
Class 11 - Biology
Sample Paper - 01 (2024-25)

Maximum Marks: 70

Time Allowed: : 3 hours

General Instructions:

- i. All questions are compulsory.
 - ii. The question paper has five sections and 33 questions. All questions are compulsory.
 - iii. Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.
 - iv. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
 - v. Wherever necessary, neat and properly labeled diagrams should be drawn.
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Section A

1. Example of interspecific hybrid is:

- a) Tigon and liger
- b) Cat and lion
- c) Tigon and tiger
- d) Liger and dog

2. The epithelial cells of Bowman's capsule are called:

- a) Calyces
- b) Filtration slits
- c) Podocytes
- d) Slit pores

3. What is the name of heterocyclic carbon compound attached to sugar?

- a) Nucleic acid
- b) All of these
- c) Nucleotide
- d) Nucleoside

4. Monocotyledonous leaves are_____.

- a) Dorsiventral
- b) Round
- c) Pinnate
- d) Isobilateral

5. In breathing movements, air volume can be estimated by:

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- a) Hygrometer
 - b) Spirometer
 - c) Stethoscope
 - d) Sphygmomanometer

6. Electrons from excited chlorophyll molecules of photosystem II to photosystem I transferred and finally convert:

- a) NADH to NAD
- b) PGA to NAD
- c) ATP to NADH
- d) NAD to NADH

7. Urea cycle operates in:

- a) Liver
- b) Lungs
- c) Skin cells
- d) Sweat glands and sebaceous glands

8. The number of nymphs produced from single ootheca of the frog is _____.

- a) 12
- b) 16
- c) 15
- d) 10

9. Phytochrome is sensitive to:

- a) Blue light
- b) Yellow light
- c) Red and far-red light
- d) Green light

10. In gymnosperms, cross-pollination is accompanied by-

- a) Water
- b) Bats
- c) Insects
- d) Wind

11. Diabetes insipidus is caused due to:

- a) Reduced secretion of ADH
- b) Hypotension
- c) Impaired urea cycle
- d) Increased secretion of ADH

12. How will you define the lungs?

- a) Respiratory Control Centre
- b) Pneumotaxic Centre

- c) Chemosensitive Centre
- d) Respiratory Rhythm Centre

13. **Assertion (A):** The Plasmodium often possesses a number of branched **veins**.

Reason (R): The position of **veins** remains fixed.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

14. **Assertion (A):** Inspiration can occur if the pressure within the lungs (intrapulmonary pressure) is less than the atmospheric pressure.

Reason (R): Expiration takes place when the intrapulmonary pressure is higher than the atmospheric pressure.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

15. **Assertion:** Oils have a lower melting point and hence remain as oil in winters.

Reason: Oil is a saturated fatty acid.

- a) Assertion and Reason both are true and the Reason is correct explanation of Assertion.
- b) Assertion and Reason both are true but Reason is not the correct explanation of Assertion.
- c) Assertion is true but Reason is wrong.
- d) Assertion and Reason both are wrong.

16. **Assertion (A):** Abdominal muscle is related with respiration in animals.

Reason (R): Relaxation of abdominal muscles draws in air.

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true but R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

Section B

17. Stomata are present on the ventral side of a dicot leaf. What may be the reason?

18. What is the difference between cutaneous and pulmonary respiration?

19. Give example of Androgens and estrogens

20. Why is death considered as a regulatory process on the earth?

21. A cyclic process is occurring in C_3 -plants, which is light-dependent and needs CO_2 . This process does not produce, but consumes energy.

- i. Can you name the given process?
ii. Is it essential for survival?

OR

Does moonlight support photosynthesis?

Section C

22. Distinguish between Red, Brown and Green Algae.
23. Endoparasites are found inside the host body. Mention the special structure, possessed by these and which enables them to survive in those conditions.
24. List two properties of enzymes.
25. Distinguish between Auxins and Gibberellins.
26. Give the name of the bones present in the lower leg in humans.
27. Explain double circulation.

OR

What is the significance of the time gap in the passage of action potential from the sinoatrial node to the ventricle?

28. Write short note on neural coordination.

Section D

29. Read the following text carefully and answer the questions that follow:

The morphology of the mycelium, mode of spore formation, and fruiting bodies form the basis for the division of the fungi kingdom into various classes which include four sub-division Phycomycetes, ascomycetes, basidiomycetes, Deuteromycetes. Members of Phycomycetes are found in aquatic habitats and on decaying wood in moist and damp places or as obligate parasites on plants, ascomycetes are mostly multicellular. The asexual spores are conidia produced exogenously on the special mycelium called conidiophores. Basidiomycetes are mushrooms, bracket fungi or puffballs. They grow in soil, on logs and tree stumps and in living plant bodies as parasites. The basidiospores are exogenously produced on the basidium.

Classification of Fungi			
Phycomycetes (Lower Fungi)	Ascomycetes (Sac Fungi)	Basidiomycetes (Club Fungi)	Deuteromycetes (Fungi imperfecti)
Saprolegnia	Yeast	Agaricus	Cercospora
Rhizopus	Aspergillus	Polyporus	Collectotrichum
Mucor	Pencillium	Puccinia	Trichoderma
Albugo	Neurospora	Ustilago	Pyricularia
Pythium	Peziza	Lycoperdon	Fusarium

- i. Observed given table of Classification of Fungi and identify the class of fungi in which asexual spores are not found, vegetative reproduction occurs by fragmentation, and sexual organs are absent. (1)

- ii. Where are Members of Phycomycetes found? (1)
- iii. What is ascomycetes? What is the characteristic feature of ascomycetes and basidiomycetes? (2)

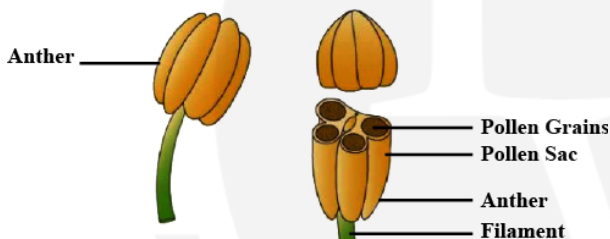
OR

Identify the figure given below. Also, mention its characteristics. (2)



30. Read the following text carefully and answer the questions that follow:

The androecium is composed of stamens. Each stamen that represents the male reproductive organ consists of a stalk or a filament and an anther. Each anther is usually bilobed and each lobe has two chambers, the pollen-sacs. Stamens of flowers may be united with other members such as petals or among themselves. The stamens may be epipetalous or epiphyllous. A flower is a modified shoot wherein the shoot apical meristem changes to floral meristem. Internodes do not elongate and the axis gets condensed. The apex produces different kinds of floral appendages laterally at successive nodes instead of leaves. The arrangement of flowers on the floral axis is termed an inflorescence.



- i. Observe the figure and mention what is androecium composed of. (1)
- ii. The pollen grains are produced in pollen-sacs. What is a sterile stamen called? (1)
- iii. Is salvia and mustard show variation in the length of filaments within a flower? (2)

OR

Mention statement justifies that the given figure is racemose inflorescence. (2)



Section E

31. Mitosis results in producing two cells that are similar to each other. What would be the consequence if each of the following irregularities occur during mitosis?
- i. Nuclear membrane fails to disintegrate
 - ii. Duplication of DNA does not occur
 - iii. Centromeres do not divide

iv. Cytokinesis does not occur.

OR

Explain, why a pair of homologous chromosomes is genetically different, but a pair of sister chromatids is genetically identical before crossing over in meiosis.

32. Give an account of Glycolysis. Where does it occur? What is the end product? Trace the fate of these products in both aerobic and anaerobic respiration.

OR

Where is the electron transport system operative in mitochondria? Explain the system highlighting the role of oxygen.

33. The cells of a unicellular organism are usually spherical whereas those of multicellular tend to be many-sided. Why?

OR

What is the difference between cell wall and ribosomes of a prokaryotic and a eukaryotic cell?

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Solution

Section A

1. (a) Tigon and liger

Explanation:

Tigon and liger are produced by hybridization of two interspecific species. Although hybridization generally takes place between the same species.

2. (c) Podocytes

Explanation:

Podocytes are cells in the Bowman's capsule in the kidneys that wrap around capillaries of the glomerulus. The Bowman's capsule filters the blood, retaining large molecules such as proteins while smaller molecules such as water, salts, and sugars are filtered as the first step in the formation of urine.

3. (d) Nucleoside

Explanation:

A nucleoside is formed by the linkage of the nitrogenous base to the -OH group at the first carbon of the pentose sugar through an N-glycosyl linkage.

4. (d) Isobilateral

Explanation:

Monocotyledonous leaves are isobilateral as both the lower and upper sides of the leaves are the same.

5. (b) Spirometer

Explanation:

In breathing movements, air volume can be estimated by the spirometer.

6. (d) NAD to NADH

Explanation:

After absorbing light, electrons are excited and transferred through PS II and PS I and finally to NAD forming NADH.

7. (a) Liver

Explanation:

Urea cycles operate in the liver, where ammonia is converted into urea. Sometimes urea cycle also occurs in the kidney.

8. (b) 16

Explanation:

Young ones of frogs are called nymphs. When the ootheca ruptures, 16 nymphs come out.

9. (c) Red and far-red light

Explanation:

Phytochrome is a photoreceptor and a pigment that plants, and some bacteria and fungi, use to detect light. It is sensitive to light in the red and far-red regions of the visible spectrum.

10. (d) Wind

Explanation:

In Gymnosperms, cross-pollination is mainly accompanied by wind. The pollen grains are produced in large quantities and generally lighter.

11. (a) Reduced secretion of ADH

Explanation:

Diabetes insipidus is a rare variety of diabetes characterized by excessive thirst and excretion of a large amount of urine. It is caused due to reduced secretion of antidiuretic hormone (ADH) or vasopressin hormone.

12. (d) Respiratory Rhythm Centre

Explanation:

The lung is a bag-like structure made up of bronchioles and alveoli. This is the place where the exchange of gases takes place.

13. (c) A is true but R is false.

Explanation:

The Plasmodium often possesses a number of branched **veins**. The protoplasm present in the veins show reversible streaming movement. The **veins** disappear and reappear as the Plasmodium moves about.



Physarum, Plasmodium - advancing in the direction of the arrows.

14. (b) Both A and R are true but R is not the correct explanation of A.

Explanation:

Both A and R are true but R is not the correct explanation of A.

15. (c) Assertion is true but Reason is wrong.

Explanation:

Unsaturated fat are usually called **oils**.

16. (a) Both A and R are true and R is the correct explanation of A.

Explanation:

In higher group of animals, respiratory process is directly related with abdominal muscles. Relaxation of abdominal muscles draws in air through spiracles, tracheae and tracheole. This air enters the body fluid through terminal opening & tracheoles. It then diffuses through the body fluid to reach the cells. Contraction of abdominal muscles drives air out from the tracheal system through spiracles. This back and forth movement of abdominal muscles regulates the whole respiratory process.

Section B

17. The ventral surface is facing the sun while the dorsal surface is usually away from the sun. Stomata need to be in the direction of sun for facilitating transpiration and absorption of light energy.
18. When breathing takes place by diffusion through the skin, it is called cutaneous respiration. When breathing takes place through the lungs, it is called pulmonary respiration. When a frog is underwater, it breathes by cutaneous respiration. When a frog is on land, it breathes by pulmonary respiration.
19. The most well known androgen is testosterone, which is responsible for developing the secondary sex characteristics in men. Another well-known androgen is dihydrotestosterone (DHT).
Example of Estrogens are Estrone, Estradiol, estriol.
20. Every organism which is born on this earth has some role with respect to another organism, ecosystem and biospheres existing on earth. After performing its functional part in its life cycle it contributes to the cycle of nature and dies. This way natural control on all natural process is maintained. This is why the death of the organism is inevitable.
21. i. Photorespiration.
ii. Yes, because by consuming oxygen at a higher temperature, it protects the chlorophyll from photo-oxidation.

OR

The intensity of moonlight is several thousands times less than that of direct sunlight, insufficient for the light-dependent phase of photosynthesis. So photosynthesis does not occur in the moonlight.

Section C

22.	Red Algae	Brown Algae	Green Algae
	Mainly marine.	Marine forms.	Chiefly freshwater.
	Only a few are unicellular.	Unicellular forms do not exist.	Unicellular species are more.
	Thylakoids unstacked.	Occur in groups of three.	Stacked in groups of 2-20.
	Only chlorophyll-a present.	Chlorophyll 'a' and 'c' present.	Chlorophyll 'a' and 'b' is present
	Fucoxanthin present	Fucoxanthin is present.	Fucoxanthin is absent.
	Phycobilins present	Absent	Phycobilins absent.
	Reserve food is Floridean starch.	Reserve food is Laminarin.	Reserve food is starch.
	Motile stages are not observed.	Present.	The motile stage is present.

23. Endoparasites live in nutrient rich environment so most of their adaptations help them in maximizing absorption. In tape worm and round worm; there is an absorbent layer called tegument outside the body. This layer has villi-like structure which helps in better absorption of food. The endoparasites living in small intestine or large intestine get pre-digested food from their hosts so many of them may not have gut. However, some of them have both gut and anus. Tapeworms also have suckers in mouth to absorb nutrients.

Endoparasites also show mechanisms to get transferred from one host to another. Sometimes, a part of their life cycle is spent in an intermediary host; such as in malarial parasite.

24. **Properties of enzymes:** Two important properties of enzymes may be listed as below :

Catalytic property: Enzymes are very similar to inorganic catalysts. They enhance the **rate of a chemical reaction** without themselves getting changed at all in the process.

Specificity: Enzymes are known to be very specific in the action. Most of the enzymes are absolutely specific i.e., they can act on only one chemical compound. Others are specific in the sense that they act only on a particular type of chemical linkage.

25.	Auxins	Gibberellins
	Induce rooting.	Do not induce rooting.
	Show apical dominance.	Do not show apical dominance.
	Have single/double unsaturated ringed structure.	Show gibbane-ringed structure.
	No bolting	Bolting occurs.
	Transportation is only basipetal.	Transportation is acropetal and basipetal both.
	Genetically dwarf shoots are unable to undergo elongation by its application.	By its application, the genetically dwarf shoots undergo elongation.

26. **Hind limb:** It consists of 30 bones. The femur is thigh bone. It is the longest bone of the body. Its upper end is called a head. The head fits into the acetabulum of the pelvic girdle. The patella is a small, sesamoid bone found on the anterior surface of the knee forming **knee cap (patella)**.

Two bones lie in the shank region of the leg

- i. tibia and
- ii. fibula

Seven tarsal bones make ankle. The foot possesses 7 tarsals.

Metatarsals: Phalanges are **five** in number. There are only two phalanges in the first digit called **hallux** and **three** in each of the rest toes.

27. **Double Circulation.** The heart is the pumping organ. It pumps blood to the various body organs, through closed vessels. From the left ventricle, blood goes with **aorta** which sends it to the arteries for supplying the body organs. From the body tissues, blood is returned to the right atrium through two veins superior and inferior vena cava. This type of circulation is known as **systemic circulation**.

From the right ventricle, blood is pumped into the pulmonary trunk which divides into the **pulmonary arteries** each of which goes to the lung. Here the blood is oxygenated. The oxygenated blood is returned to the left atrium through **pulmonary veins**. This is called **pulmonary circulation**.

OR

SA Node has a **resting potential** of approx. -55 to -60 mV. It is a **pacemaker**. Cardiac impulses originate in it and atrial contraction proceeds ventricular contraction. This has the highest degree of self-contraction that is approx. 70-75 times per minute. Cardiac impulses reach A.V. Node app. 0.03 second after their origin from SA Node.

28. **Neural Coordination.** The functions of the organs/ organ systems in our body must be coordinated to maintain homeostasis. Coordination is the process through which two or more organs interact and complement the functions of

one another. For example, when we do physical exercises, the energy demand is increased for maintaining an increased muscular activity. The supply of oxygen is also increased. The increased supply of oxygen necessitates an increase in the rate of respiration, heart beat and increased blood flow via blood vessels. When physical exercise is stopped, the activities of nerves, lungs, heart and kidney gradually return to their normal conditions. Thus, the functions of muscles, lungs, heart, blood vessels, kidney and other organs are coordinated while performing physical exercises. In our body the neural system and the endocrine system jointly coordinate and integrate all the activities of the organs so that they function in a synchronized fashion.

Section D

29. i. In basidiomycetes asexual spores are not found, vegetative reproduction occurs by fragmentation, and sexual organs are absent.
- ii. i. Aquatic habitats
ii. On decaying wood
- iii. • Ascomycetes are commonly known as sac-fungi as they are produced in a sac-like structure known as ascus.
• Dikaryon formation is the characteristic feature of ascomycetes and basidiomycetes.

OR

- Agaricus
 - Agaricus is a fleshy saprophytic fungus with over 300 species and contains both edible and poisonous species. It is found in wet and damp climates. It grows on wood and in humus-rich soil.
30. i. An androecium is the male part of the flower which is composed of a long filament and an anther attached to its tip.
ii. Sterile stamen is called staminode.
iii. Yes, salvia and mustard show variation in the length of filaments within a flower.

OR

- a. The main axis continues to grow.
- b. The flowers are borne laterally in an acropetal succession.

Section E

31. i. If the nuclear membrane fails to disintegrate, then the spindle fibres would not be able to reach chromosomes. As a result, the chromosomes would not be able to reach the opposite poles of the cell.
ii. If DNA duplication does not take place, then the cell may not be able to reach the M phase. This will result in the cessation of the cell cycle.
iii. If the division of centromeres does not take place, then one of the daughter cells will get a complete pair of chromosomes and another daughter cell will get none. This may result in trisomy. Trisomy is a type of the abnormal number of chromosomes, i.e. aneuploidy.
iv. If cytokinesis does not occur, then a cell with multinucleate condition would be formed.

OR

A pair of homologous chromosomes are genetically different because in a set of homologous chromosomes, one of the chromosomes belongs to the male parent and the other comes from the female parent. Therefore, one of a pair will contain paternal genes and the other will contain maternal genes.

However, a pair of sister chromatids are genetically identical before crossing over as the chromatids are formed from the replication of DNA during the 'S' phase of interphase. DNA replication ensures that the DNA content is doubled with identical genes being copied from the original DNA. Therefore, there is no genetic variation because there is no exchange of genetic material between sister chromatids.

If crossing over occurs, then it would be possible for some genes to be exchanged between the chromatids of homologous chromosomes that have chiasmata, thus leading to genetic variation.

32. Glycolysis occurs in the cytoplasm of the cell and is present in all living organisms. In this process, glucose undergoes partial oxidation to form two molecules of pyruvic acid. The following are the important step of glycolysis.

- Glucose undergoes phosphorylation to produce glucose- 6 -phosphate.
- Fructose-6-phosphate is then converted into PGAL. (Phosphoglyceraldehyde).
- Each molecule of PGAL then undergoes several steps to produce Pyruvic Acid.
- There is a net gain of two molecules of ATP during glycolysis of one molecule of glucose.

Fate of Pyruvate: Aerobic Respiration: Pyruvic acid is completely oxidized to produce carbon dioxide and energy.

Anaerobic Respiration: Depending upon the availability of oxygen in some organisms. pyruvic acid is converted into ethanol and carbon dioxide when there is a complete absence of oxygen. In some other organisms, pyruvic acid is converted into lactic acid when there is an incomplete oxygen supply.

OR

Electron Transport System (ETS): The metabolic pathway by which the electrons passes from one carrier to another is known as the **electron transport system**. It is operative in the inner mitochondrial membrane of mitochondria. The electrons from NADH produced in the mitochondrial matrix during the citric acid cycle are oxidised by an **NADH dehydrogenase** (Complex I). Electrons are then transferred to Ubiquinone that receives reducing equivalents via FADH, {generated during oxidation of succinate) by the activity of **Succinic dehydrogenase** (Complex II) in TCA. Reduced ubiquinone is oxidised with the transfer of electrons to cytochrome V via Cytochrome V complex (complex III). Cytochrome V acts carrier for transfer of electrons between complex III and complex IV. Complex IV refers to cytochrome c oxidase complex having cytochromes a and α_3 and two copper centres.

33. It is true that the cells of unicellular organisms tend to be spherical. It is because of the following reasons:

- Surface tension:** Surface tension shapes the spherical way as in the case in air-borne soap bubbles.
- The free-floating cells with thin membranes tend to be spherical as it is the most economical shape that can confine a given mass of protoplasm. The shape and the size of the cell depend upon the place where they are present and the functions they have to perform. In multicellular animals, the cells tend to become faceted as they come in contact with each other in the same way as the spherical soap bubbles become flattened when they are jammed together in a small space.

OR

Difference between Cell wall and Ribosomes of a prokaryotic and a Eukaryotic cell:

The cell wall of a prokaryotic and eukaryotic cell	Ribosomes of a Prokaryotic and Eukaryotic cell
The cell wall of a prokaryote is rigid due to peptidoglycan or murein. The well defined rigid cell wall is found in plant cells and fungi. It is composed of either chitin or cellulose, glycans, Galatians, mannans, and minerals (CaCO_3), etc. In higher plants (eukaryotes), it consists of primary, secondary and tertiary walls.	These are granular organelles not enclosed by any membrane. They lie freely in cytoplasm or attached to the ER. They may be found in the mitochondrial matrix and chloroplast stroma. They are sites of protein synthesis. They are composed of RNA and proteins. Eukaryotic cells have larger ribosomes (80 S) than prokaryotic cells (70 S).