WBBSE Madhyamik Class 10 Life Science Question Paper with Solutions PDF(Memory Based)

Time Allowed :3 Hours	**Maximum Marks :**100	**Total questions :**35

General Instructions

Note:

1. 15 minutes are extra for reading the question paper only. Candidates should not start writing their answers during this time..
2. Candidates must legibly write the Question Paper Serial Number on the designated space of their answer script.
3. Scientifically correct, labelled diagrams should be drawn wherever necessary.
4. In case of MCQs (Q. No. 1(A)) only the first attempt will be evaluated and will be given credit.
5. The numbers to the right of the questions indicate full marks
6. All questions in Section A (MCQs) are compulsory. There is no negative marking.
7. For 2-mark questions, answer in 2-3 sentences. For 5-mark questions, do not exceed 150 words.

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1. Define Parthenocarpy.

Solution:
Concept: In flowering plants, fruit development generally takes place after fertilization. However, in certain instances, fruits can form even without fertilization. This process is termed parthenocarpy.
Answer: Parthenocarpy refers to the formation of fruit without the fertilization of the ovule, leading to seedless fruits.
It may occur naturally (for example, in banana) or can be artificially induced by the application of plant hormones such as auxins and gibberellins. Parthenocarpy is agriculturally significant as it results in seedless and commercially valuable fruits.

Quick Tip

For definition-based questions, provide a clear and concise scientific definition in one or two sentences and include an example if necessary.

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2. What is the role of Tapetum in the anther?

Solution:

Concept: The anther is the pollen-producing part of the stamen in flowering plants. It contains microsporangia (pollen sacs) where pollen grains are formed. The innermost layer of the anther wall is known as the tapetum, which plays an essential role in pollen development.
Answer: The tapetum is the innermost nutritive layer of the anther wall. Its primary functions are:
1. It supplies nourishment to the developing microspores (pollen grains). 2. It provides enzymes and growth regulators necessary for pollen development. 3. It assists in the formation of the pollen wall (exine) by secreting sporopollenin precursors. 4. It supports the proper maturation and viability of pollen grains.
Hence, the tapetum is crucial for the growth, development, and fertility of pollen grains.

> Quick Tip
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> In short-answer biology questions, begin with the definition of the structure and then present 3–4 important functions in clear, numbered points for effective presentation.

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3. Name the enzyme used to cut DNA at specific sites in Biotechnology.

Solution:
Concept: In biotechnology, particular DNA sequences are cleaved at defined positions to isolate or insert genes. This is accomplished using special enzymes that identify specific nucleotide sequences.
Answer: The enzyme used to cut DNA at specific sites in biotechnology is **Restriction Endonuclease** (also known as a restriction enzyme).
These enzymes recognize specific palindromic DNA sequences and cut the DNA at or near those recognition sites. They are indispensable tools in genetic engineering and recombinant DNA technology.

> Quick Tip
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> For one-mark biology questions, state the correct scientific term precisely and, if required, include one short explanatory sentence.

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4. What is the phenotypic ratio of a Dihybrid Cross?

Solution:
Concept: A dihybrid cross refers to the inheritance of two pairs of contrasting traits at the same time. According to Mendel's Law of Independent Assortment, alleles of different genes segregate independently during gamete formation.
Answer: The phenotypic ratio of a typical Mendelian dihybrid cross (between two heterozygous individuals, e.g., AaBb $\times$ AaBb) is:

$$9 : 3 : 3 : 1$$

This ratio indicates:

- 9 individuals exhibiting both dominant traits
- 3 individuals exhibiting the dominant trait for the first character and the recessive trait for the second
- 3 individuals exhibiting the recessive trait for the first character and the dominant trait for the second
- 1 individual exhibiting both recessive traits

> Quick Tip
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> While presenting genetic ratios, clearly mention the type of cross performed (e.g., heterozygous × heterozygous) and briefly explain what each value in the ratio represents.

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5. Name the first "fossil man" who showed bipedal locomotion.

Solution:
Concept: In the course of human evolution, bipedal locomotion (walking on two legs) was one of the earliest and most significant traits that distinguished early hominins from apes. Fossil discoveries provide evidence for identifying the earliest ancestors who exhibited this characteristic.
Answer: The first "fossil man" showing clear evidence of bipedal locomotion is ***Australopithecus***.
Species of *Australopithecus* walked upright and are regarded as some of the earliest known hominins to demonstrate habitual bipedalism.

> Quick Tip
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> For evolution-related questions, always write the correct scientific name in italics and briefly mention the key evolutionary trait in one concise line.

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6. Define Biopiracy.

Solution:
Concept: Biological resources and the traditional knowledge of indigenous communities possess great commercial importance in biotechnology and pharmaceutical industries. The unauthorized utilization of such resources leads to serious ethical and legal issues.
Answer: Biopiracy refers to the illegal and unauthorized use or patenting of biological resources and traditional knowledge of indigenous communities without obtaining proper permission or providing fair compensation.
It includes the commercial exploitation of genetic materials, medicinal plants, or traditional practices without equitable benefit-sharing with the rightful holders.

Quick Tip

For definition-based questions, state the precise meaning in one clear sentence and, where appropriate, briefly mention the ethical or legal implications.

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7. Distinguish between Homologous and Analogous organs.

Solution:
Concept: In evolutionary biology, organs are compared on the basis of their origin, structural design, and function. Homologous and analogous organs serve as evidence for divergent and convergent evolution, respectively.
Answer:

Basis	Homologous Organs	
Definition	Organs having the same origin and basic structure but performing different functions	Org
Evolution	Indicate divergent evolution	
Structure	Fundamental structural plan remains similar	
Example	Forelimbs of human and whale	

Therefore, homologous organs suggest common ancestry, whereas analogous organs reflect adaptation to similar environmental conditions.

Quick Tip

In differentiation-type questions, present the answer in a clear tabular form with 3–4 comparison points and include one suitable example for each to improve presentation and scoring.

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8. Explain the terms Linkage and Crossing Over.

Solution:
Concept: During meiosis, genes present on chromosomes are transmitted to offspring. The behavior of genes located on the same chromosome gives rise to the concepts of linkage and crossing over, which are fundamental in genetics.
Answer:
Linkage: Linkage is the phenomenon in which two or more genes situated on the same chromosome tend to be inherited together because of their close physical proximity. Such genes do not assort independently and are usually passed into the same gamete during inheritance.
Crossing Over: Crossing over refers to the exchange of genetic material between non-sister chromatids of homologous chromosomes during prophase I of meiosis. This process leads to genetic recombination and generates new combinations of traits in the offspring.
Therefore, linkage preserves parental gene combinations, whereas crossing over introduces genetic variation.

Quick Tip

While defining genetic terms, explain each concept clearly in 2–3 concise lines and mention the specific stage of meiosis when applicable.

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9. Give the causative agent and one symptom of Ascariasis.

Solution:
Concept: Ascariasis is a widespread intestinal parasitic infection caused by a roundworm. It is transmitted primarily through contaminated food and water and mainly affects the digestive tract.
Answer:
Causative Agent: *Ascaris lumbricoides* (a roundworm)
One Symptom: Abdominal pain
(Other symptoms may include diarrhoea, malnutrition, and intestinal obstruction in severe cases.)

Quick Tip

In questions related to diseases, write the correct scientific name of the pathogen and clearly mention at least one common symptom.
