for transport in sea (to find new food grounds).

Q. No. 2 Part (iv) Compare cellular respiration & breathing.

Ans

Cellular respiration	Breathing
• Cellular respiration is the combustion of glucose (C-H bonds) in cells.	Breathing is the movement of air into and out of lungs.
• It takes place in all cells.	It only takes place in lungs.
It provides energy to an organism through ATP, for activities.	It helps in maintaining carbondioxide and oxygen level in blood.
• It is a chemical process.	It is a physical process.
• It is also called internal respiration.	It is external respiration.

CUTTING LINE

Q. No. 2 Part (vii) Describe binary fission in unicellular eukaryotes.

Ans • **Binary fission:** Binary fission is the process of splitting of an organism into two daughter cells by asexual reproduction.

• **Unicellular eukaryotes:**

In protozoa like amoeba, euglena etc, nucleus is divided into two nuclei by mitosis. Cytoplasm also divides. Cell membrane formation takes place and protozoa divides into two daughter cells. They grow up and divide again.

• Binary fission also takes place in prokaryotes & invertebrate.

Q. No.3 Part (a) (Page 1/2) Discuss Mendel's law of independent assortment by making Punnett square.

Ans: ★ **Law of Independent assortment:**

"When two pairs of contrasting traits are followed in the same cross, their alleles assort themselves in gametes independent of one another."

★ **Explanation with example:**

- Mendel took two pairs of contrasting traits in garden pea. One such experiment involved round and wrinkled seeds, and yellow and green seeds.
- He crossed round yellow seed of true breeding plant with wrinkled green seed of true breeding plant.
- **True-breeding:** True breeding means homozygous plant. They produce offspring of their own type in successive generations if self fertilization takes place.
- The first filial generation F_1 by crossing gametes of Parental generation produced all round yellow seeds.
- It showed dominance of round yellow seeds over wrinkled green seeds.
- Being hybrid in two traits, Mendel called them dihybrid.
- **Hybrid:** Hybrid is a variety produced by crossing two true breeding plants.
- The round yellow seeds of F_1 generation were grown and allowed self-fertilization.
- It produced F_2 generation seeds with four phenotypes: round yellow, round green, wrinkled yellow, wrinkled green in ratio **9:3:3:1** respectively. It is called dihybrid ratio.
- Mendel observed that in addition to parent phenotypes, two new phenotypes appeared i.e. round green, wrinkled yellow.

- From these results, mendel was able to conclude that alleles assort in gametes independent of one another in subsequent generations.
- This formed basis of law of independent assortment.

* **Punnet Square**: it is used to express genotype and phenotype of plants/animals produced by sexual mating of parent gametes.

P generation: RRYY (round yelow) — rryy (wrinkled green)

P gametes: (RY) — (ry)

F_1 generation: RrYy

F_1 gametes: (RY) (Ry) (rY) (ry)

sperms

gamete (eggs)	RY	Ry	rY	ry
RY	RRYY round yellow	RRYy round yellow	RrYY round yellow	RrYy round yellow
Ry	RRYy round yellow	RRyy round green	RrYy round yellow	Rryy round green
rY	RrYY round yellow	RrYy round yellow	rrYY wrinkled yellow	rrYy wrinkled yellow
ry	RrYy round yellow	Rryy round green	rrYy wrinkled yellow	rryy wrinkled green

Phenotype:

Round yellow : Round green : Rwrinkled yellow : wrinkled green

9 : 3 : 3 : 1

Q. No. 3 **Part (** b **) (Page 1/2)** What is asthma? Describe causes, symptoms, prevention and treatment.

Ans * **Asthma:**

- Asthma is a chronic disease of air passageways.
- Asthma is an allergic response.
- The inner lining of bronchi, etc become inflammed.

1- **Symptoms:**

- Shortness of breath. Breathlessness can occur.
- A characteristic whistling sound is produced when patient breathes out (wheezing).
- There is more difficulty in breathing out than breathing in.
- Constriction of air passageways.
- Coughing.

2- **Causes:**

- It is mainly caused by allergens like
- pollen
- feathers from pillow
- A specific food
- Cold
- Exercise
- Dust particles in air
- Particles from perfumes, spray.
- An emotional disturbance can provoke an attack too.

3- **Treatment / Prevention:**

- There is no permanent cure of asthma.
- Two types of treatment are done; long term relief, short term relief.
- Bronchodilators are used. They contain chemicals which dilate airways.

- Inhalers also provide quick relief.
- Asthma patients should stay away from allergens.
- Smoking must be stopped.
- Visit to areas near industries should be avoided.

Space for diagram
(Section C)

Q. No. Part ( )

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(Section C)

Q. No. Part ( )

Q. No. 4 Part (a) (Page 1/2) Explain male reproductive system of rabbit. Also draw diagram.

Ans ➤ **Composition:**

A male reproductive system consists of,

- Accessory glands
- A pair of Testes
- Vas defferens
- Penis
- Urethra
- Epididymes
- Scrotum

➤ **WORKING:**

- **Testes:** Testes are pink oval bodies situated in the lower portion of body.
- **Scrotum:** Each scrotum lies on sides of penis. It is covered with skin.
- **Testis:** Testis lies in each scrotum. It is divided internally into lobules which forms coiled tubules called seminiferous tubules.
- **Seminiferous tubules:** Seminiferous tubules are lined with single layer of germinal epithelium. It produces sperms.
- **Epididymes:** Seminiferous tubules collectively form a much coiled tube called epididymes. It is located outside the testes. It stores sperm.
- **Vas deferen:** Vas deferens is a tube which joins epididymes with urinary bladder/urethra.
- **Urethra:** Urethra is an ejaculatory duct which passes into penis.
- **Penis:** Penis is a cylinderical erective organ.

* **Accessory glands:** It includes prostate gland, seminal veside and cowper's gland.

1- **Prostate gland:** It neutralizes acidity of semen.

2- **Seminal veside:** It provides nourishment to sperms.

3- **Cowper's gland:** It lubricates the duct.

- Sperms are passed to vas deferens and they are combined with secretions of accessory glands.
- **Semen:** A milky fluid which contains 10% sperms and 90% secretions from accessory glands.
- **Same Path:** Males have single (same) ejaculatory path for urine and sperms.

Q. No. 4 Part (b) (Page 1/2) How are nitrates formed during nitrogen cycle?

Ans. **Nitrogen Cycle:** Nitrogen cycle is a biogeochemical cycle and is a nature's pathway of using nitrogen atoms and sending them back to atmosphere. Nitrogen atoms are also used by industries.

* **Nitrogen fixation:** The conversion of nitrogen gas into nitrates is called nitrogen fixation.

1- **Atmospheric N fixation:** During thunderstorms, nitrogen and oxygen are combined to form nitrates by electric charge.

2- **Industrial N fixation :-** Industries combine nitrogen gas and hydrogen to form ammonia by increasing pressure and temperature. Ammonia is converted into ammonium nitrate fertilizer.

3- **Biological N fixation :-** Nitrogen fixing bacteria in plants fix nitrogen gas to form ammonia, and then nitrates. Some bacteria live as symbionts in roots of pea, beans etc, some live as free-living in soil.

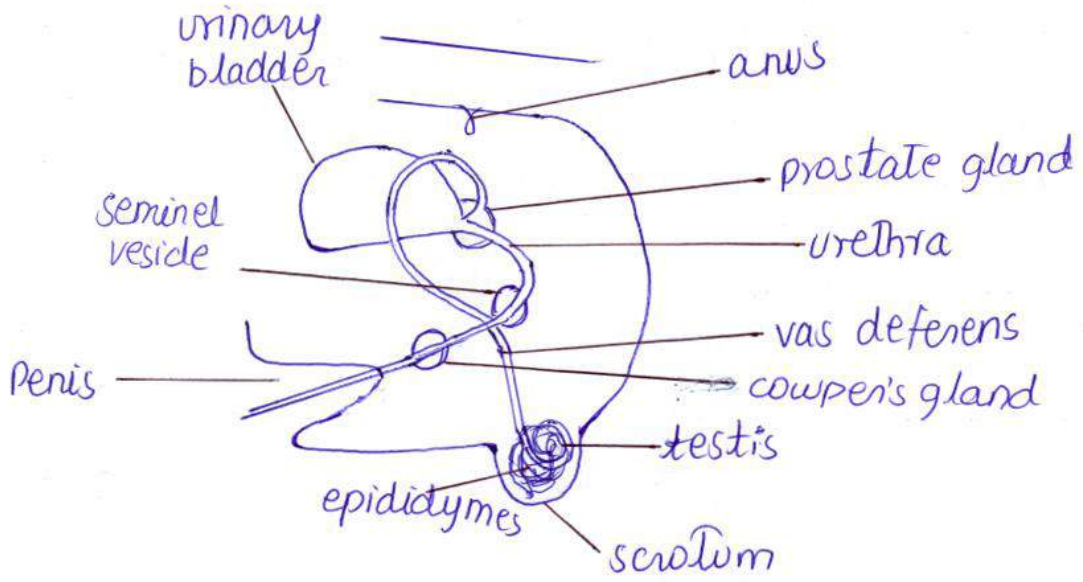
↳ **Ammonification:** The conversion of dead organisms' protein and nitrogenous waste material (urea, uric acid etc) into ammonia is called ammonification. It is done by ammonifying bacteria; i.e. Clostridium, Bacillus.

↳ **Nitrification:** The conversion of ammonia into nitrates is called nitrification. First ammonia is converted into nitrites by Nitrosomonas. Then nitrites are converted into nitrates by Nitrobacter.

→ The nitrates are taken up by plants and animals for producing nucleic acid etc through assimilation and then again converted into nitrogen by denitrifying bacteria ie. Achromobacter, Pseudomonas.
This makes it a nitrogen cycle.

Space for diagram
(Section C)

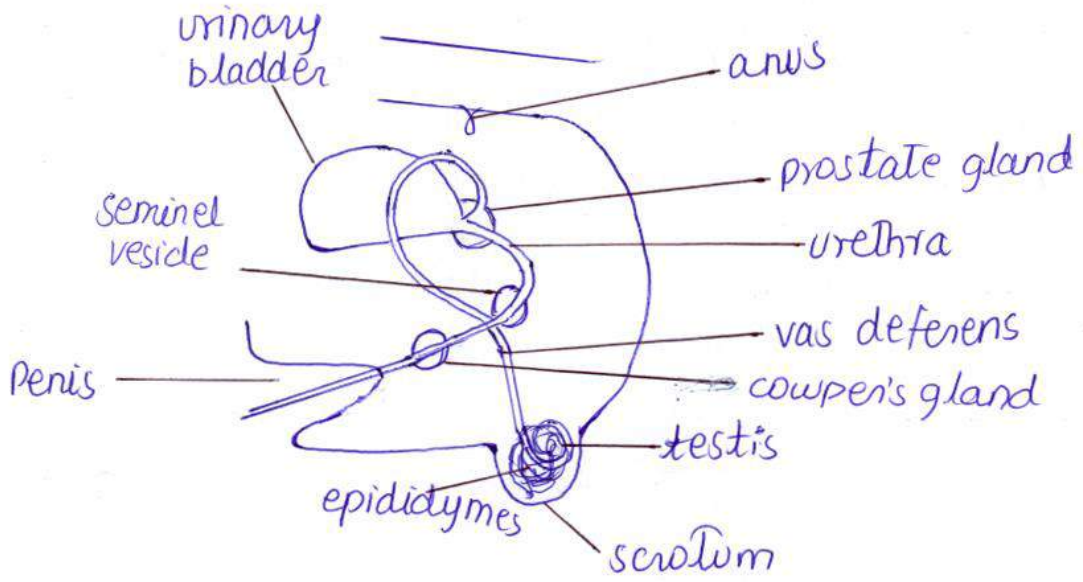
Q. No. 4 Part (a)



Male Reproductive System of Rabbit

Space for diagram
(Section C)

Q. No. 4 Part (a)



Male Reproductive System of Rabbit