Inter (Part-I) 2019

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) What are conjugated compounds?

Ans Two different molecules belonging to different categories, usually combine together to form conjugated molecules (compound). Carbohydrates may combine with proteins to form glycoprotein or with lipids to form glycolipids.

(ii) Differentiate between prosthetic group and coenzyme.

Ans

Prosthetic Group	Coenzyme
If the non-protein part is covalently bonded, it is known as a prosthetic group.	If it is loosely attached to protein part, it is known as coenzyme. Coenzyme can be used again and again.

(iii) How enzyme substrate complex is formed?

Ans The active site of enzyme is made up of two definite regions *i.e.*, the binding site and the catalytic site. The binding site helps the enzyme in the recognition and binding of proper substrate to produce an ES complex. This reaction activates the catalytic site. Activated catalytic site catalyzes the transformation of the substrate into product(s).

$$\underset{\text{Enzyme}}{E} + \underset{\text{Substrate}}{S} \rightleftharpoons \underset{\substack{\text{Enzyme}\\ \text{substrate complex}}}{ES} \rightleftharpoons \underset{\text{Enzyme}}{E} + \underset{\text{Product}}{P}$$

(iv) If more enzymes are added in a system, its rate of reaction remains unchanged, why?

Ans By increasing the enzyme molecules, an increase in the number of active sites takes place. More active sites

will convert the substrate molecules into product(s), in the given period of time. After a certain limiting concentration, the rate of reaction will no longer depend upon this increase.

(v) Define rust. Give example.

Ans Rusts are called so because of numerous rusty, orange-yellow coloured disease spots on their host surface (mostly stem, leaves), later revealing brick/rust-red spores of the fungus.

(vi) What are symptoms of ergotism?

Ans Ergotism is caused by eating bread made from purple ergot-contaminated rye flour. The poisonous material in the ergot causes nervous spasm, convulsion, psychotic delusion and even gangrene.

(vii) Differentiate between enterocoelous and schizocoelous feature.

Ans

Enterocoelous	Schizocoelous
1. Coelom is developed as an outpouching of archenterons.	1. Coelom or body cavity is formed due to splitting of mesoderm.
2. This is characteristic of Deuterostomes.	2. This is characteristic of Protostomes.

(viii) What is blastostyle?

Ans In Obelia, there is asexual as well as sexual reproduction. It has a kind of zooid known as blastostyle, which gives rise to individual zooids called medusae by asexual method.

(ix) How madrepora is important?

Ans The body is covered with hard calcareous skeleton formed of calcium carbonate. They are commonly called corals. The skeleton forms large coral reefs and even small islands.

(x) Write similarities of birds and reptiles.

Ans

Birds	Reptiles
1. Birds, as we all know, lay eggs outside their body.	1. Reptiles are oviparous too. In fact, the amniotic egg shells are common to both species.
2. Birds' body is covered with feathers. They have scales on their legs and feet. Their beaks and claws have scales too. Limbs are adapted for flying.	2. Scales in reptiles perform various functions that are vital to their survival. Most reptiles have better development for efficient locomotion.

(xi) Draw action spectrum showing photosynthesis rate at various light colours.

Ans Action spectrum can be obtained by illuminating plant with light of different wavelengths (or colours) and then estimating relative CO_2 consumption or oxygen release during photosynthesis.

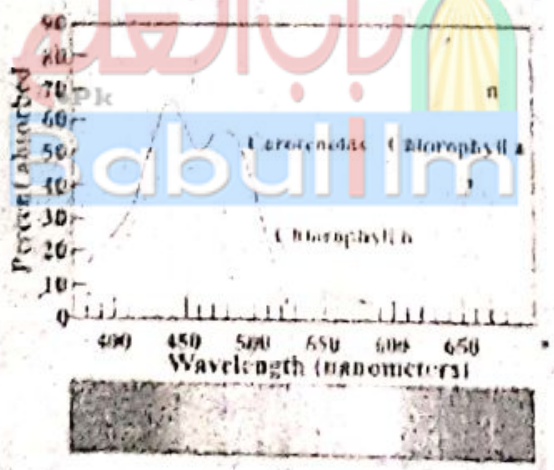

Fig. Absorption spectrum of chlorophyll and carotenoids.

Action spectrum of photosynthesis corresponds to absorption spectrum of chlorophyll. The same two peaks and the valley are obtained for absorption of light as well as for CO_2 consumption. This also shows that chlorophyll is the photosynthetic pigment.

(xii) Differentiate between chlorophyll-a and chlorophyll-b.

Ans Chlorophyll a and chlorophyll b differ from each other in only one of the functional groups bonded to the porphyrin; the methyl group ($-CH_3$) in chlorophyll a is replaced by a terminal carbonyl group (–CHO) in chlorophyll b. Due to this slight difference in their structure, the two chlorophylls show slightly different absorption spectra and hence different colours. Some wavelengths not absorbed by chlorophyll-a are very effective absorbed by chlorophyll-b and vice versa. Such differences in structure of different pigments increase the range of wavelength of the light absorbed. Chlorophyll-a is blue-green while chlorophyll-b is yellow-green.

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

(i) Define biotechnology.

Ans It deals with the use of living organisms, systems or processes in manufacturing and service industries.

(ii) What is deductive reasoning?

Ans **Deductive reasoning:**

A process of predicting new facts or processes for which new experiments can be designed and new information collected.

(iii) What is magnification?

Ans Magnification is the ability to make small things seem larger, such as make a microscopic organism visible.

(iv) Describe salient features of cell theory.

Ans The salient features of cell theory in its present form are as follows:

1. All organisms are composed of one or more cells.
2. All cells arise from pre-existing cells.

3. Cell is the basic structural as well as functional unit for all organisms.

(v) What is thromboembolism?

Ans Thrombus is a solid mass or plug of blood constituents (clot) in a blood vessel. This mass may block (wholly or only in part) the vessels in which it forms, or it may be dislodged and carried to some other location in the circulatory system, in which case it is called an embolus. Thrombosis is the formation of thrombus. Thromboembolism is leading cause of deaths in western civilization.

(vi) What is systemic circulation?

Ans Systemic circulation carries oxygenated blood from the left ventricle, through the arteries, to the capillaries in the tissues of the body. From the tissue capillaries, the deoxygenated blood returns through a system of veins to the right atrium of the heart.

(vii) How green algae and plants are identical?

Ans

1. Both have chlorophyll-a, chlorophyll-b and carotenoids present in the chloroplasts.
2. Their main energy reserves are stored as starch.
3. Most green algae and plants possess cell walls with cellulose.

(viii) What are trichonymphas?

Ans Trichonymphas are complex, specialized flagellates, with many flagella which live as symbionts in the guts of termites and help in the digestion of dry wood.

(ix) Write two characteristics of dinoflagellates?

Ans The characteristics of dinoflagellates are as follows:

1. Dinoflagellates are mostly unicellular.

2. Their cells are often covered with shells of inter-locking cellulose plates impregnated with silicates.

(x) What are the basis of diversity in protista?

Ans During the course of evolutionary history, organisms in the kingdom protista have evolved diversity in their (a) size and structure, (b) means of locomotion, (c) ways of obtaining nutrients, (d) interactions with other organisms, (e) habitat, and (f) modes of reproduction. Diverstiy is exhibited by all of the major protist groups.

Based on the diversity, most biologists regard the protists kingdom as a polyphyletic group of organisms; that is, the protists probably do not share a single common ancestor.

(xi) What is protonema?

Ans The spore of a moss, unlike that of liverworts develops into an alga-like structure, called protonema. Haploid moss plants develop from buds on the protonema and the life cycle is completed.

(xii) What are integuments?

Ans Integuments are specialized protective coverings around megasporangium which vary in number.

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

(i) Give disadvantages of common names.

Ans Common names have no scientific basis. Common names cause many problems. Different regions have different names for the same organism. Take 'Onion', for example; its common Urdu name is 'Piyaz' but in different regions of Pakistan, it is also known as 'ganda' or 'bassal' or 'vassal'. In different countries, it would have another set of names. Similarly, 'amaltas', 'argvad', 'gurmala', 'golden

shower', 'purging cassia' are common names for the same plant. Thus the same plant may have different names.

(ii) **Name different types of bacteria on the basis of flagella presence.**

Ans Some different types of bacteria are as follows:

1. Monotrichous (single polar flagellum).
2. Amphitrichous (tuft of flagella on both sides).
3. Lophotrichous (tufts of flagella at one side).
4. Peritrichous (numerous flagella all over the bacterial body).

(iii) **Enlist various functions of oral cavity.**

Ans The oral cavity performs several functions as follows:

1. Selection of food
2. Grinding or mastication
3. Lubrication
4. Digestion
5. Swallowing

(iv) **What is peristalsis and antiperistalsis?**

Ans **Peristalsis:**

These are characteristic movements of the digestive tract by which food is moved along the cavity of the canal. It consists of the wave of contraction of the circular and longitudinal muscles of digestive tract preceded by the wave of relaxation thus squeezing the food down along the canal.

Antiperistalsis:

Sometimes peristaltic movements are reversed and food may be passed from the intestine back into stomach and even into mouth. This movement is called antiperistalsis, leading to vomiting.

(v) Tubular digestive system is more efficient than sac-like digestive system. Give reasons.

Ans There is only one cavity in the body called gastro vascular cavity, which has only mouth which serves for the entry of food and water, and also for removal of wastes along with water. This is known as sac-like digestive system, having a common opening for ingestion and egestion. The tubular digestive system is of tube type *i.e.,* having mouth at the anterior end for ingestion and the anus at the posterior end for egestion. It is more efficient system than sac like digestive system having specialized organs or partitions for efficient digestion and absorption of food.

(vi) Why ventilation in water is far more difficult than air?

Ans Breathing or ventilation of water is far more difficult than ventilation of air because water is 8,000 times more dense than air.

In terms of viscosity, the water is 50 times more viscous, which makes it more difficult for exchange of gases, as compared to air.

(vii) Write down the causes of asthma.

Ans It is an allergic reaction to pollen, spores, cold, humidity, pollution, etc., which manifests itself by spasmodic contraction of small bronchiole tubes. Asthma results in the release of inflammatory chemicals such as histamines into the circulatory system that cause severe contraction of the bronchiole.

(viii) What happens when diving reflex is activated?

Ans Diving mammals have almost twice the volume of blood in relation to their body weight as compared to non-divers. Most of the diving mammals have high

concentration of myoglobin in their muscles. Myoglobin binds extra oxygen.

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. The blood is redistributed but most of the blood goes to the brain and heart which can least withstand anoxia. 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. Muscles shift from aerobic to anaerobic respiration.

(ix) Briefly describe tuberculosis.

Ans Tuberculosis is disorder of respiratory system. In fact, it is the general name of a group of diseases caused by *Mycobacterium tuberculosis*. Pulmonary tuberculosis is a disease of lungs in which inside of the lung is damaged resulting in cough and fever. It is more common in poor people. Malnutrition and poor living conditions facilitate Mycobacterium to grow. This disease is curable with proper medical attention. It is a contagious disease.

SECTION-II

NOTE: Attempt any Three (3) questions.

Q.5.(a) Write a note on protection and conservation of environment. **(4)**

Ans The contamination of environment with harmful unwanted chemicals is called pollution. Industrialization has raised the standard of living of mankind. At the same time, it has destroyed our environment. These industries are producing a huge amount of industrial wastes. These

wastes pollute our environment. Environmental pollution has reached alarming level in some countries.

Effects of Pollution on Health:

(i) The industrial waste contains a large amount of toxic and carcinogenic (cancer-causing) materials.

(ii) Automobiles and tanneries produce heavy metals like chromium. These metals affect our health.

(iii) There is loss of biocomponents from the world ecosystems due to environmental pollution. If this continues for longer time, life will become impossible on the earth.

Control of Pollution:

Biology has helped mankind to control pollution. The biologists are trying to protect the environment:

(i) The biologists have made it compulsory for the industrialists to treat the industrial waste.

(ii) The biologists are using the technique of bioremediation. The removal or the degradation of the environmental pollutants or toxic materials, by living organisms is called bioremediation. For example, algae reduce pollution of heavy metals by bioabsorption.

Endangered Species:

The species that are near to extinct are called endangered species. The biologists are preparing the lists of the endangered species of plant and animals. They have stressed the needs for their protection.

Environmental Pollution in Pakistan:

The environmental pollution is a national problem of Pakistan. The city sewage and industrial waste mix up with our rivers and canals. It makes them highly pollutant.

The freshwater organisms are decreasing in Pakistan. The fish population has been adversely affected. Measures should be taken to protect them. Automobiles produce lead in the atmosphere in cities. Lead-free petrol should be used to reduce pollution.

(b) Give any eight functions of blood.

Ans For Answer see Paper 2017 (Group-II), Q.5.(a).

Q.6.(a) What are polysaccharides? Discuss starch and glycogen in detail. (4)

Ans **Polysaccharides:**

Polysaccharides are the most complex and the most abundant carbohydrates in nature. They are usually branched and tasteless. They are formed by several monosaccharide units linked by glycosidic bonds. Polysaccharides have high molecular weights and are only sparingly soluble in water. Some biologically important polysaccharides are starch, glycogen, cellulose, dextrins, agar, pectin and chitin.

Starch:

It is found in fruits, grains, seeds, and tubers. It is the main source of carbohydrates for animals. On hydrolysis, it yields glucose molecules. Starches are of two types: amylose and amylopectin. Amylose starches have unbranched chains of glucose and are soluble in hot water. Amylopectin starches have branched chains and are insoluble in hot or cold water. Starches give blue colour with iodine.

Glycogen:

It is also called animal starch. It is the chief form of carbohydrate stored in animal body. It is found abundantly

in liver and muscles, though found in all animal cells. It is insoluble in water, and gives red colour with iodine. It also yields glucose on hydrolysis.

(b) Describe, giving example, different ways in which fungi are useful to human.

Ans

USES OF FUNGI

1. As Source of Food:

Certain fungi are edible.

Examples of edible fungi are:

Mushrooms	*e.g., Agaricus sp.*
Morels	*e.g., Morchella esculenta*
Truffles	

Reindeer moss:

(A lichen) is used as food for reindeer in cold regions.

Use in Food Industry:

Certain fungi are used in food industry.

Yeasts:

Yeasts are used in production of bread and liquor.

Penicillium:

Penicillium species are used for giving flavour, aroma and colour to some cheese.

Aspergillus:

Some species of Aspergillus are used for producing soya sauce and soya paste from soya bean.

Citric acid is also obtained from some species of Aspergillus.

2. Antibiotics & Drugs:

Some fungi are source of antibiotics and some other drugs.

Penicillin:

Penicillin, first antibiotic to be ever discovered is obtained from *Penicillium notatum*.

Lovastatin:

It is used for lowering blood cholesterol.

Cyclosporin:

It is used in organ transplantation for preventing transplant rejection.

Ergotine:

It is used to relieve migraine (a kind of headache).

Griseofulvin:

It is used to inhibit fungal growth.

Dyes:

Some natural dyes are obtained from lichens and are used in textile industry.

3. Use in Biological Research:

Yeasts:

Yeasts are used in genetic / molecular biological research; and for production of hormones.

Neurospora:

It is used for genetic research.

In 1983, a functional artificial chromosome was made in *Saccharomyces cervisiae*.

This yeast was the first eukaryote whose genomic sequence was completely studied in 1996.

Q.7.(a) Describe characteristics of cyanobacteria. (4)

Ans Cyanobacteria are prokaryotic organisms. They were previously known as "blue-green algae."

Following are the characteristics of cyanobacteria:

Size:

They range in diameter from 1-10 µm.

Shape:

They vary greatly in shape and appearance. They may be unicellular, colonial or filamentous. A filament consists of a chain of cells (trichomes) surrounded by mucilaginous sheath.

Cell Wall:

They have Gram negative type of cell wall.

Locomotion:

They lack flagella and use gas vesicles to move in water. Many filamentous species have gliding motility.

Photosynthesis:

Cyanobacteria are photosynthetic bacteria. They carry out oxygenic photosynthesis. They use water as an electron-donor and generate oxygen during photosynthesis.

Photosynthetic system:

Their photosynthetic system closely resembles to eukaryotes because they have photosystem-II and chlorophyll "a".

Photosynthetic Pigments:

In addition to chlorophyll "a", the cyanobacteria contain accessory pigments called phycobilins.

Photosynthetic pigments and electron transport chain components are located in thylakoid membranes linked with particles called phycobilisomes.

"Phycocyanin" pigment (blue) is predominant phycobilin.

Calvin Cycle:

CO_2 fixation occurs through Calvin cycle.

Reserve Food Material:

Reserve food material in cyanobacteria is glycogen.

Heterocysts:

Heterocysts are nitrogen-fixing cells.

Reproduction:

Cyanobacteria reproduce by binary fission, fragmentation and akinetes formation.

(b) What adaptation made bryophytes able to live on land?

Ans In general, bryophytes developed the following adaptive characters for terrestrial environment:

(i) Formation of a compact multicellular plant body which helped in the conservation of water by reducing cell surface area exposed to dry land conditions. Presence of cuticle further reduces loss of water by evaporation.

(ii) Development of photosynthetic tissues into special chambers for the absorption of carbon dioxide without losing much water and exposure to light.

(iii) Formation of special structures like rhizoids for absorption of water and anchorage.

(iv) Heterogamy (production of two types of gametes) is evolved, forming non-motile egg containing stored food and motile sperms.

(v) Gametes are produced and protected by the special multicellular organs (antheridia and archegonia).

(vi) Multicellular embryo is formed which is retained and protected inside the female reproductive body during its development.

(vii) Alternation of spore-producing generation (sporophyte) with gamete-producing generation (gametophyte) enabled the plant to produce and test the best genetic combinations for the versatile terrestrial conditions.

Q.8.(a) Describe lytic cycle of bacteriophage. (4)

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

(b) Write note on Calvin Cycle.

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

Q.9.(a) Define plastids. Discuss structure and function of chloroplast. (4)

Ans Plastids:

Membrane-bound, mostly pigment containing bodies present in the plant cells are called plastids. They are green in colour. They are present in green leaves, fruits and in sepals.

Plastids are present only in plant cells.

There are three main types of plastids:

1. Chloroplasts 2. Chromoplasts
3. Leucoplasts

1. Chloroplasts:

There are membrane-bound structures containing a green pigment (chlorophyll).

Size:

Chloroplasts vary in their shape and size with a diameter of about 4-6 μm.

Structure:

Under light microscope, they appear to be heterogeneous structures with small granules known as grana embedded in the matrix.

Under electron microscope, a chloroplast shows three main components:

(a) Envelope (b) Stroma (c) Thylakoid

Envelope:

It is formed by a double membrane.

Stroma:

It covers most of the volume of the chloroplast.

Stroma is a fluid which surrounds the thylakoids. It contains proteins, ribosomes and a small circular DNA. In this part, CO_2 is fixed to sugars. Dark reactions of photosynthesis and some proteins are also synthesized here.

Thylakoids:

Thylakoids are the flattened vesicles which arrange themselves to form grana and intergrana. About 50 or

more thylakoids piled to form one granum. Chlorophyll molecules are arranged on thylakoids membrane. Each granum is connected with others by non-green part called intergranum.

Membranes of the grana are the sites where light energy is trapped to form ATP.

Chlorophyll:

Green pigment in chloroplast is chlorophyll. Chlorophyll molecule resembles haem group of haemoglobin. The main difference between these two molecules is that chlorophyll has Mg^{+2} while haem has Fe^{+2} as central atom.

2. Chromoplasts:

They give colours to the plants other than green. They are present in the petals of the flower and ripened fruits.

The beautiful colours of flowers are due to chromoplasts.

Function:

They help in pollination and dispersal of seeds.

3. Leucoplasts:

(a) They are colourless plastids.
(b) They are triangular, tubular or of some other shape.
(c) They are found in the underground parts of the plant and store food.

(b) Discuss the process of absorption of food in small intestine.

Ans For Answer see Paper 2018 (Group-II), Q.7.(b).