Bihar Board 12 Biology Set E 2024 Question Paper with Solutions

Time Allowed :3 Hours 15 mins	**Maximum Marks :**70	**Total questions :**96

General Instructions

Instructions to the candidates:

1. **Candidate must enter his/her Question Booklet Serial No. (10 Digits) in the OMR Answer Sheet.**
2. Candidates are required to give their answers in their own words as far as practicable.
3. Figures in the right-hand margin indicate full marks.
4. An extra time of 15 minutes has been allotted for the candidates to read the questions carefully.
5. This question booklet is divided into two sections — **Section-A** and **Section-B**.

1. After how many months of pregnancy, do limbs and digits of the embryo develop?

(A) 2 months

(B) 3 months

(C) 1 month

(D) 6 months

Correct Answer: (B) 3 months

Solution:

Step 1: Understanding the developmental stages of pregnancy.

During pregnancy, the development of the embryo goes through various stages. The development of limbs and digits typically occurs after 3 months of pregnancy.

Step 2: Analyzing the options.

(A) 2 months: This is incorrect as the development of limbs and digits happens after 3 months.

(B) 3 months: Correct — The limbs and digits begin to develop around 3 months of pregnancy.

(C) 1 month: This is too early in pregnancy for limb and digit development.

(D) 6 months: This is incorrect, as limb and digit development happens earlier, by the third month.

Step 3: Conclusion.

The correct answer is **(B) 3 months**, as limb and digit development occurs after 3 months of pregnancy.

Quick Tip

In human embryology, limb and digit development is a crucial marker that occurs after 3 months of pregnancy.

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2. Which of the following secretes a large amount of progesterone?

(A) Graafian follicle

(B) Corpus albicans

(C) Corpus luteum

(D) Primary follicle

Correct Answer: (C) Corpus luteum

Solution:

Step 1: Understanding progesterone secretion.

Progesterone is a hormone secreted primarily by the corpus luteum in females. It plays a vital role in maintaining pregnancy.

Step 2: Analyzing the options.

(A) Graafian follicle: The Graafian follicle is involved in estrogen production, not progesterone.

(B) Corpus albicans: This structure results from the regression of the corpus luteum and does not secrete significant amounts of progesterone.

(C) Corpus luteum: Correct — The corpus luteum secretes high levels of progesterone to support pregnancy.

(D) Primary follicle: This follicle is in the early stages of development and does not secrete significant amounts of progesterone.

Step 3: Conclusion.

The correct answer is **(C) Corpus luteum**, as it secretes large amounts of progesterone, which is essential for the maintenance of pregnancy.

Quick Tip

The corpus luteum plays a crucial role in hormone secretion during the luteal phase of the menstrual cycle, particularly progesterone.

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3. After ovulation the ovum is surrounded by a group of cells called

(A) Corona radiata

(B) Zona pellucida

(C) Granulosa cells

(D) Theca layer

Correct Answer: (A) Corona radiata

Solution:

Step 1: Understanding the structure of ovum.

After ovulation, the ovum is surrounded by a layer of cells, which include the corona radiata. This structure helps protect the ovum and provides essential biochemical support.

Step 2: Analyzing the options.

(A) Corona radiata: Correct — The corona radiata is the group of cells surrounding the ovum after ovulation.

(B) Zona pellucida: This is the protective glycoprotein layer surrounding the ovum, but it is not the group of cells.

(C) Granulosa cells: These cells are involved in the development of the follicle but do not surround the ovum after ovulation.

(D) Theca layer: The theca layer is involved in the formation of the follicle and hormone secretion, but it doesn't surround the ovum.

Step 3: Conclusion.

The correct answer is **(A) Corona radiata**, as it is the cell group surrounding the ovum after ovulation.

Quick Tip

The corona radiata is important for the protection and biochemical support of the ovum after ovulation.

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4. Which of the following cells is haploid?

(A) Oogonia

(B) Primary oocyte

(C) Secondary oocyte

(D) Zygote

Correct Answer: (C) Secondary oocyte

Solution:

Step 1: Understanding haploid cells.

A haploid cell contains half the number of chromosomes, as seen in gametes (egg or sperm cells).

Step 2: Analyzing the options.

(A) Oogonia: This is a diploid cell that forms during early stages of development.

(B) Primary oocyte: A primary oocyte is also diploid before it undergoes meiosis.

(C) Secondary oocyte: Correct — The secondary oocyte is a haploid cell, formed during the process of oogenesis.

(D) Zygote: The zygote is a diploid cell, formed by the fusion of two haploid gametes.

Step 3: Conclusion.

The correct answer is **(C) Secondary oocyte**, as it is the haploid cell in the process of oogenesis.

Quick Tip

Haploid cells are essential for sexual reproduction, containing half the chromosomes necessary for fertilization.

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5. A new contraceptive pill which is non-steroidal is referred as

(A) LNG 20

(B) Progestaset

(C) Saheli

(D) Lippes loop

Correct Answer: (C) Saheli

Solution:

Step 1: Understanding contraceptive methods.

The non-steroidal contraceptive pill known as Saheli is a new approach in contraception. It is not based on steroidal hormones, offering a different method of action.

Step 2: Analyzing the options.

(A) LNG 20: This is a hormonal contraceptive pill, not non-steroidal.

(B) Progestaset: This is a progestin-based contraceptive, which is hormonal, not non-steroidal.

(C) Saheli: Correct — Saheli is a non-steroidal contraceptive pill.

(D) Lippes loop: This is a type of intrauterine device (IUD), not a contraceptive pill.

Step 3: Conclusion.

The correct answer is **(C) Saheli**, as it is the non-steroidal contraceptive pill.

Quick Tip

Saheli is a non-steroidal contraceptive that works by regulating ovulation and is an alternative to hormonal methods.

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6. What is the population growth rate of India as per 2001 census?

(A) 1%

(B) 3.7%

(C) Approximately 2%

(D) 3%

Correct Answer: (C) Approximately 2%

Solution:

Step 1: Understanding the population growth rate.

The population growth rate is a measure of how fast the population increases over a given period. According to the 2001 census of India, the population growth rate was approximately 2%.

Step 2: Analyzing the options.

(A) 1%: This is too low for the growth rate recorded in the 2001 census.

(B) 3.7%: This is higher than the actual rate of growth recorded.

(C) Approximately 2%: Correct — The population growth rate in India according to the 2001 census was around 2%.

(D) 3%: This is close, but the exact rate was approximately 2%.

Step 3: Conclusion.

The correct answer is **(C) Approximately 2%**, as the population growth rate was recorded at around 2% in the 2001 census.

Quick Tip

Population growth rates are important indicators of demographic changes and help in planning for future resource needs.

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7. Which of the following IUDs is hormone releasing?

(A) Multiload 375

(B) LNG-20

(C) Lippes loop

(D) Cu-T

Correct Answer: (B) LNG-20

Solution:

Step 1: Understanding IUDs.

Intrauterine devices (IUDs) are birth control methods that are inserted into the uterus. Some IUDs release hormones, while others work through copper or other methods.

Step 2: Analyzing the options.

(A) Multiload 375: This is a copper-releasing IUD, not a hormone-releasing one.

(B) LNG-20: Correct — LNG-20 is a hormone-releasing IUD that contains levonorgestrel, which helps in contraception.

(C) Lippes loop: This is a non-hormonal IUD, primarily made of plastic and copper.

(D) Cu-T: This is another copper-releasing IUD, which does not release hormones.

Step 3: Conclusion.

The correct answer is **(B) LNG-20**, as it is a hormone-releasing IUD.

Quick Tip

Hormone-releasing IUDs like LNG-20 are effective in preventing pregnancy by releasing small amounts of progestin.

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8. Which of the following statements is incorrect about DNA replication?

(A) DNA replication is semi-conservative

(B) Main enzyme for DNA replication is DNA polymerase

(C) Mutation appears due to error in replication

(D) Replication on both strands of DNA is continuous

Correct Answer: (D) Replication on both strands of DNA is continuous

Solution:

Step 1: Understanding DNA replication.

DNA replication is a process where the DNA molecule is copied to ensure that each daughter cell gets an identical set of genetic information. This process is semi-conservative, meaning one strand of the parent DNA is conserved in each of the new DNA molecules.

Step 2: Analyzing the options.

(A) DNA replication is semi-conservative: This is correct — DNA replication is semi-conservative, where each new DNA molecule contains one old strand and one newly synthesized strand.

(B) Main enzyme for DNA replication is DNA polymerase: This is correct — DNA polymerase is the key enzyme responsible for adding nucleotides to the growing DNA strand.

(C) Mutation appears due to error in replication: This is correct — mutations can occur due to errors during DNA replication, though mechanisms exist to correct many of these errors.

(D) Replication on both strands of DNA is continuous: Incorrect — Replication on one strand (the leading strand) is continuous, but on the other strand (the lagging strand), it is discontinuous, forming Okazaki fragments.

Step 3: Conclusion.

The correct answer is **(D) Replication on both strands of DNA is continuous**, as replication on the lagging strand is discontinuous.

Quick Tip

DNA replication is semi-conservative, with one strand of the parent DNA conserved in each daughter DNA molecule.

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9. Which of the following enzymes is responsible for transcription of ribosomal RNA?

(A) RNA polymerase I

(B) RNA polymerase II

(C) RNA polymerase III

(D) RNA polymerase IV

Correct Answer: (A) RNA polymerase I

Solution:

Step 1: Understanding ribosomal RNA transcription.

Ribosomal RNA (rRNA) is essential for ribosome function. The transcription of rRNA genes is carried out by a specific enzyme.

Step 2: Analyzing the options.

(A) RNA polymerase I: Correct — RNA polymerase I is responsible for transcribing rRNA in eukaryotic cells.

(B) RNA polymerase II: This enzyme transcribes mRNA and some snRNA, not rRNA.

(C) RNA polymerase III: This enzyme transcribes tRNA and some small RNA molecules, but not rRNA.

(D) RNA polymerase IV: This enzyme is involved in siRNA transcription in plants, not in rRNA transcription.

Step 3: Conclusion.

The correct answer is **(A) RNA polymerase I**, as it is responsible for transcribing ribosomal RNA.

Quick Tip

RNA polymerase I is crucial for the synthesis of ribosomal RNA, which is essential for protein synthesis.

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10. Some amino acids are coded by more than one codon. Such code is known as

(A) Ambiguous

(B) Degenerate/redundant

(C) Universal

(D) Specific

Correct Answer: (B) Degenerate/redundant

Solution:

Step 1: Understanding codon usage.

The genetic code is said to be degenerate because more than one codon can specify the same amino acid. This redundancy allows for some errors in transcription without altering the protein.

Step 2: Analyzing the options.

(A) Ambiguous: This is incorrect — Ambiguity in the code would mean that one codon could code for more than one amino acid, which is not the case.

(B) Degenerate/redundant: Correct — The genetic code is degenerate because multiple codons can specify the same amino acid.

(C) Universal: This refers to the fact that the genetic code is nearly the same across all organisms.

(D) Specific: This refers to the fact that each codon specifies a particular amino acid, not multiple codons for the same amino acid.

Step 3: Conclusion.

The correct answer is **(B) Degenerate/redundant**, as the genetic code allows multiple codons to code for the same amino acid.

Quick Tip

The redundancy of the genetic code helps prevent errors in protein synthesis due to mutations in the DNA.

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11. What is the role of y gene in lac operon?

(A) Codes for -galactosidase

(B) Codes for permease

(C) Codes for repressor gene

(D) Codes for transacetylase

Correct Answer: (C) Codes for repressor gene

Solution:

Step 1: Understanding the lac operon system.

The lac operon is a cluster of genes involved in lactose metabolism in bacteria. The y gene in the lac operon codes for the repressor protein, which regulates the operon's activity.

Step 2: Analyzing the options.

(A) Codes for -galactosidase: This is incorrect, as -galactosidase is coded by the z gene in the lac operon.

(B) Codes for permease: This is incorrect. Permease is coded by the y gene, but not the repressor gene.

(C) Codes for repressor gene: Correct — The y gene codes for the repressor protein that controls the lac operon.

(D) Codes for transacetylase: This is incorrect. Transacetylase is coded by the a gene in the lac operon, not the y gene.

Step 3: Conclusion.

The correct answer is **(C) Codes for repressor gene**, as the y gene is responsible for coding the repressor protein in the lac operon.

Quick Tip

In the lac operon system, the repressor gene (y) plays a crucial role in regulating the transcription of the other genes in the operon.

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12. Paleontological evidence is based on the study of

(A) Embryological development

(B) Comparative anatomy

(C) Fossils

(D) Divergent evolution

Correct Answer: (C) Fossils

Solution:

Step 1: Understanding paleontological evidence.

Paleontological evidence primarily comes from the study of fossils, which provide information about past life and evolutionary history.

Step 2: Analyzing the options.

(A) Embryological development: This is more relevant to embryology and developmental biology than paleontology.

(B) Comparative anatomy: This helps in understanding evolutionary relationships but is not the primary focus of paleontology.

(C) Fossils: Correct — Fossils are the primary source of evidence in paleontology, providing information about extinct organisms.

(D) Divergent evolution: This is a concept in evolutionary biology but not the main focus of paleontology.

Step 3: Conclusion.

The correct answer is **(C) Fossils**, as paleontological evidence is mainly based on the study of fossils.

Quick Tip

Fossils provide a direct record of past life and are essential for understanding the history of life on Earth.

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13. What do analogous structures show?

(A) Divergent evolution

(B) Convergent evolution

(C) Parallel evolution

(D) Saltation

Correct Answer: (B) Convergent evolution

Solution:

Step 1: Understanding analogous structures.

Analogous structures are similar in function and appearance but do not share a common evolutionary origin. These structures are the result of convergent evolution, where different species evolve similar traits due to similar environmental pressures.

Step 2: Analyzing the options.

(A) Divergent evolution: This refers to the process where two related species evolve different traits, not analogous structures.

(B) Convergent evolution: Correct — Analogous structures are the result of convergent evolution, where unrelated species develop similar traits due to similar environmental pressures.

(C) Parallel evolution: This involves related species evolving in similar ways, but not specifically related to analogous structures.

(D) Saltation: This refers to sudden evolutionary changes, not the development of analogous structures.

Step 3: Conclusion.

The correct answer is **(B) Convergent evolution**, as analogous structures arise due to convergent evolution.

Quick Tip

Convergent evolution results in analogous structures, where unrelated species evolve similar traits due to similar environmental conditions.

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14. When did pre-historic cave art develop?

(A) 18,000 years ago

(B) 10,000 years ago

(C) 75,000 years ago

(D) 40,000 years ago

Correct Answer: (D) 40,000 years ago

Solution:

Step 1: Understanding prehistoric art.

Prehistoric cave art is generally believed to have appeared during the Upper Paleolithic period. The most famous examples of cave art, such as those found in Lascaux, date back around 40,000 years ago.

Step 2: Analyzing the options.

(A) 18,000 years ago: This is too early for the most well-known cave art, as it developed later.

(B) 10,000 years ago: This is too recent for the development of cave art, which dates back to the Upper Paleolithic period.

(C) 75,000 years ago: While early human art may have existed, significant cave art is believed to have appeared closer to 40,000 years ago.

(D) 40,000 years ago: Correct — The most famous prehistoric cave art, such as that found in Lascaux, dates to around 40,000 years ago.

Step 3: Conclusion.

The correct answer is **(D) 40,000 years ago**, as this is when the most well-documented prehistoric cave art began to develop.

Quick Tip

Prehistoric cave art is one of the earliest forms of human artistic expression, dating back to the Upper Paleolithic period.

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15. Amount of which vitamin increases after conversion of milk into curd?

(A) Vitamin B12

(B) Vitamin A

(C) Vitamin C

(D) Vitamin B6

Correct Answer: (A) Vitamin B12

Solution:

Step 1: Understanding the conversion process.

When milk is converted into curd, beneficial microorganisms (lactic acid bacteria) are involved in the fermentation process. This fermentation leads to an increase in certain vitamins, particularly Vitamin B12.

Step 2: Analyzing the options.

(A) Vitamin B12: Correct — Fermentation during the curdling process increases the amount of Vitamin B12 in the milk.

(B) Vitamin A: This vitamin is present in milk but does not increase during the conversion into curd.

(C) Vitamin C: Vitamin C is not significantly impacted by the fermentation process in curd.

(D) Vitamin B6: This vitamin does not significantly increase during the fermentation of milk into curd.

Step 3: Conclusion.

The correct answer is **(A) Vitamin B12**, as the fermentation process during the conversion of milk into curd increases Vitamin B12 levels.

Quick Tip

Fermentation of milk into curd increases the concentration of beneficial nutrients, including Vitamin B12, which is important for nerve health.

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16. Alexander Fleming discovered penicillin while working on which of the following bacteria?

(A) Streptococcus

(B) Acetobacter

(C) Staphylococcus

(D) Lactobacillus

Correct Answer: (C) Staphylococcus

Solution:

Step 1: Understanding the discovery of penicillin.

Alexander Fleming discovered penicillin while working with Staphylococcus bacteria. His observation that the mold Penicillium notatum inhibited the growth of these bacteria led to the discovery of penicillin, the first antibiotic.

Step 2: Analyzing the options.

(A) Streptococcus: While related to bacterial infections, Streptococcus was not the focus of Fleming's penicillin discovery.

(B) Acetobacter: Acetobacter is involved in the production of vinegar and is unrelated to the discovery of penicillin.

(C) Staphylococcus: Correct — Fleming discovered penicillin while working with Staphylococcus bacteria, which led to his groundbreaking antibiotic discovery.

(D) Lactobacillus: This is a bacterium used in fermentation, but it was not involved in the discovery of penicillin.

Step 3: Conclusion.

The correct answer is **(C) Staphylococcus**, as it was the bacterium Fleming was working with when he discovered penicillin.

Quick Tip

Penicillin was the first antibiotic discovered and revolutionized medicine by providing an effective treatment for bacterial infections.

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17. Which of the following inhibits synthesis of cholesterol?

(A) Protease

(B) Streptokinase

(C) Penicillin

(D) Statin

Correct Answer: (D) Statin

Solution:

Step 1: Understanding cholesterol synthesis.

Statins are a class of drugs that inhibit the enzyme HMG-CoA reductase, which plays a crucial role in the production of cholesterol.

Step 2: Analyzing the options.

(A) Protease: Protease enzymes break down proteins but are not involved in cholesterol synthesis.

(B) Streptokinase: This is used to dissolve blood clots, not to inhibit cholesterol synthesis.

(C) Penicillin: This is an antibiotic and does not affect cholesterol synthesis.

(D) Statin: Correct — Statins are widely used to lower cholesterol by inhibiting HMG-CoA reductase.

Step 3: Conclusion.

The correct answer is **(D) Statin**, as it is the drug that inhibits cholesterol synthesis.

Quick Tip

Statins are effective in lowering cholesterol levels and are commonly prescribed for patients with high cholesterol or cardiovascular diseases.

18. Capacity to generate a whole plant from a plant cell is called as

(A) Tissue culture

(B) Pluripotency

(C) Totipotency

(D) Micropropagation

Correct Answer: (C) Totipotency

Solution:

Step 1: Understanding totipotency.

Totipotency refers to the ability of a single plant cell to divide and produce all the necessary cells to form an entire plant. This capacity is fundamental to plant cloning techniques.

Step 2: Analyzing the options.

(A) Tissue culture: This is a method for growing plant cells and tissues under sterile conditions but does not specifically refer to the ability of a single cell to form a whole plant.

(B) Pluripotency: This refers to the potential of a cell to differentiate into many, but not all, cell types. It is more relevant to animals.

(C) Totipotency: Correct — Totipotency is the term used to describe the ability of a plant cell to give rise to a whole plant.

(D) Micropropagation: This is a technique used to propagate plants in a controlled environment, but it is not the same as totipotency.

Step 3: Conclusion.

The correct answer is **(C) Totipotency**, as it describes the ability of a single plant cell to form an entire plant.

Quick Tip

Totipotency is a remarkable feature of plant cells, enabling them to regenerate into complete plants.

19. Hisardale is a breed of which of the following animals?

(A) Cow

(B) Buffalo

(C) Sheep

(D) Chicken

Correct Answer: (C) Sheep

Solution:

Step 1: Understanding Hisardale breed.

Hisardale is a hybrid breed of sheep, developed by crossing the Bikaneri ewes and the Marino rams. It is known for its high wool quality.

Step 2: Analyzing the options.

(A) Cow: Hisardale is not a breed of cows.

(B) Buffalo: Hisardale is not a breed of buffalo.

(C) Sheep: Correct — Hisardale is a breed of sheep.

(D) Chicken: Hisardale is not a breed of chicken.

Step 3: Conclusion.

The correct answer is **(C) Sheep**, as Hisardale is a breed of sheep.

Quick Tip

Hisardale sheep are known for their fine wool and are an important breed in the textile industry.

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20. Which of the following techniques was used to get yellow mosaic virus-resistant mung lentil?

(A) Mutation breeding

(B) Introduction

(C) Hybridisation

(D) Tissue culture

Correct Answer: (A) Mutation breeding

Solution:

Step 1: Understanding mutation breeding.

Mutation breeding involves inducing mutations in plants through radiation or chemicals, leading to the development of new varieties with desirable traits. It was used to develop yellow mosaic virus-resistant mung lentils.

Step 2: Analyzing the options.

(A) Mutation breeding: Correct — Mutation breeding was used to produce yellow mosaic virus-resistant mung lentils.

(B) Introduction: This refers to introducing foreign genes or species, but not the method used in developing resistant mung lentils.

(C) Hybridisation: Hybridisation involves crossing two different varieties, but it was not used to develop this resistant variety.

(D) Tissue culture: While tissue culture is used for plant propagation, it was not the method used for developing resistant mung lentils.

Step 3: Conclusion.

The correct answer is **(A) Mutation breeding**, as it was used to create yellow mosaic virus-resistant mung lentils.

Quick Tip

Mutation breeding is an effective technique for developing plants with resistance to diseases and pests.

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21. Reason for movement of DNA fragments towards anode in electrophoresis is DNA fragments being

(A) Negatively charged

(B) Positively charged

(C) Charged

(D) Charged with charges of both types

Correct Answer: (A) Negatively charged

Solution:

Step 1: Understanding electrophoresis.

Electrophoresis is a technique used to separate DNA fragments based on their size and charge. DNA molecules are negatively charged due to their phosphate backbone.

Step 2: Analyzing the options.

(A) Negatively charged: Correct — DNA fragments are negatively charged and thus move towards the positively charged anode in electrophoresis.

(B) Positively charged: This is incorrect as DNA is negatively charged, not positively charged.

(C) Charged: While DNA is charged, the direction of movement in electrophoresis is determined by whether the DNA is negatively charged.

(D) Charged with charges of both types: This is incorrect as DNA is only negatively charged.

Step 3: Conclusion.

The correct answer is **(A) Negatively charged**, as the negatively charged DNA fragments move towards the anode during electrophoresis.

Quick Tip

DNA molecules are negatively charged due to their phosphate groups, making them migrate towards the positive anode in electrophoresis.

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22. Which of the following is not responsible for vegetative propagation of plants?

(A) Offset

(B) Bulb

(C) Rhizome

(D) Gemmule

Correct Answer: (D) Gemmule

Solution:

Step 1: Understanding vegetative propagation.

Vegetative propagation is the process of asexual reproduction in plants, where new plants are formed from the vegetative parts like stems, roots, or leaves.

Step 2: Analyzing the options.

(A) Offset: This is a form of vegetative propagation, where a small bud develops into a new plant.

(B) Bulb: Bulbs, like those of onions or tulips, are involved in vegetative propagation, forming new plants.

(C) Rhizome: Rhizomes are underground stems that grow horizontally and help in vegetative propagation.

(D) Gemmule: Correct — Gemmules are a form of asexual reproduction in sponges, not in plants.

Step 3: Conclusion.

The correct answer is **(D) Gemmule**, as it is not a method of vegetative propagation in plants.

Quick Tip

Vegetative propagation in plants involves structures like bulbs, rhizomes, and offsets, but not gemmules.

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23. Which of the following statements is incorrect?

(A) Antheridia are present on antheridiophore of female thallus of Marchantia

(B) Chara is monoecious

(C) Diploid gene forms gamete after meiosis

(D) Zoospores are formed in Chlamydomonas

Correct Answer: (C) Diploid gene forms gamete after meiosis

Solution:

Step 1: Understanding the statements.

Each of these statements refers to fundamental concepts in plant biology and genetics. The incorrect statement refers to the formation of gametes.

Step 2: Analyzing the options.

(A) Antheridia are present on antheridiophore of female thallus of Marchantia: This is correct. Antheridia are male reproductive organs in Marchantia, and they are borne on the antheridiophore.

(B) Chara is monoecious: This is correct. Chara has both male and female reproductive organs on the same plant.

(C) Diploid gene forms gamete after meiosis: Incorrect — Gametes are formed from haploid cells, not from diploid genes. After meiosis, the diploid cells divide to form haploid gametes.

(D) Zoospores are formed in Chlamydomonas: This is correct. Chlamydomonas forms zoospores, which are motile asexual spores.

Step 3: Conclusion.

The correct answer is **(C) Diploid gene forms gamete after meiosis**, as gametes are formed from haploid cells, not from diploid genes.

Quick Tip

Gametes are always haploid, formed after meiosis, whereas diploid cells undergo meiosis to produce haploid gametes.

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24. Which of the following plants is referred to as 'Terror of Bengal'?

(A) Water hyacinth

(B) Bamboo

(C) Lantana

(D) Parthenium

Correct Answer: (A) Water hyacinth

Solution:

Step 1: Understanding the term 'Terror of Bengal'.

Water hyacinth is often referred to as the 'Terror of Bengal' because it grows rapidly in water bodies, blocking water flow and affecting aquatic ecosystems. It is an invasive species in many parts of the world, including Bengal.

Step 2: Analyzing the options.

(A) Water hyacinth: Correct — Water hyacinth is widely known as the 'Terror of Bengal' for its invasive nature.

(B) Bamboo: Bamboo is not referred to as the 'Terror of Bengal'.

(C) Lantana: While lantana is an invasive species, it is not specifically called the 'Terror of Bengal'.

(D) Parthenium: Parthenium is an invasive plant, but it is not commonly referred to by this specific term.

Step 3: Conclusion.

The correct answer is **(A) Water hyacinth**, as it is known as the 'Terror of Bengal' due to its aggressive growth and ecological impact.

Quick Tip

Water hyacinth can block waterways, affect aquatic life, and is considered one of the world's most problematic invasive species.

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25. Which of the following is not a part of microsporangium?

(A) Endothecium

(B) Tapetum

(C) Epidermis

(D) Micropyle

Correct Answer: (D) Micropyle

Solution:

Step 1: Understanding microsporangium structure.

The microsporangium is a part of the male reproductive structure in plants. It consists of several layers, including the endothecium, tapetum, and epidermis, but the micropyle is not a part of the microsporangium itself.

Step 2: Analyzing the options.

(A) Endothecium: This is a layer of the microsporangium, providing support and structure.

(B) Tapetum: This is a layer in the microsporangium that nourishes developing microspores.

(C) Epidermis: This is the outermost layer of the microsporangium.

(D) Micropyle: Correct — The micropyle is a small opening in the ovule, not part of the microsporangium.

Step 3: Conclusion.

The correct answer is **(D) Micropyle**, as it is not a part of the microsporangium but is found in the ovule.

Quick Tip

The micropyle is an important feature in the ovule, allowing the passage of pollen tubes during fertilization.

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26. Which of the following cells divides to form two male gametes in angiospermic plant?

(A) Vegetative cell

(B) Generative cell

(C) Microspore mother cell

(D) Microspore

Correct Answer: (B) Generative cell

Solution:

Step 1: Understanding male gamete formation in angiosperms.

In angiosperms (flowering plants), the generative cell divides to form two male gametes (sperm cells) during pollen grain development.

Step 2: Analyzing the options.

(A) Vegetative cell: The vegetative cell does not divide to form gametes but plays a role in supporting the generative cell.

(B) Generative cell: Correct — The generative cell divides to form the two male gametes in the pollen grain.

(C) Microspore mother cell: This cell undergoes meiosis to form microspores, not male gametes directly.

(D) Microspore: The microspore develops into the pollen grain but does not divide into male gametes directly.

Step 3: Conclusion.

The correct answer is **(B) Generative cell**, as it divides to form two male gametes in angiospermic plants.

Quick Tip

The generative cell divides within the pollen grain to produce two male gametes that fertilize the ovule in the process of sexual reproduction in angiosperms.

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27. Which of the following is not associated with egg apparatus?

(A) Synergid

(B) Egg

(C) Antipodal cells

(D) Filiform apparatus

Correct Answer: (D) Filiform apparatus

Solution:

Step 1: Understanding the egg apparatus.

The egg apparatus in angiosperms consists of three cells — the egg cell and two synergids, which are important for fertilization. The antipodal cells are also present but are not part of the egg apparatus itself. The filiform apparatus is present in the synergids, not an independent structure.

Step 2: Analyzing the options.

(A) Synergid: Synergids are part of the egg apparatus and help in guiding the pollen tube.

(B) Egg: The egg cell is a central component of the egg apparatus.

(C) Antipodal cells: While antipodal cells are present in the ovule, they are not part of the egg apparatus.

(D) Filiform apparatus: Correct — The filiform apparatus is part of the synergid cell, which helps in pollen tube guidance, but it is not an independent part of the egg apparatus.

Step 3: Conclusion.

The correct answer is **(D) Filiform apparatus**, as it is associated with synergid cells, not the egg apparatus directly.

Quick Tip

The egg apparatus in angiosperms consists of the egg cell and two synergids, important for fertilization, while the filiform apparatus is found in the synergids.

---

28. Scutellum present in the seeds of grass is called

(A) Endosperm

(B) Cotyledon

(C) Seed coat

(D) Embryonal axis

Correct Answer: (A) Endosperm

Solution:

Step 1: Understanding scutellum.

In monocot seeds, such as those of grasses, the scutellum is part of the endosperm. It functions in the absorption of nutrients from the endosperm during seed germination.

Step 2: Analyzing the options.

(A) Endosperm: Correct — The scutellum is part of the endosperm, which is the nutritive tissue in monocot seeds.

(B) Cotyledon: Cotyledons are part of the embryo and are different from the scutellum.

(C) Seed coat: The seed coat is a protective layer around the seed and is not the scutellum.

(D) Embryonal axis: The embryonal axis is part of the seed but is not related to the scutellum.

Step 3: Conclusion.

The correct answer is **(A) Endosperm**, as the scutellum is a part of the endosperm in monocot seeds.

Quick Tip

In monocot seeds, the scutellum is a specialized part of the endosperm, important for the seed's nutrient absorption.

---

29. What is the use of alpha-1-antitrypsin?

(A) In treatment of emphysema

(B) In treatment of asthma

(C) As insecticidal protein

(D) In treatment of diabetes

Correct Answer: (A) In treatment of emphysema

Solution:

Step 1: Understanding alpha-1-antitrypsin.

Alpha-1-antitrypsin is a protein that helps protect the lungs from damage caused by enzymes like elastase. A deficiency in alpha-1-antitrypsin can lead to conditions such as emphysema.

Step 2: Analyzing the options.

(A) In treatment of emphysema: Correct — Alpha-1-antitrypsin is used to treat emphysema, especially in individuals with a deficiency of this protein.

(B) In treatment of asthma: While related to lung function, alpha-1-antitrypsin is not primarily used to treat asthma.

(C) As insecticidal protein: Alpha-1-antitrypsin is not used as an insecticide.

(D) In treatment of diabetes: Alpha-1-antitrypsin is not used in the treatment of diabetes.

Step 3: Conclusion.

The correct answer is **(A) In treatment of emphysema**, as alpha-1-antitrypsin is used to treat lung diseases like emphysema caused by its deficiency.

Quick Tip

Alpha-1-antitrypsin deficiency can lead to lung damage, and its replacement therapy is used in the treatment of emphysema.

---

30. Which of the following methods is used for the amplification of nucleic acid?

(A) Transformation

(B) Transfection

(C) PCR

(D) Micropropagation

Correct Answer: (C) PCR

Solution:

Step 1: Understanding PCR.

Polymerase chain reaction (PCR) is a technique used to amplify small segments of DNA, making millions of copies from a single molecule. It is widely used in molecular biology.

Step 2: Analyzing the options.

(A) Transformation: This involves introducing foreign DNA into a cell, but it does not amplify nucleic acid.

(B) Transfection: This is a method used to introduce nucleic acids into eukaryotic cells, but it is not a method for amplification.

(C) PCR: Correct — PCR is a technique specifically designed to amplify DNA segments.

(D) Micropropagation: This is a method used for plant tissue culture, not for amplifying nucleic acid.

Step 3: Conclusion.

The correct answer is **(C) PCR**, as it is the method specifically used for amplifying nucleic acids.

Quick Tip

PCR is a powerful technique used to amplify specific DNA sequences for various applications, including cloning and diagnostics.

---

31. At what pH insecticidal protein synthesized by Bacillus thuringiensis becomes active?

(A) Acidic pH

(B) Alkaline pH

(C) Neutral pH

(D) First acidic then alkaline pH

Correct Answer: (A) Acidic pH

Solution:

Step 1: Understanding Bacillus thuringiensis protein activation.

Bacillus thuringiensis (Bt) produces insecticidal proteins that are activated in the acidic environment of the insect's gut. These proteins are toxic to specific insect pests.

Step 2: Analyzing the options.

(A) Acidic pH: Correct — The insecticidal proteins produced by Bacillus thuringiensis are activated in the acidic pH of the insect's gut.

(B) Alkaline pH: This is incorrect as the activation of Bt proteins occurs in an acidic environment.

(C) Neutral pH: This is incorrect as the protein is not activated in neutral pH.

(D) First acidic then alkaline pH: This is incorrect as the activation occurs in the acidic pH only.

Step 3: Conclusion.

The correct answer is **(A) Acidic pH**, as the insecticidal protein produced by Bacillus thuringiensis becomes active in the acidic pH of the insect's gut.

Quick Tip

Bacillus thuringiensis proteins are activated in the acidic environment of the insect gut, making them effective as biopesticides.

---

32. Which of the following is used for producing nematode specific genes in tobacco plants?

(A) Bacteriophage

(B) Retrovirus

(C) Escherichia coli

(D) Agrobacterium

Correct Answer: (D) Agrobacterium

Solution:

Step 1: Understanding RNA interference and Agrobacterium.

RNA interference is used to prevent nematode infestation in tobacco plants. Agrobacterium is commonly used as a vector to transfer nematode-specific genes into plants for this purpose.

Step 2: Analyzing the options.

(A) Bacteriophage: Bacteriophages are used for viral gene transfer, not for plant genetic modification for nematode resistance.

(B) Retrovirus: Retroviruses are not commonly used for transferring nematode-specific genes into plants.

(C) Escherichia coli: E. coli is used in bacterial cloning, but it is not used for gene transfer in plants.

(D) Agrobacterium: Correct — Agrobacterium is used as a vector to transfer specific genes, such as nematode-resistant genes, into plants like tobacco.

Step 3: Conclusion.

The correct answer is **(D) Agrobacterium**, as it is used to transfer nematode-specific genes into tobacco plants.

Quick Tip

Agrobacterium is a powerful tool in plant genetic engineering, used to introduce specific genes into plants for pest resistance and other traits.

---

33. How many varieties of Basmati rice are grown in India?

(A) 20

(B) 15

(C) 27

(D) 5

Correct Answer: (C) 27

Solution:

Step 1: Understanding Basmati rice.

India is known for producing a wide variety of Basmati rice. There are around 27 different varieties of Basmati rice grown across the country.

Step 2: Analyzing the options.

(A) 20: This is incorrect; the actual number is higher than 20.

(B) 15: This is incorrect; there are more than 15 varieties of Basmati rice.

(C) 27: Correct — 27 varieties of Basmati rice are grown in India.

(D) 5: This is incorrect; there are far more than 5 varieties.

Step 3: Conclusion.

The correct answer is **(C) 27**, as India grows 27 varieties of Basmati rice.

Quick Tip

India is home to a variety of Basmati rice, with over 27 different varieties grown for different regions and market needs.

---

34. Which of the following organizations makes decision regarding the validity of GM research and the safety of introducing GM organisms?

(A) Department of Science and Technology

(B) Department of Biotechnology

(C) GEAC

(D) Indian Patent Office

Correct Answer: (C) GEAC

Solution:

Step 1: Understanding the role of GEAC.

The Genetic Engineering Appraisal Committee (GEAC) is the national body responsible for regulating genetically modified (GM) organisms and ensuring the safety of GM research and applications in India.

Step 2: Analyzing the options.

(A) Department of Science and Technology: This department is involved in scientific research but does not specifically regulate GM organisms.

(B) Department of Biotechnology: While this department is involved in biotechnology research, the GEAC specifically regulates GM organisms.

(C) GEAC: Correct — The GEAC is the authority that makes decisions regarding GM research and safety in India.

(D) Indian Patent Office: The Indian Patent Office deals with intellectual property rights, not with GM research regulation.

Step 3: Conclusion.

The correct answer is **(C) GEAC**, as it is responsible for regulating GM organisms in India.

Quick Tip

The GEAC is responsible for evaluating the safety of GM organisms and approving their commercial release in India.

35. Name of Ramdeo Mishra is associated with which field of research?

(A) Ecology

(B) Biotechnology

(C) Green revolution

(D) Genetics

Correct Answer: (C) Green revolution

Solution:

Step 1: Understanding Ramdeo Mishra's contribution.

Ramdeo Mishra is known for his significant contributions to the Green Revolution, particularly in the development of high-yielding varieties of crops in India.

Step 2: Analyzing the options.

(A) Ecology: While ecology is important, Ramdeo Mishra's work was focused more on agriculture.

(B) Biotechnology: This is not his primary field of research, although biotechnology plays a role in modern agriculture.

(C) Green revolution: Correct — Ramdeo Mishra is associated with the Green Revolution, which transformed Indian agriculture.

(D) Genetics: While related to plant breeding, Ramdeo Mishra's main work was more closely related to the Green Revolution.

Step 3: Conclusion.

The correct answer is **(C) Green revolution**, as Ramdeo Mishra's work was centered around the Green Revolution in India.

Quick Tip

The Green Revolution in India was a period of agricultural transformation that saw the adoption of high-yielding crop varieties, revolutionizing food production.

---

36. Which of the following is not a cloning vector for bacteria?

(A) Bacteriophage

(B) Plasmid

(C) pBR322

(D) T-DNA

Correct Answer: (D) T-DNA

Solution:

Step 1: Understanding cloning vectors.

Cloning vectors are used in genetic engineering to transfer foreign genes into a host organism. Bacteriophages, plasmids, and pBR322 are commonly used as vectors for cloning in bacteria. T-DNA, however, is a vector used in plant genetic transformation, not in bacterial cloning.

Step 2: Analyzing the options.

(A) Bacteriophage: Bacteriophages are viruses that infect bacteria and are used as cloning vectors.

(B) Plasmid: Plasmids are circular DNA molecules used as common cloning vectors in bacteria.

(C) pBR322: pBR322 is a plasmid vector widely used in molecular cloning.

(D) T-DNA: Correct — T-DNA is part of the Agrobacterium Ti plasmid used for transforming plant cells, not bacteria.

Step 3: Conclusion.

The correct answer is **(D) T-DNA**, as it is not used as a cloning vector in bacteria.

Quick Tip

T-DNA is a DNA segment from the Ti plasmid used for transferring genes into plant cells, not bacteria.

---

38. For isolation of DNA a fungus is treated with which enzyme?

(A) Lysozyme

(B) Cellulase

(C) DNase

(D) Chitinase

Correct Answer: (D) Chitinase

Solution:

Step 1: Understanding the enzyme used for DNA isolation.

Chitinase is an enzyme used to break down chitin, which is found in the cell walls of fungi. This enzyme is helpful in isolating DNA from fungal cells.

Step 2: Analyzing the options.

(A) Lysozyme: Lysozyme is used to break down bacterial cell walls, not fungal cell walls.

(B) Cellulase: Cellulase breaks down cellulose in plant cell walls but does not affect fungal cell walls.

(C) DNase: DNase breaks down DNA, so it is not used for DNA isolation.

(D) Chitinase: Correct — Chitinase is used to break down the chitin in fungal cell walls, allowing for the isolation of DNA.

Step 3: Conclusion.

The correct answer is **(D) Chitinase**, as it is used to break down the chitin in fungal cell walls for DNA isolation.

Quick Tip

Chitinase is essential for breaking down fungal cell walls, which contain chitin, during DNA isolation.

---

39. Which of the following is absent in pBR322?

(A) Origin of replication

(B) Restriction site

(C) T-DNA

(D) Antibiotic resistant genes

Correct Answer: (C) T-DNA

Solution:

Step 1: Understanding pBR322 plasmid.

pBR322 is a commonly used plasmid vector in molecular cloning. It contains an origin of replication, restriction sites, and antibiotic-resistant genes, but it does not contain T-DNA. T-DNA is part of the Agrobacterium Ti plasmid.

Step 2: Analyzing the options.

(A) Origin of replication: pBR322 contains an origin of replication, allowing it to replicate within bacterial cells.

(B) Restriction site: pBR322 has multiple restriction sites for cloning.

(C) T-DNA: Correct — T-DNA is not present in pBR322. T-DNA is part of the Agrobacterium plasmid used for plant transformation.

(D) Antibiotic resistant genes: pBR322 contains genes for resistance to antibiotics such as ampicillin and tetracycline.

Step 3: Conclusion.

The correct answer is **(C) T-DNA**, as it is not present in the pBR322 plasmid.

Quick Tip

pBR322 is a widely used plasmid vector for cloning and does not contain T-DNA, which is specific to Agrobacterium vectors for plant transformation.

---

40. If a foreign DNA is inserted in tetracycline resistant gene, the recombinant plasmid will

(A) Will lose ampicillin resistance

(B) Will lose tetracycline resistance

(C) Cloning will become easier

(D) Ampicillin resistance will become stronger

Correct Answer: (B) Will lose tetracycline resistance

Solution:

Step 1: Understanding the impact of inserting foreign DNA.

When foreign DNA is inserted into a plasmid that contains a tetracycline resistance gene, the resistance function can be disrupted. This occurs if the foreign DNA is inserted into the tetracycline resistance gene, causing the recombinant plasmid to lose its ability to confer tetracycline resistance.

Step 2: Analyzing the options.

(A) Will lose ampicillin resistance: This is incorrect because ampicillin resistance is not affected by the insertion of foreign DNA into the tetracycline resistance gene.

(B) Will lose tetracycline resistance: Correct — The insertion of foreign DNA into the tetracycline resistance gene disrupts its function, leading to the loss of tetracycline resistance.

(C) Cloning will become easier: This is not true; the insertion of foreign DNA into the plasmid may complicate the cloning process.

(D) Ampicillin resistance will become stronger: This is incorrect, as ampicillin resistance is unrelated to the insertion of foreign DNA into the tetracycline gene.

Step 3: Conclusion.

The correct answer is **(B) Will lose tetracycline resistance**, as the foreign DNA insertion disrupts the tetracycline resistance gene.

Quick Tip

When cloning with plasmids that contain antibiotic resistance genes, the insertion of foreign DNA into these genes will disrupt their function, leading to the loss of resistance.

---

41. From which of the following bacteria, thermostable DNA polymerase is isolated?

(A) Agrobacterium

(B) Thermus aquaticus

(C) Methanobacterium

(D) Archaebacteria

Correct Answer: (B) Thermus aquaticus

Solution:

Step 1: Understanding the significance of thermostable DNA polymerase.

Thermostable DNA polymerase is used in techniques like PCR (Polymerase Chain Reaction) because it remains active at high temperatures. Thermus aquaticus, a bacterium found in hot springs, is the source of Taq polymerase, one of the most widely used thermostable DNA polymerases.

Step 2: Analyzing the options.

(A) Agrobacterium: Agrobacterium is used in plant transformation but is not a source of thermostable DNA polymerase.

(B) Thermus aquaticus: Correct — Thermus aquaticus is the bacterium from which Taq polymerase is isolated, used in PCR.

(C) Methanobacterium: Methanobacterium is a type of archaebacterium but is not used for thermostable DNA polymerase.

(D) Archaebacteria: Archaebacteria include various species, but Thermus aquaticus is specifically known for its thermostable polymerase.

Step 3: Conclusion.

The correct answer is **(B) Thermus aquaticus**, as it is the source of Taq polymerase used in PCR.

Quick Tip

Thermostable DNA polymerases, like Taq polymerase from Thermus aquaticus, are crucial for amplifying DNA in PCR reactions.

---

42. Which of the following bacteria synthesizes insecticidal protein?

(A) Agrobacterium

(B) Bacillus thuringiensis

(C) Escherichia coli

(D) Archaebacteria

Correct Answer: (B) Bacillus thuringiensis

Solution:

Step 1: Understanding Bacillus thuringiensis.

Bacillus thuringiensis (Bt) is a bacterium known for producing insecticidal proteins, particularly the Cry proteins, which are toxic to specific insect pests. Bt is widely used as a natural biopesticide.

Step 2: Analyzing the options.

(A) Agrobacterium: Agrobacterium is used in plant transformation, but it does not produce insecticidal proteins.

(B) Bacillus thuringiensis: Correct — Bacillus thuringiensis produces insecticidal proteins that are toxic to insects, and it is used as a biopesticide.

(C) Escherichia coli: Escherichia coli is a common bacterium used in molecular biology, but it does not synthesize insecticidal proteins.

(D) Archaebacteria: Archaebacteria are ancient microorganisms but do not produce insecticidal proteins.

Step 3: Conclusion.

The correct answer is **(B) Bacillus thuringiensis**, as it is known for synthesizing insecticidal proteins.

Quick Tip

Bacillus thuringiensis is a naturally occurring bacterium used in agriculture as a biopesticide due to its production of insecticidal proteins.

---

43. HIV attacks on which of the following cells?

(A) B-cells

(B) T-cells

(C) Epithelial cells

(D) T-helper cells

Correct Answer: (D) T-helper cells

Solution:

Step 1: Understanding HIV infection.

HIV (Human Immunodeficiency Virus) primarily targets T-helper cells, which are essential for the immune system's ability to fight infections. The virus attaches to the CD4 receptors on these cells, leading to their destruction.

Step 2: Analyzing the options.

(A) B-cells: B-cells are part of the immune system but are not the primary target of HIV.

(B) T-cells: While T-cells are involved in the immune response, HIV specifically targets T-helper cells.

(C) Epithelial cells: HIV does not target epithelial cells; these are cells that line body surfaces.

(D) T-helper cells: Correct — T-helper cells are the primary target of HIV, as the virus binds to the CD4 receptors on these cells.

Step 3: Conclusion.

The correct answer is **(D) T-helper cells**, as HIV specifically targets these cells during infection.

Quick Tip

HIV attacks the immune system by targeting T-helper cells, which play a crucial role in coordinating immune responses.

---

44. Going down of inorganic water soluble nutrients into the soil nutrients is called as?

(A) Fragmentation

(B) Leaching

(C) Catabolism

(D) Humification

Correct Answer: (B) Leaching

Solution:

Step 1: Understanding Leaching.

Leaching is the process where water-soluble substances such as nutrients, minerals, or other solutes are washed down through the soil. This is an important process in the movement of nutrients in ecosystems.

Step 2: Analyzing the options.

(A) Fragmentation: Fragmentation refers to the breaking down of organic material into smaller pieces, not nutrient movement in soil.

(B) Leaching: Correct — Leaching is the process by which nutrients are carried down into the soil.

(C) Catabolism: Catabolism refers to the breakdown of complex molecules into simpler ones, which is unrelated to the movement of nutrients in soil.

(D) Humification: Humification refers to the process of organic material breaking down into humus, not the movement of water-soluble nutrients.

Step 3: Conclusion.

The correct answer is **(B) Leaching**, as it refers to the downward movement of water-soluble nutrients into the soil.

Quick Tip

Leaching is an important natural process in soil that helps transport water-soluble nutrients to deeper soil layers.

---

45. According to Robert May, how much is the global species diversity?

(A) 7 million

(B) 1.5 million

(C) 20-25 million

(D) 2 million

Correct Answer: (C) 20-25 million

Solution:

Step 1: Understanding global species diversity.

Robert May, an ecologist, estimated that the global species diversity lies between 20 to 25 million species. However, only a fraction of these species have been identified.

Step 2: Analyzing the options.

(A) 7 million: This is an underestimate of the total species diversity.

(B) 1.5 million: This is an even lower estimate, not reflecting Robert May's estimation.

(C) 20-25 million: Correct — Robert May estimated that the total global species diversity is between 20 to 25 million.

(D) 2 million: This is too low compared to May's estimate.

Step 3: Conclusion.

The correct answer is **(C) 20-25 million**, as Robert May estimated global species diversity in this range.

Quick Tip

Global species diversity is estimated to be around 20-25 million, although many species remain undiscovered.

---

46. Biodiversity of India is what percentage of the total global species diversity?

(A) 2-4%

(B) 8-1%

(C) 5%

(D) 9%

Correct Answer: (A) 2-4%

Solution:

Step 1: Understanding India's biodiversity.

India is home to a significant portion of the world's biodiversity. However, it constitutes around 2-4% of the global species diversity.

Step 2: Analyzing the options.

(A) 2-4%: Correct — India accounts for about 2-4% of the total global species diversity.

(B) 8-1%: This is too high; India does not represent such a large proportion of global species diversity.

(C) 5%: This is slightly higher than the correct estimate.

(D) 9%: This is an overestimate.

Step 3: Conclusion.

The correct answer is **(A) 2-4%**, as India represents about 2-4% of the global species diversity.

Quick Tip

India has a rich biodiversity, contributing significantly to global species diversity, representing approximately 2-4% of it.

---

47. What was the reason for extinction of more than 200 species of Cichlid fish in Lake Victoria?

(A) Co-extinction

(B) Alien species invasion

(C) Overexploitation

(D) Habitat loss

Correct Answer: (B) Alien species invasion

Solution:

Step 1: Understanding the extinction of Cichlid fish.

The extinction of more than 200 species of Cichlid fish in Lake Victoria is primarily attributed to the introduction of alien species, especially the Nile perch, which became a predator to the native fish species.

Step 2: Analyzing the options.

(A) Co-extinction: Co-extinction refers to the extinction of species that are dependent on others, but this was not the primary cause in this case.

(B) Alien species invasion: Correct — The introduction of alien species like Nile perch led to the extinction of many native Cichlid fish in Lake Victoria.

(C) Overexploitation: While overexploitation can lead to species extinction, it was not the primary cause in this case.

(D) Habitat loss: Habitat loss is a common cause of extinction but was not the primary cause for the Cichlids in Lake Victoria.

Step 3: Conclusion.

The correct answer is **(B) Alien species invasion**, as the introduction of invasive species like Nile perch caused the extinction of many Cichlid fish in Lake Victoria.

Quick Tip

Alien species invasion is a major threat to native biodiversity, often leading to the extinction of native species by predation, competition, or disease.

---

48. Which of the following is not the reason for global warming?

(A) Use of fossil fuels

(B) Deforestation

(C) Population explosion

(D) Improvement in the efficiency of energy use

Correct Answer: (D) Improvement in the efficiency of energy use

Solution:

Step 1: Understanding the causes of global warming.

Global warming is caused by an increase in greenhouse gases in the atmosphere, primarily due to human activities like burning fossil fuels, deforestation, and population growth. Improving energy efficiency actually helps to reduce global warming.

Step 2: Analyzing the options.

(A) Use of fossil fuels: The burning of fossil fuels releases carbon dioxide, a major greenhouse gas that contributes to global warming.

(B) Deforestation: Deforestation contributes to global warming by reducing the planet's ability to absorb carbon dioxide.

(C) Population explosion: A rapid increase in population leads to greater demand for energy, food, and land, which contributes to global warming.

(D) Improvement in the efficiency of energy use: Correct — Improving the efficiency of energy use helps to reduce the amount of fossil fuels burned, thus reducing global warming.

Step 3: Conclusion.

The correct answer is **(D) Improvement in the efficiency of energy use**, as this helps mitigate, rather than contribute to, global warming.

Quick Tip

Improving energy efficiency and switching to renewable energy sources are essential steps in combating global warming and reducing carbon emissions.

---

49. Which of the following statements is incorrect about organic farming?

(A) It is cyclic

(B) Zero waste is generated

(C) Maximum utilization of resources

(D) Use of chemical fertilizers

Correct Answer: (D) Use of chemical fertilizers

Solution:

Step 1: Understanding organic farming.

Organic farming is a method of farming that avoids the use of synthetic chemicals and fertilizers. It focuses on maintaining ecological balance and promoting biodiversity.

Step 2: Analyzing the options.

(A) It is cyclic: Organic farming is based on a cyclic process where natural resources are recycled, and crop rotation is practiced to maintain soil health.

(B) Zero waste is generated: Organic farming aims to generate zero waste by recycling all resources.

(C) Maximum utilization of resources: Organic farming promotes the efficient use of resources such as water, compost, and organic inputs.

(D) Use of chemical fertilizers: Correct — Organic farming does not use synthetic chemical fertilizers; instead, it uses natural methods like composting and organic amendments.

Step 3: Conclusion.

The correct answer is **(D) Use of chemical fertilizers**, as organic farming does not rely on chemical fertilizers.

Quick Tip

Organic farming avoids the use of synthetic chemicals and fertilizers, promoting sustainability and ecological balance.

---

50. Which of the following statements is incorrect about temperature?

(A) Temperature is the most important environmental factor

(B) Temperature decreases from the equator towards the pole

(C) Temperature increases with increase in height

(D) Temperature is low at the summit of a mountain

Correct Answer: (C) Temperature increases with increase in height

Solution:

Step 1: Understanding the temperature gradient.

Temperature generally decreases with an increase in height due to the thinning of the atmosphere and the decreasing pressure at higher altitudes.

Step 2: Analyzing the options.

(A) Temperature is the most important environmental factor: This is true, as temperature significantly impacts ecosystems, weather, and climate patterns.

(B) Temperature decreases from the equator towards the pole: Correct — Temperature tends to decrease from the equator towards the poles due to the variation in solar radiation.

(C) Temperature increases with increase in height: Incorrect — Temperature actually decreases with height in the troposphere due to the lower air pressure.

(D) Temperature is low at the summit of a mountain: This is true, as temperature drops with an increase in altitude.

Step 3: Conclusion.

The correct answer is **(C) Temperature increases with increase in height**, as temperature decreases with altitude, not increases.

Quick Tip

Temperature typically decreases with altitude in the troposphere, which is why mountain summits are cooler than valleys.

---

51. At which level natural selection operated to evolve the desired traits?

(A) Individual level

(B) Population level

(C) Community level

(D) Ecosystem level

Correct Answer: (B) Population level

Solution:

Step 1: Understanding natural selection.

Natural selection operates on individuals within a population, favoring those with traits that enhance survival and reproduction. This leads to the evolution of the population over generations.

Step 2: Analyzing the options.

(A) Individual level: Natural selection does not operate at the individual level, although individuals with beneficial traits are favored.

(B) Population level: Correct — Natural selection acts on the population by favoring individuals with advantageous traits, leading to evolutionary changes in the population over time.

(C) Community level: Natural selection operates on populations, not communities.

(D) Ecosystem level: Natural selection works at the population level, not at the ecosystem level.

Step 3: Conclusion.

The correct answer is **(B) Population level**, as natural selection operates on populations, driving evolutionary changes.

Quick Tip

Natural selection works at the population level, where traits that improve survival and reproduction are passed down through generations.

---

52. When percentage of individuals of pre-reproductive, reproductive and post-reproductive phase is in decreasing order in the age pyramid of human population, it shows that population is

(A) Expanding

(B) Decreasing

(C) Stable

(D) Unstable

Correct Answer: (B) Decreasing

Solution:

Step 1: Understanding the age pyramid.

An age pyramid with a larger proportion of post-reproductive individuals compared to pre-reproductive individuals indicates a declining population. A decreasing population has fewer younger individuals, leading to a shrinking workforce and higher dependency ratios.

Step 2: Analyzing the options.

(A) Expanding: An expanding population would have a larger proportion of younger individuals.

(B) Decreasing: Correct — A population with a higher percentage of older individuals indicates a decrease in the birth rate and a potential decline in the population size.

(C) Stable: A stable population would have an even distribution across age groups.

(D) Unstable: This is an inaccurate description of the population's trend.

Step 3: Conclusion.

The correct answer is **(B) Decreasing**, as the pyramid indicates a declining population with more post-reproductive individuals.

Quick Tip

A population with more elderly individuals and fewer younger ones tends to have a declining population growth rate.

---

53. Which of the following reproduces once in a lifetime?

(A) Pacific salmon fish and bamboo

(B) Mammals

(C) Birds and mammals

(D) Litchi and mango

Correct Answer: (A) Pacific salmon fish and bamboo

Solution:

Step 1: Understanding life history strategies.

Certain organisms like Pacific salmon fish and bamboo reproduce only once in their lifetime. Pacific salmon, for example, spawn and die after one reproductive event, and bamboo species typically flower only once and then die.

Step 2: Analyzing the options.

(A) Pacific salmon fish and bamboo: Correct — Both of these organisms reproduce only once in their lifetime and then die.

(B) Mammals: Mammals typically reproduce multiple times throughout their lifetime.

(C) Birds and mammals: Most birds and mammals reproduce multiple times in their lives.

(D) Litchi and mango: Litchi and mango trees produce fruit multiple times in their lifetime.

Step 3: Conclusion.

The correct answer is **(A) Pacific salmon fish and bamboo**, as both reproduce once and then die.

Quick Tip

Some organisms, like Pacific salmon and bamboo, have a semelparous life history strategy where they reproduce once and then die.

---

54. What was the reason for co-existence of five closely related species of warblers?

(A) Competitive exclusion

(B) Resource partitioning

(C) Parasitism

(D) Commensalism

Correct Answer: (B) Resource partitioning

Solution:

Step 1: Understanding resource partitioning.

Resource partitioning occurs when closely related species share a habitat but avoid direct competition by utilizing different resources or occupying different niches. In the case of warblers, they co-exist by partitioning resources, such as feeding on different types of insects in different parts of trees.

Step 2: Analyzing the options.

(A) Competitive exclusion: Competitive exclusion would not allow for co-existence; it states that two species competing for the same resources cannot coexist long-term.

(B) Resource partitioning: Correct — Resource partitioning allows species to coexist by utilizing different ecological niches, thus avoiding competition.

(C) Parasitism: Parasitism involves one species benefiting at the expense of another and does not explain co-existence.

(D) Commensalism: Commensalism involves one species benefiting without affecting the other, but resource partitioning is the primary reason for co-existence here.

Step 3: Conclusion.

The correct answer is **(B) Resource partitioning**, as it explains the co-existence of closely related species by sharing resources without competing.

Quick Tip

Resource partitioning allows species to coexist in the same habitat by dividing resources in ways that reduce competition.

---

55. Which of the following plants produces poisonous cardiac glycoside?

(A) Cactus

(B) Calotropis

(C) Coffee plant

(D) Tobacco

Correct Answer: (B) Calotropis

Solution:

Step 1: Understanding cardiac glycosides.

Cardiac glycosides are toxic compounds that affect the heart. Calotropis, also known as milkweed, produces these poisonous compounds. It is used in traditional medicine, but its toxicity is well known.

Step 2: Analyzing the options.

(A) Cactus: While some cacti may have medicinal properties, they do not produce cardiac glycosides.

(B) Calotropis: Correct — Calotropis is known to produce toxic cardiac glycosides, which affect heart function.

(C) Coffee plant: The coffee plant does not produce cardiac glycosides; it produces caffeine.

(D) Tobacco: Tobacco contains nicotine, not cardiac glycosides.

Step 3: Conclusion.

The correct answer is **(B) Calotropis**, as it produces toxic cardiac glycosides.

Quick Tip

Cardiac glycosides are toxic compounds found in certain plants, such as Calotropis, and affect heart function.

---

56. Which of the following are decomposers?

(A) Fungi and algae

(B) Fungi and virus

(C) Fungi and bacteria

(D) Fungi, bacteria and virus

Correct Answer: (C) Fungi and bacteria

Solution:

Step 1: Understanding decomposers.

Decomposers break down dead organic material into simpler substances, recycling nutrients back into the ecosystem. Fungi and bacteria are the primary decomposers in most ecosystems.

Step 2: Analyzing the options.

(A) Fungi and algae: While algae are photosynthetic organisms, they are not primary decomposers.

(B) Fungi and virus: Viruses are not decomposers; they are pathogens that require a host cell to replicate.

(C) Fungi and bacteria: Correct — Both fungi and bacteria are essential decomposers, breaking down dead organic matter.

(D) Fungi, bacteria and virus: While fungi and bacteria are decomposers, viruses do not play a role in decomposition.

Step 3: Conclusion.

The correct answer is **(C) Fungi and bacteria**, as they are the main decomposers in ecosystems.

Quick Tip

Fungi and bacteria are the primary decomposers that break down dead organic matter and recycle nutrients in ecosystems.

---

57. In a cross between true breeding red flowered and true breeding white flowered plants of Antirrhinum the F1 generation was pink flowered which is an example of

(A) Dominance

(B) Codominance

(C) Incomplete dominance

(D) Blending of contrasting forms of a character

Correct Answer: (C) Incomplete dominance

Solution:

Step 1: Understanding incomplete dominance.

Incomplete dominance is a genetic scenario in which neither allele is completely dominant over the other. In the case of Antirrhinum, crossing red and white flowered plants results in pink flowers, indicating that both alleles contribute to the phenotype but neither is completely dominant.

Step 2: Analyzing the options.

(A) Dominance: In dominance, one allele completely masks the expression of the other, which is not the case here.

(B) Codominance: In codominance, both alleles are expressed equally, but in incomplete dominance, the heterozygote shows an intermediate phenotype.

(C) Incomplete dominance: Correct — The pink flowers in the F1 generation are a result of incomplete dominance, where neither red nor white is fully dominant.

(D) Blending of contrasting forms of a character: This is a general description of incomplete dominance but does not specify the genetic mechanism.

Step 3: Conclusion.

The correct answer is **(C) Incomplete dominance**, as it explains the intermediate phenotype (pink flowers) seen in the F1 generation.

Quick Tip

Incomplete dominance results in an intermediate phenotype, where neither allele is completely dominant.

---

58. Which of the following statements is incorrect?

(A) Characters are controlled by factors

(B) Factors are discrete

(C) In pea, factors are in pairs

(D) Alleles blend with each other

Correct Answer: (D) Alleles blend with each other

Solution:

Step 1: Understanding genetic inheritance.

In Mendelian genetics, alleles for a trait do not blend. Instead, they segregate, with each allele maintaining its identity. The concept of blending alleles is incorrect in Mendelian inheritance.

Step 2: Analyzing the options.

(A) Characters are controlled by factors: Correct — The term ”factors” refers to what we now call genes.

(B) Factors are discrete: Correct — Genes or factors are discrete units and do not blend.

(C) In pea, factors are in pairs: Correct — According to Mendel’s laws, alleles for each trait come in pairs, one from each parent.

(D) Alleles blend with each other: Incorrect — In Mendelian inheritance, alleles do not blend. Instead, one allele may be dominant or recessive.

Step 3: Conclusion.

The correct answer is **(D) Alleles blend with each other**, as this statement is incorrect in the context of Mendelian genetics.

Quick Tip

Alleles do not blend in classical genetics. Instead, they may be dominant or recessive, or they may exhibit incomplete dominance or codominance.

---

59. What is the cytological basis of law of independent assortment?

(A) There is no blending of alleles

(B) Alleles of a pair separate during gamete formation

(C) Alleles may be dominant or recessive

(D) Pair of chromosomes arrange themselves in line independently in metaphase I

Correct Answer: (D) Pair of chromosomes arrange themselves in line independently in metaphase I

Solution:

Step 1: Understanding independent assortment.

The law of independent assortment, proposed by Mendel, states that the alleles for different traits are distributed to gametes independently. This occurs during metaphase I of meiosis when chromosome pairs align randomly.

Step 2: Analyzing the options.

(A) There is no blending of alleles: This is true, but it does not explain independent assortment.

(B) Alleles of a pair separate during gamete formation: This refers to Mendel's law of segregation, not independent assortment.

(C) Alleles may be dominant or recessive: While this is true, it is unrelated to independent assortment.

(D) Pair of chromosomes arrange themselves in line independently in metaphase I: Correct — During metaphase I, homologous chromosome pairs align randomly, leading to independent assortment.

Step 3: Conclusion.

The correct answer is **(D) Pair of chromosomes arrange themselves in line independently in metaphase I**, as this explains the basis of independent assortment.

Quick Tip

In meiosis I, homologous chromosomes randomly align during metaphase, which leads to the independent assortment of alleles.

---

60. Who propounded the chromosomal theory of inheritance?

(A) Mendel

(B) Sutton and Boveri

(C) Morgan

(D) Henking

Correct Answer: (B) Sutton and Boveri

Solution:

Step 1: Understanding the chromosomal theory of inheritance.

The chromosomal theory of inheritance was proposed by Sutton and Boveri. It states that genes are carried on chromosomes, and the inheritance of traits follows the behavior of chromosomes during meiosis.

Step 2: Analyzing the options.

(A) Mendel: Mendel is known for his work on inheritance laws, but not for the chromosomal theory.

(B) Sutton and Boveri: Correct — Sutton and Boveri proposed that genes are located on chromosomes, which is the chromosomal theory of inheritance.

(C) Morgan: Morgan worked on Drosophila and contributed to the understanding of linked genes, but not the chromosomal theory itself.

(D) Henking: Henking was involved in the study of sex chromosomes, but he did not propose the chromosomal theory.

Step 3: Conclusion.

The correct answer is **(B) Sutton and Boveri**, as they are credited with the chromosomal theory of inheritance.

Quick Tip

The chromosomal theory of inheritance, proposed by Sutton and Boveri, links genes to chromosomes and explains how traits are inherited.

---

61. Which of the following is not a chromosomal disorder?

(A) Down's syndrome
(B) Klinefelter's syndrome
(C) Turner's syndrome
(D) Haemophilia

Correct Answer: (D) Haemophilia

Solution:

Step 1: Understanding chromosomal disorders.
Chromosomal disorders are caused by abnormalities in the number or structure of chromosomes. Down's syndrome, Klinefelter's syndrome, and Turner's syndrome are chromosomal disorders. Haemophilia, however, is a genetic disorder caused by mutations in specific genes on the X chromosome.
Step 2: Analyzing the options.
(A) Down's syndrome: Down's syndrome is caused by the presence of an extra chromosome 21.
(B) Klinefelter's syndrome: Klinefelter's syndrome is caused by an extra X chromosome in males (XXY).
(C) Turner's syndrome: Turner's syndrome is caused by the absence of one X chromosome in females (45, X).
(D) Haemophilia: Correct — Haemophilia is a genetic disorder linked to the X chromosome but is not caused by a chromosomal abnormality.

Step 3: Conclusion.

The correct answer is **(D) Haemophilia**, as it is a genetic disorder, not a chromosomal one.

> Quick Tip
>
> Haemophilia is an X-linked genetic disorder, whereas chromosomal disorders are caused by abnormalities in chromosome number or structure.

---

62. Who provided X-ray diffraction data of DNA?

(A) Maurice Wilkins & Rosalind Franklin

(B) Chargaff

(C) Watson and Crick

(D) Holley

Correct Answer: (A) Maurice Wilkins & Rosalind Franklin

Solution:

Step 1: Understanding the significance of X-ray diffraction.

Maurice Wilkins and Rosalind Franklin played a key role in obtaining the X-ray diffraction images of DNA that provided essential insights into its helical structure. Their work was crucial for Watson and Crick to propose the double-helix model of DNA.

Step 2: Analyzing the options.

(A) Maurice Wilkins & Rosalind Franklin: Correct — They provided the X-ray diffraction data that led to the discovery of the DNA double helix structure.

(B) Chargaff: Chargaff is known for formulating Chargaff's rules, which explain the base pairing in DNA, but he did not provide X-ray diffraction data.

(C) Watson and Crick: Watson and Crick are credited with proposing the double helix structure of DNA, but they used the X-ray data provided by Wilkins and Franklin.

(D) Holley: Holley is known for his work on the structure of tRNA, not for providing X-ray diffraction data of DNA.

Step 3: Conclusion.

The correct answer is **(A) Maurice Wilkins & Rosalind Franklin**, as they provided the crucial X-ray diffraction data that led to the discovery of the structure of DNA.

Quick Tip

The X-ray diffraction images produced by Wilkins and Franklin were key to understanding the helical structure of DNA, leading to the discovery of its double-helix structure.

---

63. What was the conclusion of Hershey and Chase experiment?

(A) Genetic material of bacteria is DNA

(B) Genetic material of virus is DNA

(C) Genetic material of bacteria is RNA

(D) Genetic material of virus is RNA

Correct Answer: (A) Genetic material of bacteria is DNA

Solution:

Step 1: Understanding the Hershey and Chase experiment.

Hershey and Chase's experiment involved tracking radioactive phosphorus and sulfur in bacteriophages to determine whether DNA or protein carried genetic information. They concluded that DNA, not protein, is the genetic material in bacteria.

Step 2: Analyzing the options.

(A) Genetic material of bacteria is DNA: Correct — The Hershey and Chase experiment confirmed that DNA is the genetic material of bacteria.

(B) Genetic material of virus is DNA: This is incorrect in the context of the experiment, as it focused on bacteria.

(C) Genetic material of bacteria is RNA: This is incorrect; the experiment showed that DNA is the genetic material.

(D) Genetic material of virus is RNA: This statement is irrelevant to the experiment, which focused on bacteriophages.

Step 3: Conclusion.

The correct answer is **(A) Genetic material of bacteria is DNA**, as concluded by the Hershey and Chase experiment.

Quick Tip

Hershey and Chase's experiment provided key evidence that DNA is the genetic material, not proteins.

---

64. Which of the following is not a termination codon?

(A) UAG

(B) UGA

(C) AUG

(D) UAA

Correct Answer: (C) AUG

Solution:

Step 1: Understanding codons.

Termination codons, also known as stop codons, signal the end of translation. The three stop codons are UAG, UGA, and UAA. AUG is a start codon that signals the beginning of translation.

Step 2: Analyzing the options.

(A) UAG: This is a termination codon.

(B) UGA: This is a termination codon.

(C) AUG: Correct — AUG is the start codon, not a termination codon.

(D) UAA: This is a termination codon.

Step 3: Conclusion.

The correct answer is **(C) AUG**, as it is the start codon, not a termination codon.

Quick Tip

Start codons initiate protein synthesis, while stop codons signal the end of translation.

65. What is the meaning of charging of t-RNA?

(A) Linking of amino acid with cognate t-RNA

(B) Attachment of t-RNA with ribosome

(C) Translation of RNA

(D) Modification of RNA

Correct Answer: (A) Linking of amino acid with cognate t-RNA

Solution:

Step 1: Understanding the charging of t-RNA.

Charging of t-RNA refers to the process by which an amino acid is covalently attached to its corresponding t-RNA molecule. This process is catalyzed by aminoacyl-tRNA synthetase and is essential for protein synthesis.

Step 2: Analyzing the options.

(A) Linking of amino acid with cognate t-RNA: Correct — This is the definition of charging of t-RNA.

(B) Attachment of t-RNA with ribosome: This happens later during translation, but it is not the meaning of t-RNA charging.

(C) Translation of RNA: Translation is the process in which proteins are synthesized, but it is not the definition of t-RNA charging.

(D) Modification of RNA: This is a different process that involves changes to RNA molecules, not the charging of t-RNA.

Step 3: Conclusion.

The correct answer is **(A) Linking of amino acid with cognate t-RNA**, which is the definition of t-RNA charging.

Quick Tip

Charging of t-RNA is the process where an amino acid is attached to its corresponding t-RNA molecule before translation.

66. Which of the following is a non-infectious disease?

(A) AIDS

(B) Malaria

(C) Cancer

(D) Typhoid

Correct Answer: (C) Cancer

Solution:

Step 1: Understanding infectious and non-infectious diseases.

Infectious diseases are caused by pathogens, such as bacteria, viruses, or parasites, while non-infectious diseases are not caused by pathogens. Cancer is a non-infectious disease, as it results from abnormal cell growth rather than an infection.

Step 2: Analyzing the options.

(A) AIDS: AIDS is an infectious disease caused by the HIV virus.

(B) Malaria: Malaria is an infectious disease caused by Plasmodium parasites transmitted through mosquito bites.

(C) Cancer: Correct — Cancer is a non-infectious disease caused by abnormal cell growth.

(D) Typhoid: Typhoid is an infectious disease caused by the Salmonella bacteria.

Step 3: Conclusion.

The correct answer is **(C) Cancer**, as it is a non-infectious disease.

Quick Tip

Non-infectious diseases like cancer are not caused by pathogens, but by genetic mutations or environmental factors.

---

67. Which of the following blood cells is known as PMNL?

(A) Lymphocyte

(B) Monocyte

(C) Neutrophil

(D) Platelets

Correct Answer: (C) Neutrophil

Solution:

Step 1: Understanding PMNL.

PMNL stands for polymorphonuclear leukocytes, which is another term for neutrophils. Neutrophils are a type of white blood cell and the most abundant in the bloodstream. They are essential for fighting infections.

Step 2: Analyzing the options.

(A) Lymphocyte: Lymphocytes are a type of white blood cell but are not PMNL. They play a key role in adaptive immunity.

(B) Monocyte: Monocytes are large white blood cells that differentiate into macrophages and dendritic cells but are not PMNL.

(C) Neutrophil: Correct — Neutrophils are polymorphonuclear leukocytes (PMNL), which are crucial in the body's defense against infections.

(D) Platelets: Platelets are involved in blood clotting, not part of the PMNL group.

Step 3: Conclusion.

The correct answer is **(C) Neutrophil**, as they are also known as PMNL.

Quick Tip

PMNL refers to neutrophils, a key type of white blood cell in the immune system.

---

68. Which of the following is abundantly found in colostrum?

(A) IgA

(B) IgG

(C) IgM

(D) IgD

Correct Answer: (A) IgA

Solution:

Step 1: Understanding colostrum.

Colostrum is the first milk produced by mammals after giving birth. It is rich in antibodies, especially Immunoglobulin A (IgA), which is essential for the newborn's immune protection.

Step 2: Analyzing the options.

(A) IgA: Correct — IgA is the most abundant antibody in colostrum and is crucial for protecting the newborn from infections.

(B) IgG: IgG is the most abundant antibody in blood plasma, not in colostrum.

(C) IgM: IgM is present in colostrum but is not the most abundant antibody.

(D) IgD: IgD is mainly found on B cells, not in colostrum.

Step 3: Conclusion.

The correct answer is **(A) IgA**, as it is the primary antibody found in colostrum.

Quick Tip

IgA in colostrum provides immune protection to newborns by neutralizing pathogens.

---

69. What is diacetyl morphine?

(A) Codeine

(B) Heroin

(C) Cannabinoid

(D) Coke

Correct Answer: (B) Heroin

Solution:

Step 1: Understanding diacetyl morphine.

Diacetyl morphine is the chemical name for heroin, an opioid drug that is highly addictive. It is synthesized from morphine and has potent analgesic and euphoric effects.

Step 2: Analyzing the options.

(A) Codeine: Codeine is an opioid, but it is not diacetyl morphine. It is a less potent pain reliever than heroin.

(B) Heroin: Correct — Diacetyl morphine is another name for heroin, a powerful illicit drug.

(C) Cannabinoid: Cannabinoids are compounds found in cannabis, not in heroin.

(D) Coke: Coke refers to cocaine, which is a stimulant, not an opioid like heroin.

Step 3: Conclusion.

The correct answer is **(B) Heroin**, as diacetyl morphine is the chemical name for heroin.

Quick Tip

Heroin, also known as diacetyl morphine, is a highly addictive opioid derived from morphine.

---

70. Which fever is confirmed by Widal test?

(A) Malaria

(B) Typhoid

(C) AIDS

(D) Pneumonia

Correct Answer: (B) Typhoid

Solution:

Step 1: Understanding the Widal test.

The Widal test is used to diagnose typhoid fever caused by the bacterium *Salmonella typhi*. It detects antibodies against *Salmonella* in the patient's blood.

Step 2: Analyzing the options.

(A) Malaria: Malaria is diagnosed through blood smears or rapid diagnostic tests, not the Widal test.

(B) Typhoid: Correct — The Widal test is specifically used to diagnose typhoid fever.

(C) AIDS: AIDS is diagnosed using tests like ELISA or PCR, not the Widal test.

(D) Pneumonia: Pneumonia is diagnosed through chest X-rays and sputum tests, not the Widal test.

Step 3: Conclusion.

The correct answer is **(B) Typhoid**, as the Widal test is used to confirm the diagnosis of typhoid fever.

Quick Tip

The Widal test is commonly used to diagnose typhoid fever by detecting antibodies against *Salmonella* bacteria.

Section B

1. How are DNA fragments separated and isolated?

Solution:

Step 1: Understanding the process of DNA fragment separation.

DNA fragments can be separated and isolated using a technique known as gel electrophoresis. This process involves the migration of DNA molecules through a gel matrix when an electric current is applied. The DNA fragments move based on their size, with smaller fragments moving faster through the gel.

Step 2: Conclusion.

The DNA fragments are separated and isolated through **gel electrophoresis**, which is the most commonly used method for DNA fragment separation.

Quick Tip

Gel electrophoresis is a powerful technique for separating DNA fragments based on their size, allowing for further analysis or isolation.

---

2. What is ELISA?

Solution:

Step 1: Understanding ELISA.

ELISA (Enzyme-Linked Immunosorbent Assay) is a biochemical test that uses antibodies and color change to identify the presence of a substance, often an antigen or antibody in a

sample. It is widely used in immunology for detecting and quantifying substances like hormones, proteins, antibodies, or antigens.

Step 2: Conclusion.

The correct answer is **Enzyme-Linked Immunosorbent Assay (ELISA)**, which is a test for detecting the presence of specific substances using enzyme-linked antibodies.

Quick Tip

ELISA is a versatile assay used for detecting and quantifying substances based on antigen-antibody interactions.

---

3. What are the primary and secondary productivities?

Solution:

Step 1: Understanding primary and secondary productivity.

- Primary productivity refers to the rate at which energy is captured by primary producers (like plants and algae) through photosynthesis or chemosynthesis. - Secondary productivity refers to the rate at which energy is transferred to consumers (herbivores, carnivores) and the rate of biomass production in these organisms.

Step 2: Conclusion.

The correct answer is: **Primary productivity is the rate of energy capture by producers, and secondary productivity is the rate of energy transfer to consumers.**

Quick Tip

Primary productivity measures the energy captured by producers, while secondary productivity measures the energy passed through trophic levels to consumers.

---

4. What is Dobson unit?

Solution:

Step 1: Understanding Dobson unit.

A Dobson unit (DU) is a unit of measurement used to quantify the amount of ozone in the Earth's atmosphere. One Dobson unit corresponds to the amount of ozone that would form a layer 0.01 millimeters thick at standard temperature and pressure. It is commonly used in atmospheric sciences to assess the ozone layer's thickness.

Step 2: Conclusion.

The correct answer is **A Dobson unit is used to measure ozone concentration in the atmosphere.**

Quick Tip

A Dobson unit measures the concentration of ozone in the atmosphere, which is crucial for monitoring ozone depletion.

---

5. What is MOET?

Solution:

Step 1: Understanding MOET.

MOET stands for Multiple Ovulation Embryo Transfer. It is a technique used in animal breeding to increase the number of offspring produced by a female. This method involves stimulating the female to produce multiple eggs using hormones, which are then fertilized and transferred into surrogate mothers to produce multiple embryos.

Step 2: Conclusion.

MOET is a reproductive technology used to improve livestock production by increasing the number of offspring a female can produce.

Quick Tip

MOET is widely used in animal breeding to produce multiple offspring from a single female in a short period.

---

6. How is the name given to restriction endonucleases?

Solution:

Step 1: Understanding restriction endonucleases.

Restriction endonucleases are enzymes that cut DNA molecules at specific sequences. The naming of these enzymes is standardized and follows a specific format. Typically, the name consists of three parts: 1. The genus of the bacterium (usually abbreviated), 2. The species of the bacterium (also abbreviated), 3. A number that indicates the order in which the enzyme was isolated from that bacterium.

For example, EcoRI is a restriction enzyme isolated from *Escherichia coli* (Eco), strain RY13 (R), and the first enzyme (I) from this strain.

Step 2: Conclusion.

The name of restriction endonucleases is based on the bacterium from which they are isolated, using the genus, species, and order of isolation.

Quick Tip

Restriction enzymes are named based on the organism they were isolated from, with a systematic naming convention.

---

7. What is cell-mediated immunity?

Solution:

Step 1: Understanding cell-mediated immunity.

Cell-mediated immunity is an immune response that does not involve antibodies but rather the activation of T-cells (a type of white blood cell) to target and destroy infected or cancerous cells. This type of immunity is particularly important in fighting intracellular pathogens, such as viruses, as well as in the body's defense against cancer cells. T-helper cells and cytotoxic T-cells play a critical role in this process.

Step 2: Conclusion.

Cell-mediated immunity involves T-cells directly attacking infected or abnormal cells, and it plays a key role in the body's defense against viruses and cancer.

Quick Tip

Cell-mediated immunity is vital for combating viral infections and cancers, where antibodies are less effective.

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8. What is cyclosporin-A and what is its use?

Solution:

Step 1: Understanding Cyclosporin-A.

Cyclosporin-A is an immunosuppressant drug derived from the fungus *Tolypocladium inflatum*. It works by inhibiting the activity of T-cells, which are responsible for initiating immune responses. This makes it particularly useful in preventing organ rejection in transplant patients, as it suppresses the immune system's ability to attack the transplanted organ.

Step 2: Conclusion.

Cyclosporin-A is primarily used to prevent organ rejection after transplants and is also used to treat autoimmune diseases by suppressing the immune system.

Quick Tip

Cyclosporin-A is essential in transplant medicine to prevent organ rejection by suppressing the immune response.

---

9. What are spermatogonia, primary spermatocytes and secondary spermatocytes?

Solution:

Step 1: Spermatogonia.

Spermatogonia are the diploid cells that exist in the testes and are the precursor cells to sperm cells. They undergo mitosis to form primary spermatocytes.

Step 2: Primary Spermatocytes.

Primary spermatocytes are diploid cells formed from spermatogonia. They undergo meiosis I to form secondary spermatocytes.

Step 3: Secondary Spermatocytes.

Secondary spermatocytes are haploid cells formed after meiosis I. They undergo meiosis II to form spermatids, which later develop into mature sperm.

Step 4: Conclusion.

Spermatogonia are the precursor cells, primary spermatocytes undergo meiosis I, and secondary spermatocytes are the result of meiosis I.

Quick Tip

Spermatogenesis involves multiple stages, starting with spermatogonia and ending with mature sperm.

---

10. What are contraceptive pills? How do they function?

Solution:

Step 1: Understanding Contraceptive Pills.

Contraceptive pills are oral medications used to prevent pregnancy. They typically contain synthetic forms of female hormones like estrogen and progestin.

Step 2: Mechanism of Action.

Contraceptive pills function by inhibiting ovulation (the release of an egg from the ovaries), thickening cervical mucus to block sperm entry, and altering the uterine lining to prevent implantation of a fertilized egg.

Step 3: Conclusion.

Contraceptive pills work mainly by preventing ovulation and making it difficult for sperm to fertilize an egg.

Quick Tip

Contraceptive pills are effective when used consistently and correctly, preventing pregnancy through hormonal regulation.

---

11. Describe the structure of microsporangium.

Solution:

Step 1: Structure of Microsporangium.

A microsporangium is a structure in plants where microspores (male gametes) are produced. It is typically found within the anthers of flowers in angiosperms. The microsporangium consists of: 1. Epidermis: The outer layer that protects the sporangium. 2. Tapetum: The innermost layer that nourishes the developing microspores. 3. Middle layers: These are found between the epidermis and tapetum and help in the formation of pollen. 4. Microspores: These are the haploid cells formed after meiosis and will eventually develop into pollen grains.

Step 2: Conclusion.

Microsporangium is composed of layers such as the epidermis, tapetum, middle layers, and microspores, all working together to produce pollen.

Quick Tip

In angiosperms, microsporangia are crucial for the production of pollen, which carries the male gametes.

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12. Explain double fertilization.

Solution:

Step 1: Understanding Double Fertilization.

Double fertilization is a unique process found in angiosperms (flowering plants) where two fertilization events occur within the ovule. The steps are: 1. One sperm cell fuses with the egg cell, forming a diploid zygote (the embryo). 2. The other sperm cell fuses with two polar nuclei, forming the triploid endosperm, which nourishes the developing embryo.

Step 2: Conclusion.

Double fertilization results in the formation of both the zygote and the endosperm, ensuring that the seed has both the genetic material and the nutrition required for development.

Quick Tip

Double fertilization ensures the development of both the embryo and its nutritional support in angiosperms.

---

13. What are the factors which affect population growth?

Solution:

Step 1: Factors Affecting Population Growth.

Several factors can affect population growth in a species: 1. Birth rate: The number of offspring produced per individual. 2. Death rate: The number of individuals that die in a given time period. 3. Immigration and Emigration: The movement of individuals into (immigration) or out of (emigration) a population. 4. Environmental factors: Availability of resources like food, space, and water can impact the survival and reproduction rates.

Step 2: Conclusion.

Population growth is influenced by birth rates, death rates, immigration, emigration, and environmental conditions.

Quick Tip

Population growth is a dynamic process influenced by both biotic factors (like birth and death rates) and abiotic factors (like environmental resources).

---

14. Explain parasitic adaptations.

Solution:

Step 1: Understanding Parasitic Adaptations.

Parasites have evolved several adaptations that help them survive and reproduce within their host. Some of these include: 1. Attachment structures: Parasites often have specialized organs (e.g., hooks, suckers) to attach themselves to the host and avoid being expelled. 2. Nutrient absorption: Many parasites absorb nutrients directly from the host, avoiding the

need to digest food on their own. 3. Reproductive strategies: Parasites often produce a large number of offspring to ensure that some survive and continue the parasitic cycle. 4. Immune evasion: Some parasites can evade or suppress the host's immune system to avoid being detected and eliminated.

Step 2: Conclusion.

Parasitic adaptations such as attachment structures, nutrient absorption, reproductive strategies, and immune evasion are crucial for survival and reproduction within the host.

Quick Tip

Parasites have developed specialized adaptations that allow them to live and reproduce at the expense of their host.

---

15. What is the relationship between thorns of Bougainvillea and tendrils of Cucurbita?

Solution:

Step 1: Understanding the relationship.

Both thorns in Bougainvillea and tendrils in Cucurbita are modified stems. These modifications occur for protective and structural functions: - Bougainvillea: The thorns are modified stems that provide protection to the plant from herbivores. - Cucurbita: The tendrils are modified stems that help the plant to climb and attach itself to support structures.

Step 2: Conclusion.

Both thorns and tendrils are modifications of the stem, serving different functions: protection in Bougainvillea and support in Cucurbita.

Quick Tip

Modifications in plants often occur for protection, support, or reproduction, as seen in the thorns and tendrils of different species.

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16. Name the different species of Plasmodium. Which species is responsible for malignant malaria?

Solution:

Step 1: Understanding Plasmodium species.

The genus *Plasmodium* includes several species that cause malaria in humans. The main species are: 1. Plasmodium falciparum – responsible for the most severe, malignant form of malaria. 2. Plasmodium vivax – causes relapsing malaria, but generally less severe. 3. Plasmodium malariae – causes a milder form of malaria with long intervals between attacks. 4. Plasmodium ovale – causes mild malaria and is rare. 5. Plasmodium knowlesi – a zoonotic malaria found in Southeast Asia.

Step 2: Conclusion.

The species responsible for malignant malaria is **Plasmodium falciparum**, which can cause cerebral malaria and other life-threatening complications.

Quick Tip

Plasmodium falciparum is the deadliest of the malaria-causing species and requires prompt treatment.

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17. What is incomplete dominance?

Solution:

Step 1: Understanding incomplete dominance.

Incomplete dominance occurs when neither allele in a heterozygous pair is fully dominant or recessive. As a result, the phenotype of the heterozygote is a blend of the two parental traits. An example is the cross between red and white snapdragon flowers, which produce pink flowers in the F1 generation.

Step 2: Conclusion.

In incomplete dominance, the offspring exhibit an intermediate phenotype between the two parental traits.

Quick Tip

Incomplete dominance results in blending traits, as seen in certain flower colors and genetic traits.

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18. What would be the blood group of offspring, if the blood group of mother is AB and blood group of father is O?

Solution:

Step 1: Understanding the inheritance of blood groups.

Blood group inheritance follows the ABO system, where A and B are dominant and O is recessive. - The mother has the genotype AB, which means she can pass either an A allele or a B allele to her offspring. - The father has the genotype OO, which means he can only pass an O allele.

Step 2: Possible offspring genotypes.

The possible genotypes of the offspring are: 1. AO (Blood group A) 2. BO (Blood group B) Thus, the child will have either blood group A or blood group B.

Step 3: Conclusion.

The offspring will have either blood group A or blood group B, but not blood group O.

Quick Tip

In ABO blood group inheritance, A and B are dominant, and O is recessive. The child's blood group is determined by the combination of alleles inherited from both parents.

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19. Draw the symbols used for male, female, mating, and consanguineous mating in human pedigree analysis.

Solution:

Step 1: Understanding Pedigree Symbols.

In human pedigree analysis, certain symbols are used to represent individuals and relationships. These symbols include: 1. Male: A square () represents a male individual. 2.

Female: A circle () represents a female individual. 3. Mating: A horizontal line connecting a square and a circle represents a mating (or marriage) between a male and a female. 4. Consanguineous Mating: A double line connecting a square and a circle represents consanguineous mating, i.e., mating between close relatives, such as cousins.

Step 2: Drawing the Symbols.

The following diagram illustrates the symbols used in human pedigree analysis:

Male: □ Female: ○ Mating: □ ⟷ ○ Consanguineous Mating: □ ⟷ ○

Step 3: Conclusion.

These symbols are used to depict the relationships and mating patterns in human pedigree analysis.

Quick Tip

Pedigree analysis is a key tool in understanding the inheritance of genetic traits and diseases in a family.

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20. What are the goals of the Human Genome Project?

Solution:

Step 1: Understanding the Human Genome Project (HGP).

The Human Genome Project (HGP) was an international research project aimed at mapping the entire human genome. The main goals of the project were: 1. Identify all genes in human DNA: This includes identifying the approximately 20,000-25,000 human genes and understanding their function. 2. Determine the sequence of nucleotides: The project aimed to sequence the 3 billion DNA base pairs that make up human DNA. 3. Analyze genetic variation: The HGP sought to identify the genetic variations that make each individual unique. 4. Improve medical applications: The project aimed to advance personalized medicine, develop treatments for genetic disorders, and understand the genetic basis of diseases. 5. Understand the structure of human DNA: The goal was to identify how genes are arranged and regulated within the genome.

Step 2: Conclusion.

The goals of the Human Genome Project were to map and sequence the human genome, identify all human genes, and provide insights into the genetic basis of health and disease.

Quick Tip

The Human Genome Project has provided valuable insights into human genetics, facilitating advancements in medical research and treatments.

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21. Explain the causes of biodiversity loss.

Solution:

Step 1: Human Activities.

Human activities are the primary cause of biodiversity loss. These include: 1. Deforestation: Cutting down forests destroys habitats for many species, leading to a loss of biodiversity. 2. Pollution: Pollution from industrial, agricultural, and urban sources harms ecosystems and can lead to species extinction. 3. Overexploitation: Overhunting, overfishing, and excessive harvesting of natural resources deplete species populations. 4. Climate Change: Human-induced climate change alters habitats, affecting species' ability to survive. 5. Habitat Destruction: Urbanization and agricultural expansion destroy ecosystems that are crucial for biodiversity.

Step 2: Natural Factors.

In addition to human activities, natural factors such as invasive species, diseases, and natural disasters also contribute to biodiversity loss. Invasive species can outcompete native species, leading to their decline.

Step 3: Conclusion.

Biodiversity loss is mainly caused by human activities like deforestation, pollution, overexploitation, and climate change, though natural factors can also play a role.

Quick Tip

Preserving biodiversity requires sustainable practices, protecting natural habitats, and mitigating climate change.

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22. Write short notes on the following:

- **(A) Phosphorus cycle**
- **(B) Primary immunity**

Solution:

Step 1: Phosphorus Cycle.

The phosphorus cycle is the process by which phosphorus moves through the environment, including the soil, water, and living organisms. Unlike other biogeochemical cycles, the phosphorus cycle does not involve the atmosphere. The main stages are: 1. Weathering of rocks: Phosphorus is released from rocks through weathering. 2. Absorption by plants: Phosphorus is absorbed by plants in the form of phosphate. 3. Consumption by animals: Herbivores consume plants, and carnivores eat herbivores, thus transferring phosphorus. 4. Decomposition: When organisms die, decomposers break down organic matter, returning phosphorus to the soil. 5. Leaching: Phosphorus may be washed into water bodies, where it can contribute to aquatic life.

Step 2: Primary Immunity.

Primary immunity, also known as innate immunity, is the first line of defense against pathogens. It is a nonspecific response, meaning it does not target specific pathogens but acts against any foreign invader. The components of primary immunity include: 1. Physical barriers: The skin, mucous membranes, and cilia prevent the entry of pathogens. 2. Chemical barriers: Enzymes, stomach acid, and antimicrobial peptides help kill or neutralize harmful invaders. 3. Cellular defenses: White blood cells like neutrophils and macrophages engulf and destroy pathogens through phagocytosis.

Step 3: Conclusion.

The phosphorus cycle is vital for ecosystem productivity, while primary immunity provides immediate, nonspecific protection from infections.

Quick Tip

Understanding the phosphorus cycle helps in ecosystem management, and primary immunity is crucial in the body's first defense against diseases.

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23. Write short notes on the following:

- **(A) Allergy**
- **(B) Chemical composition of DNA.**

Solution:

Step 1: Allergy.

Allergy is an immune system reaction to foreign substances known as allergens. These substances may include pollen, dust mites, mold, certain foods, and insect venom. When a person with an allergy encounters an allergen, the immune system overreacts, producing symptoms such as: 1. Sneezing 2. Itchy eyes 3. Runny nose 4. Swelling 5. Anaphylaxis in severe cases.

The immune system produces IgE antibodies against allergens, which trigger the release of histamine and other chemicals that cause inflammation. Treatment options include antihistamines and immunotherapy.

Step 2: Chemical Composition of DNA.

DNA (Deoxyribonucleic acid) is the molecule that carries the genetic information in living organisms. Its chemical composition includes: 1. Nucleotides: The building blocks of DNA, consisting of: - Sugar: Deoxyribose in DNA. - Phosphate group: Forms the backbone of the DNA structure. - Nitrogenous bases: Adenine (A), Thymine (T), Cytosine (C), and Guanine (G). 2. Double Helix Structure: DNA forms a double helix with two complementary strands held together by hydrogen bonds between the bases. Adenine pairs with thymine, and cytosine pairs with guanine. 3. Chromatin: DNA in the nucleus is wrapped around histone proteins, forming structures called nucleosomes, which make up chromatin.

Step 3: Conclusion.

Allergy involves an overreaction of the immune system to harmless substances, while DNA is made up of nucleotides with a specific structure that encodes genetic information.

Quick Tip

Understanding allergies can help manage reactions, and knowledge of DNA composition is essential for studying genetics and molecular biology.

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24. How is gene of interest amplified by using PCR?

Solution:

Step 1: Understanding PCR (Polymerase Chain Reaction).

Polymerase Chain Reaction (PCR) is a laboratory technique used to amplify specific segments of DNA. It enables researchers to create millions of copies of a gene of interest from a small amount of DNA. The process involves several key steps: 1. Denaturation: The double-stranded DNA is heated to 94-98°C, causing the DNA to separate into two single strands. 2. Annealing: The temperature is lowered to 50-65°C, allowing the primers (short single-stranded sequences) to bind to the target DNA sequences at the beginning and end of the gene of interest. 3. Extension: The temperature is raised to 75-80°C, and DNA polymerase synthesizes new DNA strands starting from the primers, copying the gene of interest. This process is repeated multiple times to generate millions of copies.

Step 2: Conclusion.

PCR amplifies a gene of interest by repeatedly denaturing, annealing, and extending DNA, resulting in the production of large quantities of the target gene.

Quick Tip

PCR is a powerful tool in molecular biology, allowing for the amplification of specific DNA regions, facilitating gene cloning, sequencing, and diagnostic tests.

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25. Answer the following questions:

- **(A) Stability of DNA is higher than that of RNA. How?**
- **(B) What are the roles of the three parts of the transcription unit?**

Solution:

Step 1: Stability of DNA compared to RNA.

DNA is more stable than RNA due to the following reasons: 1. Double-stranded structure: DNA exists as a double-stranded helix, which provides greater stability. The double-strand structure helps in protecting the genetic information against damage. 2. Deoxyribose sugar: DNA contains deoxyribose, which lacks a hydroxyl group at the 2' position (compared to RNA, which contains ribose with a hydroxyl group at the 2' position). The absence of this hydroxyl group makes DNA less reactive and more stable. 3. Longer lifespan: DNA is designed to store genetic information for long periods, whereas RNA is more transient and involved in protein synthesis.

Step 2: The roles of the three parts of the transcription unit.

The transcription unit consists of three main parts: 1. Promoter: The promoter is a region of DNA that initiates transcription. It is recognized by RNA polymerase, which binds to it and begins the transcription process. 2. Coding Region: The coding region is the part of the DNA that contains the gene to be transcribed into RNA. This is the portion that is ultimately used to synthesize proteins. 3. Terminator: The terminator is a sequence that signals the end of transcription. When RNA polymerase reaches this sequence, it stops synthesizing RNA and releases the RNA transcript.

Step 3: Conclusion.

DNA is more stable than RNA due to its structural properties, while the three parts of the transcription unit (promoter, coding region, and terminator) play crucial roles in the process of gene transcription.

Quick Tip

Understanding the stability of DNA and RNA, and the transcription process, is crucial for molecular biology, particularly in gene expression and regulation.

26. Write brief notes on the following:

- **(A) Implantation**
- **(B) Autogamy**

Solution:

Step 1: Implantation.

Implantation is the process by which the embryo embeds itself into the lining of the uterus after fertilization. This is a critical step in pregnancy. The steps involved are: 1. Blastocyst formation: After fertilization, the zygote divides into a ball of cells, known as a blastocyst. 2. Attachment: The blastocyst attaches to the endometrial lining of the uterus. 3. Invasion: The trophoblast cells of the blastocyst secrete enzymes that allow it to burrow into the uterine wall. 4. Nutrient supply: Once implanted, the embryo receives nutrients from the mother via the placenta, which forms during implantation.

Step 2: Autogamy.

Autogamy is a form of self-fertilization in which an organism fertilizes its own eggs with its own sperm. It is common in certain plants and hermaphroditic animals. For example: 1. Plants: Some plants are capable of self-pollination, where the pollen from a flower fertilizes the same flower or another flower of the same plant. 2. Hermaphroditic Animals: Certain animals, like earthworms, can mate with themselves, as they possess both male and female reproductive organs.

Step 3: Conclusion.

Implantation is a vital process in pregnancy, ensuring the embryo receives nutrients from the mother, while autogamy allows for reproduction without a mate, ensuring species survival in specific conditions.

Quick Tip

Implantation is a crucial process for the continuation of pregnancy, and autogamy helps organisms reproduce in isolated environments.