Inter (Part-I) 2018

Biology	Group-II	PAPER: I
Time: 2.40 Hours	(SUBJECTIVE TYPE)	Marks: 68

SECTION-I

2. Write short answers to any EIGHT (8) questions: (16)

(i) Differentiate between micromolecules and macromolecules.

Ans

Micromolecules	Macromolecules
The molecules with low molecular weight may be called micromolecules. Examples are CO_2, H_2O, etc.	The molecules with larger molecular weights are said to be macromolecules. Examples are sugar, proteins, etc.

(ii) Differentiate between gene therapy and chemotherapy.

Ans **Gene Therapy:**

Recently, a new technique has been developed to repair defective genes. They consist of isolating the normal gene and inserting it into the host through bone marrow cells. This is called gene therapy.

Chemotherapy:

Chemotherapy consists of administrating certain anticancer chemicals to the patients at regular intervals. These chemicals may kill both cancerous and normal cells.

(iii) What is effect of changed pH on the working of enzymes?

Ans A slight change in pH can change the ionization of amino acids at the active site. Moreover, it may affect the ionization of the subtracts.

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Extreme change in pH cause the bonds in the enzyme to break, resulting in the enzyme denaturation.

(iv) Differentiate between competitive and non-competitive inhibitors.

Ans Competitive inhibitors:

Because of the structural similarity with the substrate, they may be selected by the binding sites, but are not able to activate the catalytic sites. Thus, product(s) are not formed.

Non-competitive inhibitors:

They form enzyme inhibitor complex at a point other than the active site. They alter the structure of the enzyme in such a way that even if genuine substrate binds the active site, catalysis fails to take place.

(v) What is meant by optimum temperature? Give an example.

Ans The temperature at which enzyme work efficiently is called optimum temperature.

Example:

For enzymes of human body 37°C is the optimum temperature.

(vi) Write down biological classification of corn.

Ans Biological classification of corn is given below:

Kingdom	Plantae
Division (phylum)	Anthophyta (Tracheophyta)
Class	Angios permae
Order	Poales
Family	Poaceas
Genus	Zea
Species	Mays

(vii) Differentiate between ascus and basidium.

Ans Ascus:

The ascospores are produced by meiosis inside sac-like structure called asci (singular ascus). Meiosis follows nuclear fusion inside the ascus, commonly 8 ascospores are produced inside each ascus.

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Basidium:

Hyphae produce special reproductive structures called basidia (singular, basidium). Basidium are club-shaped, therefore, these are also called club fungi.

(viii) What are toadstools? Give example.

Ans Poisnous mushrooms are called as toadstools. *e.g.,* Amanita (death cap / death angel) Jack O' latern mushroom.

(ix) What is diaphragm? In which group of animals it is found?

Ans The floor of the chest is called diaphragm. Diaphragm is a sheet of skeletal muscles. Animals like amphibians and reptiles have diaphragm.

(x) Differentiate between coelomates and acoelomates.

Ans Coelomates:

Coelom is a cavity present between the body wall and the alimentary canal and is lined by mesoderm. The mesoderm splits into outer parietal layer which underlines the body walls and visceral layer which covers the alimentary canal and the cavity between them is the true coelom. It is filled with fluid called coelomic fluid. The animals which possess coelom or true body cavity are called coelomates.

Acoelomates:

In phylum platyhelminthes, there is no body cavity or coelom, and the mesoderm forms a loose, cellular tissue called mesenchyma or parenchyma which fills the space between the ectoderm and endoderm. It forms a packing around the internal organs of the animals to support and protect them. Such animals are called acoelomates.

(xi) Differentiate between diploblastic and triploblastic animals.

Ans Diploblastic animals	Triploblastic animals
1. Diploblastic animals belong to grade radiata as these animals have radial symmetry.	1. Triploblastic animals are included in phyla which have been placed in grade bilateria, as these animals shows bilateral symmetry.

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2.	The body of these animals consists of two layers of cells, ectoderm and endoderm.	2.	The body of these animals is made of three layers, ectoderm, mesoderm and endoderm.
3.	Diploblastic animals are included in phylum cnidaria.	3.	Triploblastic animals may be, acoelomate, pseudocoelomate or coelomate.

(xii) Write down affinities of echinoderms with hemichordates.

Ans Following are the affinities of echinoderms with hemichordates:

1. The formation of enterocoel coelom.
2. Similar larva and having a heart vesicle which represents coelom.
3. Both possess mesodermal exoskeleton, whereas, the exoskeleton is ectodermal in origin.

3. Write short answers to any EIGHT (8) questions: (16)

(i) Differentiate between amphitrichous and peritrichous bacteria.

Ans **Amphitrichous Bacteria:**

Amphitrichous is a condition when tuft of flagella at each of two poles is present.

Peritrichous Bacteria:

In peritrichous form, flagella surround the whole cell. Most of bacilli and spiral-shaped bacteria have flagella.

(ii) Write down the importance of algae.

Ans **Importance of Algae:**

1. Some algae such as kelps are edible and may be used to overcome shortage of food in the world.
2. Kelps are rich in sodium, potassium, iodine, etc. They are good source of these minerals.

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(iii) Write down evolutionary significance of euglenoids.

Ans Euglenoids have special evolutionary significance as they resemble with plants and green algae in having similar pigments and, on the other hand, are also related to zooflagellates.

(iv) How flagellates obtain food?

Ans Flagellates obtain their food either by ingesting living or dead organisms or by absorbing nutrients from dead or decomposing organic matter.

(v) Write down the ecological role of dinoflagellates.

Ans Ecologically, dinoflagellates are one of the most important groups of producers (second only to diatoms) in marine ecosystem.

(vi) Differentiate between microgametophyte and megagametophyte.

Ans The microspores produced inside Microsporangia germinated to form male gametophyte or the microgametophte, whereas the megaspores germinated to form female gametophyte or megagametophyte.

(vii) Define circinate vernation. Give an example.

Ans When the frond is immature and young, it is coiled. This pattern of development is called circinate vernation.

Example:

Ferns, an ostrich fern growing on a forest floor. See the coiled immature and young fronds ready to uncoil.

(viii) Differentiate between photophosphorylation and oxidative phosphorylaton.

Ans Synthesis of ATP in the presence of light is called photophosphorylation while, synthesis of ATP in the presence of oxygen is called oxidative phosphorylation.

(ix) Define alcoholic fermentation. Write its equation.

Ans In primitive cells and in some eukaryotic cells such as yeast, pyruvic acid is further broken down by alcoholic fermentation into alcohol ($C_2H_2O_5$) and CO_2.

$$\underset{\text{Pyruvic acid}}{2(C_3H_4O_3)} \longrightarrow \underset{\text{Ethyl alcohol}}{2(C_2H_5OH)} + 2CO_2$$

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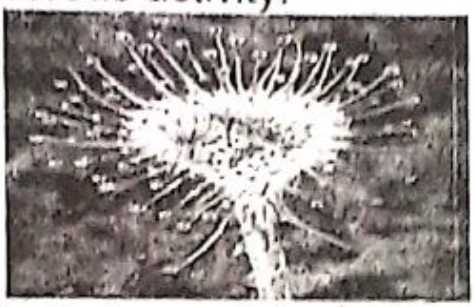
(x) **How Sundew (Drosera) shows its insectivorous activity?**

Ans In Sundew, the tiny leaves bear numerous hair-like tentacles, each with a gland at its tip. The insects, attracted by the plants' odour cause nearby tentacles to bend over the animals. Thus, they become entangled, and they show insectivorous activity.



(xi) **Differentiate between intracellular and extracellular digestion.**

Ans **Intracellular digestion:**

They are involved in intracellular digestion since they have enzymes to digest the phagocytosed food particles.

Extracellular digestion:

They also help in extracellular digestion by releasing enzymes.

(xii) **Enlist the enzymes of digestive juice of pancreas with their function.**

Ans Pancreatic juice contains enzymes that digest carbohydrates, fats and proteins. The roles of these enzymes are as follows:

1. Amylase:

It is a carbohydrate digesting enzyme. It is also called amylopsin. It digests much starch into maltose.

2. Lipase:

It is a fat digesting enzymes. It hydrolyzes a small percentage of fats into fatty acids and glycerol.

3. Trypsin:

It is a protein digesting enzyme. It breaks proteins into peptones and polypeptides.

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4. Write short answers to any SIX (6) questions: (12)

(i) Define autophagosome.

Ans Autophagosomes are double-membraned vesicles that contain cellular material slated to be degraded by autophagy.

(ii) What is resolution of human eye and electron microscope?

Ans **Electron Microscope:**

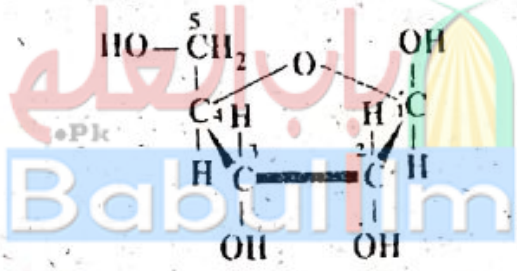
An electron microscope is a microscope that uses a beam of accelerated electrons as a source of illumination.

Resolution of Human Eye:

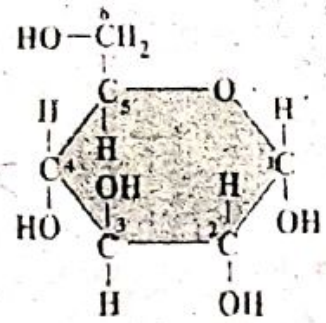
Angular resolution which is also called as spatial resolution, describes the ability of any device that forms as image such as eye and to telescopes, to distinguish small details of an object. The eye which is an organ act as an instrument in human eye optical system is resolution of human eye.

(iii) Write structural formula of ribofuranose and glucopyranose.

Ans **Ribofuranose (D-Ribose):**



Glucopyranose (D-glucose):



(iv) What do you know about bleeding in plants?

Ans Sometimes, it so happens that certain plants, when cut, pruned, tapped or otherwise wounded. Show a flow of sap from the cut ends or surfaces quite often with a

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considerable force. This phenomenon is commonly called bleeding in plants.

It is often seen in many land plants in the spring, particularly grape wine, some palms, sugar maple, etc.

(v) What is cell-mediated and humoral immune response?

Ans Cell-mediated:

T-cells recognize antigen, then combat micro-organisms and / or effect the rejection of foreign tissues (in case of tissue transplant). This is called cell-mediated response.

Humoral immune response:

The humoral immune response is mediated by antibody molecules that are secreted by plasma cells.

(vi) What is the rate of breathing at rest and during exercise?

Ans Normally, at rest, we inhale and exhale 15-20 times per minute. During exercise, the breathing rate may rise to 30 times per minute.

(vii) Differentiate between bronchi and bronchioles.

Ans Each bronchus on entering the lungs divides and subdivides progressively into smaller and smaller specie called bronchi.

When the smaller bronchi attain a diameter of one mm or less, then, they are called bronchioles.

(viii) What is diving reflex?

Ans Aquatic mammals, especially cetaceans can stay in the depth of the ocean for about two hours without coming up for air.

When a mammal dives to its limit, the diving reflex is activated. The breathing stops, the rate of heartbeat slows down to one-tenth of the normal rate, the consumption of oxygen and energy is reduced. Skin muscles and digestive organs and other internal organs receive very little blood, while an animal is submerged because these areas can survive with less oxygen.

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(ix) **What are the fronds?**

Ans The class Filicineae contains seedless plants with foliar sporangia. The leaves are called fronds.

SECTION-II

NOTE: Attempt any Three (3) questions.

Q.5.(a) How biology has helped mankind in construction of environment. (4)

Ans The science of biology has been helping mankind in many ways in increasing food production; in combating diseases and in protecting and conserving environment. Biological advances in the field of food and health have resulted in high standard of living.

Industrialization has helped mankind to raise the standard of living. It has at the same time destroyed our environment. Tons of industrial waste, and effluents in solid, liquid or gas form are being injected into the environment by the industries. These effluents frequently contain sizable amount of certain very toxic even carcinogenic materials. Heavy metals like lead from automobiles, chromium from tanneries, are playing havoc to human health. Environmental pollution has reached alarming level in some countries.

This problem, therefore, needs to be addressed or else, it would soon be out of control in which case the biocomponents of the world ecosystem would suffer irreparable loss and this environment would no longer support life on this planet.

Biology has helped mankind in attracting attention to this problem and the biologists are striving to find the solution to set this environment right, wherever, it has deteriorated. Biologists have already asked for the treatment of industrial effluents to be made obligatory. Several ways of bioremediation (removal or degradation of environmental pollutants or toxic materials by living

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organisms) are also under investigation. For example, algae have been found to reduce pollution of heavy metals by bioabsorption.

Biologists are also working out the list of endangered species of plants and animals which, if not protected would soon be extinct. They have, therefore, stressed the needs for their protection.

The environmental pollution is a national problem in Pakistan. Our rivers, canals are highly polluted with the mixing of city sewage and industrial wastes. The life in freshwater of Pakistan is towards decline. Fish populations have been most adversely affected. We need to take protective measures as early as possible. In cities, particularly, the exhaust from automobiles is enormously adding lead into the atmosphere. There is then a need for lead-free petrol to reduce the pollution.

(b) How CO_2 concentration and humidity affect the rate of transpiration? (4)

Ans **Carbon dioxide concentration:**

Low carbon dioxide concentration (such as those that occurs during the day when photosynthesis exceeds respiration), stimulates the active transport of Potassium ions into the guard cells. This transport (as discussed earlier) cause stomata to open and allow CO_2 to diffuse in the mesophyll cells of leaves. At night, cellular respiration in the absence of photosynthesis raises CO_2 levels. This halts the inward transport of K^+, and thus, of water, allowing the guard cells to become flaccid and stomata close. Thus, transpiration almost stops.

Humidity and vapour pressure:

When air is dry, the rate of diffusion of water molecules, from the surface of mesophyll cells, air spaces, and through stomata to outside the leaf, increases. So, more water is lost, increasing the rate of transpiration. In

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humid air, the diffusion rate is reduced. This decreases the rate of transpiration appreciably.

Q.6.(a) Explain the structure of DNA. (4)

Ans For Answer see Paper 2017 (Group-II), Q.6.(a).

(b) Write a note on ascomycota. (4)

Ans **Ascomycota:**

It is the largest group of fungi, including over 60,000 species, 50% or so occurring in lichens and some, such as morels, are mycorrhizal. Most are terrestrial, though some are marine or freshwater. The group shows diversity from unicellular yeasts to large cup fungi and morels. They produce haploid sexual spores called ascospores by meiosis inside their characteristic sac-like structures called asci (sing. ascus). Meiosis follows nuclear fusion inside the ascus, commonly 8 ascospores are produced inside each ascus. Most sac -- fungi have asci inside macroscopic fruiting bodies called ascocarps -- the visible morels, etc. Their hyphae are septate. They have lengthy dikaryotic phase that forms ascocarps. They reproduce asexually by conidia that are often dispersed by wind.

Yeasts are unicellular microscopic fungi, derived from all the three different groups of fungi but mostly Ascomycetes, and reproducing mostly asexually by budding. However, yeasts reproduce sexually by forming asci / ascospores or basidia / basidiospores. They ferment carbohydrate (glucose) to ethanol and carbon dioxide. Because of this feature and many other reasons, these are of great economic importance. Saccharomyces cerevisiae is the most commonly exploited yeast.

Q.7.(a) What are lysosomes? Explain its phagocytic role with the help of diagram. (4)

Ans For Answer see Paper 2017 (Group-I), Q.7.(a).

(b) Discuss digestion and absorption in small intestine. (4)

Ans **Digestion in small intestine:**

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Small intestine in man consists of duodenum, jejunum and ileum. Duodenum is about 20-25 cm long, which leads into jejunum and then ileum. When chyme passes from stomach into duodenum, its acidity stimulates the release of secretions from pancreas, liver and duodenal cells.

Absorption in small intestine:

As we know that small intestine consists of duodenum, jejunum and ileum. Nearly, all absorption of the products of digestion takes place in the ileum. The internal surface of ileum has many folds, which exhibit velvety appearance due to the presence of numerous finger-like outgrowths called villi. Each villus is richly supplied with blood capillaries and a vessel called lacteal of lymphatic system with a covering of epithelial cells. Electron microscope reveals that these cells have countless, closely packed cylindrical processes, microvilli. The total area of absorption becomes incredibly large due to the enfolding, villi and microvilli. Simple sugars and amino acids are absorbed by diffusion or active transport into the blood capillaries through the microvilli. Some of the fatty acids and glycerol are also absorbed into blood stream. However, a large proportion of fatty acids and glycerol enter the epithelial cells of villi, where they recombine into fats. These fats then enter the lacteals. Proteins present in lymph vessels combine with fat molecules to form lipo-protein droplets. These pass into blood stream via thoracic lymphatic duct. The lipo-proteins are subsequently hydrolysed by blood plasma enzyme and enter body cells, where they may be used in respiration or stored as fat in the liver, muscle of under the skin.

The intestinal contents are pushed along the alimentary canal by normal peristaltic activity. At the end of ileum, there is an ileocolic sphincter that opens and closes time to time to allow a small amount of residue from the ileum to enter the large intestine.

Q.8.(a) Explain lytic cycle of virus in bacteria. (4)

Ans For Answer see Paper 2017 (Group-I), Q.8.(a).

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(b) Sketch Calvin Cycle (no description). (4)

Ans

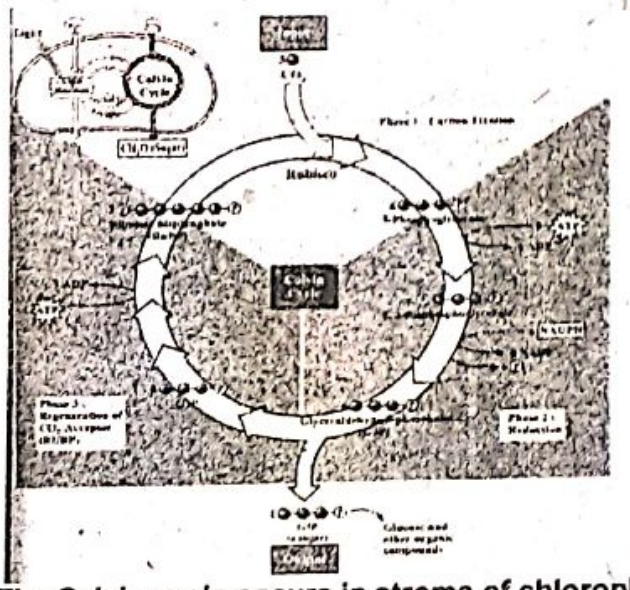

Fig. The Calvin cycle occurs in stroma of chloroplast. Carbon in fixed and reduced to sugar.

Q.9.(a) Discuss nutrition in bateria. (4)

Ans For Answer see Paper 2017 (Group-II), Q.9.(a).

(b) Describe prothallus of adiantum. (4)

Ans The prothallus (gametophyte) is an autotrophic, small, flat, heart-shaped structure. At the anterior end of the prothallus is a notch in which lies the growing point. Its size is about 8 mm at its longest diameter. It is horizontally placed on the soil, and has unicellular rhizoids on its lower surface towards the posterior end. The rhizoids fix the prothallus to the soil and absorb nutrients for it. It is composed of rounded thin walled cells. The margin of the prothallus is one-celled thick but the middle part is many-celled and is cushion-like.

The prothallus is monoecious *i.e.*, male and female sex organs appear on the under-surface of the same prothallus. In the mature prothallus, archegonia occur near the notch and the antheridia are scattered among the rhizoids.

Each antheridium produces numerous spermatozoids which are spirally coiled and multiciliated.

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