





(Section B)

Q. No. 2 Part (i) (B)

Causes of Emphysema:-

Following are the causes of emphysema:-

1) Smoking (2) Vapping and e-ciggerrates (3) Marijuana (4) Atmospheric pollution (5) dust. (6) Cigar smoke

Symptoms/effects of Emphysema:-

following are impacts of emphysema on body:-

(1) Long-term smokers cough (2) abnormal mucus production (3) abnormal mucus color (4) heart diseases (5) constant feeling of not being able to get enough air specially after short exercise or walking.

Q. No. 2 Part (ii)

Phase:-

Phase of ventilation shown in the figure is "Expiration."

Explanation:- It is known as the passive phase of respiration. In this phase diaphragm relaxes and becomes dome shaped. The external intercost relaxes and the internal coastal contracts. The rib cage moves backward and downward so space in thoracic cavity decreases. Hence pressure in the chest cavity and the lungs increases and air is expelled out of the lungs.

(Section B)

Q. No. 2 Part (iii)

Role of Ca^{+2} ions in muscle contraction:

Role Ca^{+2} ions in muscle contraction is that the Ca^{+2} ions binds to troponin and cause them to move from their place slightly. As a result tropomyosin is also displaced and myosin head binding sites on actin are exposed. myosin head binds to actin and cause the contraction of muscle. So muscle contraction is possible only due to the Ca^{+2} ions.

Sarcomere:- During the contraction the Sarcomere also contracts. As H band disappear, I band shortens, Sarcomere contracts or reduces in length.

Q. No. 2 Part (iv)

3,

Arteries	Veins
→ They carry blood away from the heart.	→ They carry blood towards the heart.
→ They do not have valves.	→ They have valves in their walls.
→ The artries transport oxygenated blood.	→ The veins carries deoxygenated blood.

(Section B)

Q. No. 2 Part (v)

Monoclonal Antibodies:- These are the proteins that are synthesized in the laboratory to act as a protein found inside our body called "antibody." MABs are clones of each other. They are copy of a single antibody. They are used in diagnosis, cancer treatment and research

Advantages:-

(1) **High Specificity:** They are engineered to bind only single, spe antigen or epitop allowing for precis targeting and reducing off target effects.

(2) **Renewable production:-**
Once a hybridoma or recombinant cell line is established MABs can be produced indefinitely.

Q. No. 2 Part (vi)

Protection Provided by skin against microbial invasion:-

(1) **Sweat:-** Skin contains sweat glands that produce sweat which is salty solution. It causes dehydration of bacteria and kills them.

(2) **Sebum:-** Skin has subaceus glands which produce sebum and has antibacterial properties. It makes skin oily and acidic and prevents microbial growth

(3) **Desquamation:-** Skin has a process of desquamation through which it sheds its dead skin cells. As a result the attached microbes are also removed from the skin.

(Section B)

Q. No. 2 Part (vii)

Osteoporosis:-

Osteoporosis is the condition in which the amount of bone mass in the bones decreases and the risk of fracture increases.

Causes:-

It happens when the bone resorption exceeds the bone absorption. mostly after thirties amount of bone mass starts to decrease in both sexes. There is no calcium deposition of Ca in bon.

Symptoms:-

(1) fatigue (2) Weakness (3) Pain in bones (4) difficulty in doing work.

Q. No. 2 Part (viii)

Absorption of fats:

Fats are converted by lipids into fatty acids & glycerols. After These fatty acids and glycerols are absorbed by epithelial cell, they are again combine within these cells to form fats. These fats then combines with special proteins & cholesterol to form chylomicrons. These chylomicrons then enters the lacteal. The lymph containing the chylomicrons finally drains from the lymphatic system into the inferior vena cava which returns the blood and these back to the heart.

(Section B)

Q. No. 2 Part (ix)

Hormones of Anterior Pituitary:-

Hormones secreted by anterior pituitary are:-

(1) GH or growth hormone
(2) TSH (Thyroid stimulating hormone)
(3) FSH
(4) LH
(5) Prolactin
(6) ACTH
(7) Leuteotrophic hormone.

Q. No. 2 Part (x)

Effects of Ocean Acidification:-

1) **Effect on calcifying Organism:-**
Due to Ocean Acidification PH of the water decreases which reduces the Availability of HCO_3^- ions for Calcifying organism. These ions are needed by calcifying organisms for shell and skeletal. As a result their population declines.

2) **Behavioral changes in Marine life:-** Due to ocean acidification the fishes loses ability to navigate, avoid Predators and finding mates.

3) **Uneven Acidification:-** As warmer water holds less gases so the Oceans in polar regions are Acidifying rapidly marine

(Section B)

Q. No. 2 Part (xi)

Selective Reabsorption:-

The significance of the selective reabsorption in the tubules is that the essential substances that have been filtered out of glomerulus during ultrafiltration are reabsorbed such as some amount of water, amino acids, essential salts etc.
As these substances are required by the body so their absorption in tubules is necessary for various body functions.

Q. No. 2 Part (xii)

Species that have Gone extinct:-

1) **Bramble Cay Melomys:-** (Melomys Rubicola)
This small rodent native to the bramble cay (island of) off coast of Australia is first mammal that have gone extinct due to climate change. Rising sea level and storm surges wiped out its habitat leading to its extinction.

(2) **Golden Toad:** (Incilius Periglenes)
Golden toad once found is Costa Rica's monteverde cloud forest have gone extinct in late 1980s. climate change induced drought and rising temperature made the forest less hospitable and disease further decimated the population.

(Section B)

Q. No. 2 Part (xiii)

Homologous Structure:-

Homologous structure are the structure in different species that have same structure, same origin but are different in function.

→ They represents the same evolutionary ancesto
→ Human and horse are examples of this.

Analogous Structure:-

Analogous structures are those structures in different species that have same structures, same origin and they also performs the same function.

→ They also represents same evolutionary ancestor.
→ Bat and butterfly are example of this.

Q. No. 2 Part (xiv) Mechanism to lose body heat:-

(1) **Vasodilation:-** One way to increase heat lose into the environment is to supply the arteries in the skin with greater volume of blood which will then lose th heat via radiation. The muscle in the capillaries walls relax as a result capillaries in the skin dilate more blood passes through them. Little blood passes through shunt vessel.

(2) **Sweating:-** Sweat glands in the skin produces the sweat. As the sweat evaporates from the body it takes the body heat away with itself. It uses the body heat for evaporation Efficiency of sweating depends on humidity in environ

(Section C)

Q. No. 3 (Page 1)

Impacts of Climate Change On plants:-

(1) Changes in growing Season:-

Growing season is period of year during which plant grows best. Due to climate change growing season are becoming shorter in some region while longer in some region. It effects the plants, blooming, flowering, seed production and product formation.

(2) Increased stressed due to Extreme Condition:-

Climate change is causing frequent and intense storms, rainfalls and heatwaves. This makes it difficult for various plants to survive.

(3) Migration:-

The plants can't move like animal but their seeds are dispersed by air, water or animals. due to climate change plants that once thrived in particular area may grow in newer region better suited to them. They may disappear from their native area.

(Section C)

Q. No. 3 (Page 2)

Impacts of climate change on Animals:-

1) Habitat loss:

Climate change is causing rise in average global temperature. This disrupt habitat for various animals. Global warming is causing the sea ice to melt due to which habitat for polar bears and other animal is shrinking.

2) Food chain disruption:-

Fauna and flora are part of interconnected web. Animals depends on other animals and plants for survival. If one species experiences extinction it might effect the whole species population that feeds on it.

(3) Ecosystem disruption:-

Some species move to other regions to prevent themselves from climate change. Due to this reason the species that depends on them experiences diffuclties and it also disturb the whole ecosystem of the area.

(Section C)

Q. No. 3 (Page 3)

Invasive Species:-

To escape climate change species move to other regions. In this process they might invade an area that do not naturally belong to them. They compete with the native for food and other resources. This causes stress to native species.

(Section C)

Q. No. 4 (Page 1)

Location of Pancreas:-

Pancreas are located in the abdominal Cavity. It is present below the stomach and its head is located in the dudenom.

Head: Head of pancreas is located in C shaped section of dudenum.

Neck: Neck connects the head to the body of pancreas.

Body: This is the largest and important part of pancreas.

Tail: tappered end of pancreas located near the spleen. (Splenic Hilum).

Pancreas as an endocrine Gland:-

As an endocrine glands pancreas produces two hormones.

Insulin:-

→ B-cells of pancreas produces insulin which is larger in numbers.

→ Insulin is released when the conc. of glucose in blood is high.

→ It inhibits gluconeogenesis, promotes catabolic destruction of glucose in cellular respiration.

(Section C)

Q. No. 4 (Page 2)

makes the cell wall more permeable to glucose and specially fat and skeletal muscle take up the excess glucose. It also stores excess glucose in form of glycogen in liver.

Glucagon:

When the conc. of glucose in blood is low pancreas releases the hormone glucagon. It is released from α-Cells of the pancreas which are less in number.

It reverses the action taken by the insulin and causes an increase in the conc. of glucose in blood.

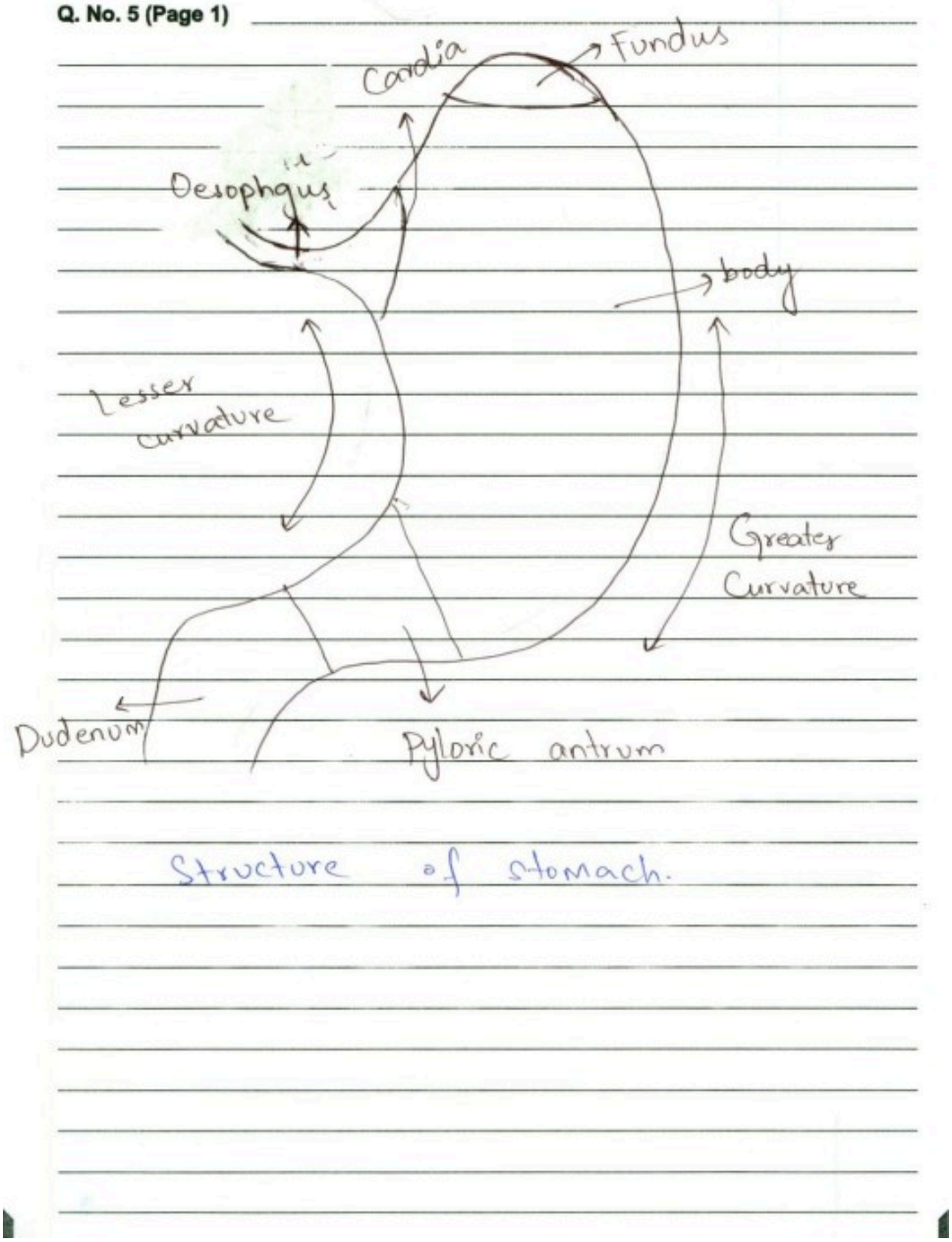
It binds to receptors on cells and initiates transport of glucose out of cell and into blood.

(Section C)

Q. No. 4 (Page 3)

(Section C)

Q. No. 5 (Page 1)



Structure of stomach.

(Section C)

Q. No. 5 (Page 2)

Chemical digestion in stomach-

The chemicals produced in stomach includes HCl, pepsin, gastrin, mucous, Intrinsic factor.

Mucous:- Mucous cells in the stomach walls secrete the thick, viscous, Alkaline mucous. It protects the stomach walls from the damaging effect of acidic chyme and HCl. Parietal or oxyntic cells in the gastric glands produces the intrinsic factor and HCl. Intrinsic factor is a glycoprotein that binds to the vitamin B12 and helps in its readily absorption in the ileum. HCl produced by the parietal cells do not play an important role in food digestion. It kills the bacteria present in the food that are present in essentialy everything that humans put into the mouth. It maintains the PH of the stomach between 1 and 3 usually near 2. This PH denatures certains proteins so that the proteolytic enzymes can reach to inner peptide bonds and helps in digestion of protein. It inactivates the salivary amylase. Pepsin exhibits max activity at

(Section C)

Q. No. 5 (Page 3)

a PH of 2. So HCl provide optimum PH for Pepsin's activity. Pepsin is secreted in its inactive form as pepsinogen in chief cells. As its secretion is stimulated it is packed in Zymogen granules and comes into lumen of stomach by exocytosis. Once inside the lumen of stomach it is activated by HCl and converted into Pepsin. It breaks peptide bonds in proteins and aids in its digestion.

(Section C)

Q. No. 6 (Page 1)

excretion of waste material:

Ammoniotelic:

Ammonia is a highly toxic substance. it can interfere with membrane transport function. It is highly soluble in water and travels across the membrane easily 1 gram nitrogen in the form of Ammo requires 500 ml of water to dissolve it to non toxic level. Such high amount of water is only tolerated by fresh wader animals like sponges, cnider echinoderms etc. These are called amoniotelic.

Ureotelic:-

The animals which excrete urea as their major nitrogenous waste are called as ureotelic. These animals invest some energy to convert ammonia into urea. 1 grams nitrogen in the form of Urea requires 50ml of water to dissolve it to non-toxic level. It is found is both marine and tarrestial organisms. These animals are called ureotelic.

Urea is approximately 100000 times less toxic than ammonia.

(Section C)

Q. No. 6 (Page 2)

Uricotelic

The animals which excrete uric acid as their major nitrogenous waste product are called uricotelic. 1 gram of nitrogen in the form of Uric acid require only 1 ml of water to dissolve it to non-toxic level. It can precipate from the solution. One Uric acid molecule excrete three nitrogen atoms. Most of the terrestial animals are uricotelic.

(Section C)

Q. No. 6 (Page 3)