NEET 2024 Zoology R3 2024 Question Paper with Solutions

Section A

151. Which of the following is not a natural/traditional contraceptive method?

(1) Periodic abstinence

(2) Lactational amenorrhea

(3) Vaults

(4) Coitus interruptus

Correct Answer: (3) Vaults

Solution: - Periodic abstinence, lactational amenorrhea, and coitus interruptus are all traditional contraceptive methods.

- Vaults are a modern contraceptive method and do not fall under natural or traditional methods.

Conclusion: The correct option is (**3**).

Quick Tip

Natural contraceptive methods include periodic abstinence, lactational amenorrhea, and coitus interruptus, while vaults are modern contraceptive devices.

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152. Match List I with List II

List-I	List-II
A. Common cold	I. Plasmodium
B. Haemozoin	II. Typhoid
C. Widal test	III. Rhinoviruses
D. Allergy	IV. Dust mites

(1) A-I, B-III, C-II, D-IV

(2) A-III, B-I, C-II, D-IV

(3) A-IV, B-II, C-III, D-I

(4) A-II, B-IV, C-III, D-I

Correct Answer: (2) A-III, B-I, C-II, D-IV

Solution: - Common cold is caused by Rhinoviruses (III).

- Haemozoin is produced by Plasmodium (I), which is the causative agent of malaria.

- Widal test is used to diagnose Typhoid (II).

- Allergy can be triggered by Dust mites (IV).

Conclusion: The correct option is (**2**).

Quick Tip

The Widal test is used for diagnosing typhoid, while haemozoin is linked to malaria caused by Plasmodium.

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153. Which of the following statements is incorrect?

(1) Most commonly used bio-reactors are of stirring type

(2) Bio-reactors are used to produce small scale bacterial cultures

(3) Bio-reactors have an agitator system, an oxygen delivery system and foam control system

(4) A bio-reactor provides optimal growth conditions for achieving the desired product

Correct Answer: (4) A bio-reactor provides optimal growth conditions for achieving the desired product

Solution: - Bio-reactors are typically used for large-scale production of microbial cultures and industrial products, not small-scale cultures.

- They are equipped with systems to provide optimal conditions for growth, such as an agitator, oxygen delivery, and foam control.

Quick Tip

Bio-reactors are mainly used in large-scale production of microbial cultures and bioproducts, rather than for small-scale cultures.

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154. Which of the following are Autoimmune disorders?

A. Myasthenia gravis B. Rheumatoid arthritis

C. Gout D. Muscular dystrophy

E. Systemic Lupus Erythematosus (SLE)

(1) A, B E only

(2) B, C E only

(3) C, D E only

(4) A, B D only

Correct Answer: (1) A, B E only

Solution: - Myasthenia gravis, Rheumatoid arthritis, and Systemic Lupus Erythematosus (SLE)

are autoimmune disorders where the immune system attacks the body's own tissues.

- Gout and Muscular dystrophy are not autoimmune disorders.

Conclusion: The correct option is (1).

Quick Tip

Autoimmune disorders occur when the body's immune system mistakenly attacks its own tissues, as seen in myasthenia gravis, rheumatoid arthritis, and SLE.

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155. Match List I with List II

List-I	List-II
A. Down's syndrome	I. 11th chromosome
B. Alpha-Thalassemia	II. 'X' chromosome
C. Beta-Thalassemia	III. 21st chromosome
D. Klinefelter's syndrome	IV. 16th chromosome

(1) A-II, B-III, C-IV, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-IV, B-I, C-II, D-III

(4) A-I, B-II, C-III, D-IV

Correct Answer: (3) A-IV, B-I, C-II, D-III

Solution: - Down's syndrome is caused by an extra chromosome on the 21st chromosome (IV).

- Alpha-Thalassemia is associated with the 16th chromosome (I).

- Beta-Thalassemia is associated with the 11th chromosome (II).

- Klinefelter's syndrome is caused by an extra X chromosome (III).

Conclusion: The correct option is (**2**).

Quick Tip

Chromosomal disorders such as Down's syndrome and Klinefelter's syndrome are linked to specific chromosomal abnormalities.

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156. Match List I with List II

List-I (Type of IUD)	List-II (Example)
A. Non-medicated IUD	I. Multiload 375
B. Copper releasing IUD	III. Lippes loop
C. Hormone releasing IUD	IV. LNG-20
D. Implants	II. Progestogens

(1) A-I, B-III, C-IV, D-II

(2) A-IV, B-I, C-II, D-III

(3) A-III, B-I, C-IV, D-II

(4) A-III, B-I, C-II, D-IV

Correct Answer: (1) A-I, B-III, C-IV, D-II

Solution: - Non-medicated IUD: Example - Lippes loop (I)

- Copper releasing IUD: Example - Multiload 375 (III)

- Hormone releasing IUD: Example - LNG-20 (IV)

- Implants: Example - Progestogens (II)

Quick Tip

IUDs can be either medicated with copper or hormones, or non-medicated to prevent pregnancy.

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157. Match List I with List II

List-I	List-II
A. Pleurobrachia	I. Mollusca
B. Radula	II. Ctenophora
C. Stomochord	III. Osteichthyes
D. Air bladder	IV. Hemichordata

(1) A-II, B-I, C-IV, D-III

(2) A-II, B-IV, C-I, D-III

(3) A-IV, B-III, C-II, D-I

(4) A-IV, B-II, C-III, D-I

Correct Answer: (4) A-IV, B-II, C-III, D-I

Solution: - Pleurobrachia belongs to Ctenophora (IV).

- Radula is a feature of Mollusca (II).

- Stomochord is found in Hemichordata (III).

- Air bladder is found in Osteichthyes (IV).

Conclusion: The correct option is (4).

Quick Tip

Radula is a characteristic of mollusks, while stomochord is found in hemichordates.

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158. Which of the following factors are favourable for the formation of oxyhaemoglobin in alveoli?

(1) High pO2 and Lesser H+ concentration

(2) Low pCO2 and High H+ concentration

(3) Low pCO2 and High temperature

(4) High pO2 and High pCO2

Correct Answer: (2) Low pCO2 and High H+ concentration

Solution: - Oxyhaemoglobin formation occurs when oxygen binds to hemoglobin in the alveoli, which is facilitated by high partial pressure of oxygen (pO2) and lower hydrogen ion concentration (pH), which favors oxygen binding.

- Low pCO2 conditions lead to the release of oxygen from hemoglobin (Bohr effect).

Quick Tip

Oxyhaemoglobin formation is favored by high oxygen levels and a lower concentration of hydrogen ions in the alveoli.

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159. Match List I with List II

List-I	List-II
A. Cocaine	I. Effective sedative in surgery
B. Heroin	II. Cannabis sativa
C. Morphine	III. Erythroxylum
D. Marijuana	IV. Papaver somniferum

(1) A-I, B-III, C-II, D-IV

(2) A-II, B-I, C-III, D-IV

(3) A-III, B-IV, C-I, D-II

(4) A-IV, B-III, C-I, D-II

Correct Answer: (2) A-II, B-I, C-III, D-IV

Solution: - Cocaine is derived from Erythroxylum (II) and is used as a local anesthetic in surgeries.

- Heroin is derived from Papaver somniferum (I), the opium poppy.

- Morphine is derived from Papaver somniferum (III and is used as a potent painkiller.

- Marijuana is derived from Cannabis sativa (IV), a plant known for its psychoactive properties.

Quick Tip

Cocaine is from Erythroxylum, heroin and morphine are from the poppy plant, and marijuana is from Cannabis sativa.

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160. Match List I with List II

List-I (Sub Phases of Prophase I)	List-II (Specific Characters)
A. Diakinesis	I. Synaptonemal complex formation
B. Pachytene	II. Completion of terminalisation of chiasmata
C. Zygotene	III. Chromosomes look like thin threads
D. Leptotene	IV. Appearance of recombination nodules

(1) A-I, B-II, C-IV, D-III

(2) A-II, B-IV, C-I, D-III

(3) A-IV, B-III, C-II, D-I

(4) A-IV, B-II, C-III, D-I

Correct Answer: (2) A-II, B-IV, C-I, D-III

Solution: - Diakinesis is characterized by the completion of terminalisation of chiasmata (II).

- Pachytene is associated with the appearance of recombination nodules (IV).

- Zygotene involves the formation of the synaptonemal complex (I).

- Leptotene is characterized by chromosomes looking like thin threads (III).

Conclusion: The correct option is (**2**).

Quick Tip

The different sub-phases of prophase I are distinguished by the processes of chromosome pairing and recombination.

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161. Match List I with List II

List-I	List-II
A. Fibrous joints	I. Adjacent vertebrae, limited movement
B. Cartilaginous joints	II. Humerus and Pectoral girdle, rotational movement
C. Hinge joints	III. Skull, don't allow any movement
D. Ball and socket joints	IV. Knee, help in locomotion

(1) A-I, B-III, C-II, D-IV

(2) A-II, B-III, C-I, D-IV

(3) A-III, B-I, C-IV, D-II

(4) A-IV, B-II, C-III, D-I

Correct Answer: (2) A-II, B-III, C-I, D-IV

Solution: - Fibrous joints are found in the skull where they allow no movement (II).

- Cartilaginous joints are found between adjacent vertebrae and allow limited movement (III).

- Hinge joints are found in the knee, enabling movement for locomotion (I).

- Ball and socket joints are found at the humerus and pectoral girdle, allowing rotational movement (IV).

Quick Tip

The different types of joints in the human body are classified based on their structure and the type of movement they allow.

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162. Which of the following is not a steroid hormone?

(1) Testosterone

(2) Progesterone

(3) Glucagon

(4) Cortisol

Correct Answer: (2) Progesterone

Solution: - Testosterone, Progesterone, and Cortisol are all steroid hormones derived from cholesterol.

- Glucagon, on the other hand, is a peptide hormone produced by the pancreas, not a steroid.

Quick Tip

Steroid hormones are derived from cholesterol, while peptide hormones like glucagon are made of amino acids.

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163. In both sexes of cockroach, a pair of jointed filamentous structures called anal cerci are present on

(1) 10th segment

(2) 8th and 9th segment

(3) 11th segment

(4) 5th segment

Correct Answer: (4) 5th segment

Solution: - In both male and female cockroaches, anal cerci are present on the 10th segment of the abdomen.

- These cerci are sensory structures that help in detecting changes in the environment.

Quick Tip

Anal cerci in cockroaches are sensory structures that help detect vibrations and air currents.

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164. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: FSH acts upon ovarian follicles in female and Leydig cells in male.

Reason R: Growing ovarian follicles secrete estrogen in female while interstitial cells secrete androgen in male human being.

Choose the correct answer from the options given below:

(1) Both A and R are true but R is NOT the correct explanation of A

(2) A is true but R is false

(3) A is false but R is true

(4) Both A and R are true and R is the correct explanation of A

Correct Answer: (3) A is false but R is true

Solution: - Assertion A is false: FSH (Follicle Stimulating Hormone) acts on ovarian follicles in females but on Sertoli cells, not Leydig cells, in males.

- Reason R is true: In females, growing ovarian follicles secrete estrogen, and in males, interstitial cells (Leydig cells) secrete androgens (testosterone).

Conclusion: The correct option is (**3**).

Quick Tip

FSH acts on Sertoli cells in males and ovarian follicles in females, with the secreted hormones differing in both genders.

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165. Match List I with List II

List-I (Pulmonary Volumes)	List-II (Corresponding Volumes)
A. Expiratory capacity	I. Expiratory reserve volume + Tidal volume + Inspiratory reserve vol
B. Functional residual capacity	II. Tidal volume + Expiratory reserve volume
C. Vital capacity	III. Tidal volume + Inspiratory reserve volume
D. Inspiratory capacity	IV. Expiratory reserve volume + Residual volume

Choose the correct answer from the options given below:

(1) A-III, B-II, C-IV, D-I

(2) A-II, B-I, C-IV, D-III

(3) A-I, B-III, C-II, D-IV

(4) A-II, B-IV, C-I, D-III

Correct Answer:(3) A-I, B-III, C-II, D-IV

Solution: - Expiratory capacity is the sum of Tidal volume + Expiratory reserve volume (I).

- Functional residual capacity is the sum of Expiratory reserve volume + Residual volume (III).

- Vital capacity is the sum of Expiratory reserve volume + Tidal volume + Inspiratory reserve volume (II).

- Inspiratory capacity is the sum of Tidal volume + Inspiratory reserve volume (IV).

Quick Tip

Pulmonary volumes are important for assessing lung function and can be measured using a spirometer.

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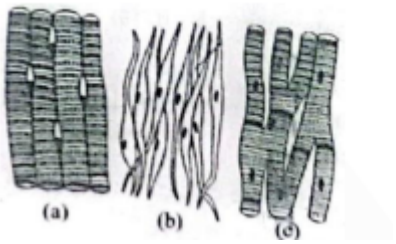
166. Three types of muscles are given as a, b and c. Identify the correct matching pair along with their location in human body:



(1) (a) Skeletal - Triceps

(b) Smooth – Stomach

(c) Cardiac – Heart

(2) (a) Skeletal - Biceps

(b) Involuntary – Intestine

(c) Smooth – Heart

(3) (a) Involuntary – Nose tip

(b) Skeletal – Bone

(c) Cardiac – Heart

(4) (a) Smooth - Toes

(b) Skeletal – Legs

(c) Cardiac – Heart

Correct Answer: (4) (a) Smooth - Toes

(b) Skeletal – Legs

(c) Cardiac – Heart

Solution: - Skeletal muscles like the Triceps are attached to bones and enable voluntary movements.

- Smooth muscles like those in the Stomach are involuntary and help in digestion.

- Cardiac muscles are specialized muscles in the Heart that contract involuntarily to pump blood.

Quick Tip

Skeletal muscles are under voluntary control, smooth muscles are involuntary, and cardiac muscles are specialized for heart function.

167. Match List I with List II

List-I	List-II
A. Lipase	I. Peptide bond
B. Nuclease	II. Ester bond
C. Protease	III. Glycosidic bond
D. Amylase	IV. Phosphodiester bond

(1) A-III, B-II, C-I, D-IV

(2) A-II, B-IV, C-I, D-III

(3) A-IV, B-I, C-III, D-II

(4) A-IV, B-II, C-III, D-I

Correct Answer: (2) A-II, B-IV, C-I, D-III

Solution: - Lipase acts on ester bonds (II), which are found in lipids.

- Nuclease acts on phosphodiester bonds (IV) in nucleic acids.

- Protease breaks down peptide bonds (I) in proteins.

- Amylase acts on glycosidic bonds (III) in carbohydrates.

Conclusion: The correct option is (**2**).

Quick Tip

Different enzymes are specific to breaking down bonds in various macromolecules such as lipids, proteins, and carbohydrates.

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168. The flippers of the Penguins and Dolphins are the example of the

(1) Natural selection

(2) Convergent evolution

(3) Divergent evolution

(4) Adaptive radiation

Correct Answer: (3) Divergent evolution

Solution: - The flippers of Penguins and Dolphins are examples of (a) Smooth - Toes

(b) Skeletal – Legs

(c) Cardiac – Heart

evolution, where unrelated species evolve similar traits as a result of adapting to different environments or ecological niches.

- This evolution occurs despite the species being from different lineages.

Quick Tip

Convergent evolution occurs when unrelated species develop similar features due to similar environmental pressures.

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169. Following are the stages of cell division :

A. Gap 2 phase

B. Cytokinesis

C. Synthesis phase

D. Karyokinesis

E. Gap 1 phase

(1) E-B-D-A-C

(2) B-D-E-A-C

(3) E-C-A-D-B

(4) C-E-D-A-B

Correct Answer: (1) E-B-D-A-C

Solution: - The correct sequence of stages is:

1. Gap 1 phase (E)
2. Cytokinesis (B)
3. Karyokinesis (D)
4. Gap 2 phase (A)
5. Synthesis phase (C)

Conclusion: The correct option is (1).

Quick Tip

In cell division, the sequence typically follows Gap 1 → Synthesis → Gap 2 → Karyokinesis → Cytokinesis.

170. Which one of the following factors will not affect the Hardy-Weinberg equilibrium?

(1) Genetic drift

(2) Gene migration

(3) Constant gene pool

(4) Genetic recombination

Correct Answer: (3) Constant gene pool

Solution: - The Hardy-Weinberg equilibrium assumes no change in allele frequencies due to external factors.

- Factors like genetic drift, gene migration, and genetic recombination can disrupt this equilibrium.

- A constant gene pool implies no changes in allele frequencies, which is essential for maintaining the Hardy-Weinberg equilibrium.

Conclusion: The correct option is (**3**).

Quick Tip

The Hardy-Weinberg equilibrium is disrupted by genetic drift, gene migration, and recombination, but assumes a constant gene pool.

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171. Given below are two statements: one is labelled as Assertion A and the other is labelled as Reason R:

Assertion A: FSH acts upon ovarian follicles in female and Leydig cells in male.

Reason R: Growing ovarian follicles secrete estrogen in female while interstitial cells secrete androgen in male human being.

(1) Both A and R are true but R is NOT the correct explanation of A

(2) A is true but R is false

(3) A is false but R is true

(4) Both A and R are true and R is the correct explanation of A

Correct Answer: (1) Both A and R are true but R is NOT the correct explanation of A

Solution: - Assertion A is true: FSH acts on ovarian follicles in females and Leydig cells in males.

- Reason R is true: The Leydig cells in males secrete androgens (testosterone), not interstitial cells. Growing ovarian follicles secrete estrogen in females.

Conclusion: The correct option is (1).

Quick Tip

FSH acts on both ovarian follicles in females and Sertoli cells in males, with Leydig cells secreting testosterone in males.

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172. Match List I with List II

List-I	List-II
A. Typhoid	I. Fungus
B. Leishmaniasis	II. Nematode
C. Ringworm	III. Protozoa
D. Filariasis	IV. Bacteria

(1) A-IV, B-III, C-I, D-II

(2) A-III, B-I, C-IV, D-II

(3) A-II, B-IV, C-III, D-I

(4) A-I, B-III, C-II, D-IV

Correct Answer: (2) A-III, B-I, C-IV, D-II

Solution: - Typhoid is caused by Bacteria (III).

- Leishmaniasis is caused by Protozoa (I).

- Ringworm is caused by Fungus (IV).

- Filariasis is caused by a Nematode (II).

Conclusion: The correct option is (2).

Quick Tip

Infections like typhoid, leishmaniasis, and ringworm are caused by bacteria, protozoa, and fungi, respectively.

173. Given below are some stages of human evolution. Arrange them in correct sequence. (Past to Recent)

A. Homo habilis

B. Homo sapiens

C. Homo neanderthalensis

D. Homo erectus

(1) B-A-D-C

(2) C-B-D-A

(3) A-D-C-B

(4) D-A-C-B

Correct Answer: (4) D-A-C-B

Solution: The correct sequence of human evolution from past to recent is:

- Homo erectus (D)

- Homo habilis (A)

- Homo neanderthalensis (C)

- Homo sapiens (B)

Conclusion: The correct option is (4).

Quick Tip

Human evolution follows the sequence: D-A-C-B.

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174. Which of the following is not a component of Fallopian tube?

(1) Isthmus

(2) Infundibulum

(3) Ampulla

(4) Uterine fundus

Correct Answer: (2) Infundibulum

Solution: The Fallopian tube consists of the following parts:

- Isthmus

- Uterus fundus

- Ampulla

The (2) Infundibulum is part of the uterus, not the Fallopian tube.

Quick Tip

The uterine fundus is part of the uterus and not part of the Fallopian tube.

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175. Consider the following statements:

A. Annelids are true coelomates

B. Poriferans are pseudocoelomates

C. Aschelminthes are acoelomates

D. Platyhelminthes are pseudocoelomates

(1) A only

(2) C only

(3) D only

(4) B only

Correct Answer: (3) D only

Solution: - Annelids are true coelomates (A), meaning they possess a true coelom.

- Poriferans are not pseudocoelomates, and Aschelminthes and Platyhelminthes are pseudocoelomates either.

- Therefore, statement D is the only correct one.

Quick Tip

Annelids are true coelomates, meaning they possess a true coelom surrounded by mesoderm.

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176. Match List I with List II

List-I	List-II
A. Axoneme	I. Centriole
B. Cartwheel pattern	II. Cilia and flagella
C. Crista	III. Chromosome
D. Satellite	IV. Mitochondria

(1) A-IV, B-II, C-III, D-I

(2) A-II, B-IV, C-I, D-III

(3) A-II, B-I, C-IV, D-III

(4) A-IV, B-III, C-II, D-I

Correct Answer: (3) A-II, B-I, C-IV, D-III

Solution: - Axoneme is found in Cilia and flagella (II).

- Cartwheel pattern is associated with Centriole (I).

- Crista is found in the Mitochondria (IV).

- Satellite is found near the Chromosome (III).

Conclusion: The correct option is (**3**).

Quick Tip

Axoneme is the structural part of cilia and flagella, while cristae are inner folds in the mitochondria.

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177. Match List I with List II

List I	List II
A. Pterophyllum	I. Hag fish
B. Myxine	II. Saw fish
C. Pristis	III. Angel fish
D. Exocoetus	IV. Flying fish

(1) A-III, B-I, C-II, D-IV

(2) A-IV, B-I, C-II, D-III

(3) A-III, B-II, C-I, D-IV

(4) A-II, B-I, C-III, D-IV

Correct Answer: (3) A-III, B-II, C-I, D-IV

Solution: - Pterophyllum is commonly known as Angel fish (III).

- Myxine is commonly known as Hag fish (II).

- Pristis is known as Saw fish (I).

- Exocoetus is commonly known as the Flying fish (IV).

Quick Tip

Fish species like Pristis (sawfish) and Exocoetus (flying fish) are known for their unique adaptations.

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178. Match List I with List II

List-I	List-II
A. Pons	I. Provides additional space for Neurons, regulates posture and balance.
B. Hypothalamus	II. Controls respiration and gastric secretions.
C. Medulla	III. Connects different regions of the brain.
D. Cerebellum	IV. Neuro secretory cells

(1) A-III, B-IV, C-II, D-I

(2) A-I, B-III, C-II, D-IV

(3) A-II, B-I, C-III, D-IV

(4) A-II, B-III, C-I, D-IV

Correct Answer: (1) A-III, B-IV, C-II, D-I

Solution: - Pons is responsible for connecting different regions of the brain (III).

- Hypothalamus contains neurosecretory cells (IV), involved in hormone production.

- Medulla controls respiration and gastric secretions (II).

- Cerebellum helps in regulating posture and balance (I).

Conclusion: The correct option is (1).

Quick Tip

The pons, medulla, and cerebellum are part of the brainstem and cerebellum, involved in functions like posture, balance, and vital processes.

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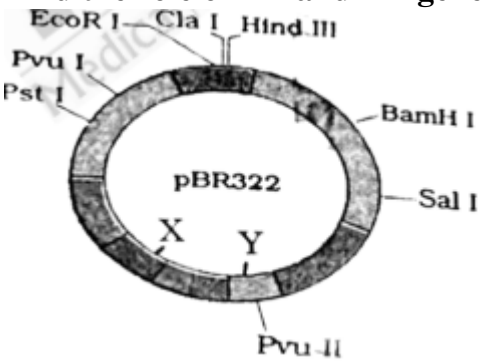
179. The following diagram showing restriction sites in E. coli cloning vector pBR322. Find the role of 'X' and 'Y' genes :



(1) The gene 'X' is responsible for controlling the copy number of the linked DNA and 'Y' for protein involved in the replication of Plasmid.

(2) The gene 'X' is for protein involved in replication of Plasmid and 'Y' for resistance to antibiotics.

(3) Gene 'X' is responsible for recognitions sites and 'Y' is responsible for antibiotic resistance.

(4) The gene 'X' is responsible for resistance to antibiotics and 'Y' for protein involved in the replication of Plasmid.

Correct Answer: (3) Gene 'X' is responsible for recognitions sites and 'Y' is responsible for antibiotic resistance.

Solution: - Gene 'X' controls the copy number of the linked DNA in plasmid cloning vectors.

- Gene 'Y' encodes a protein involved in plasmid replication.

Conclusion: The correct option is (3).

Quick Tip

Cloning vectors like pBR322 are used to replicate recombinant DNA in bacteria, with specific genes controlling replication and resistance.

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180. Given below are two statements :

Statement I : In the nephron, the descending limb of loop of Henle is impermeable to water and permeable to electrolytes.

Statement II : The proximal convoluted tubule is lined by simple columnar brush border epithelium and increases the surface area for reabsorption.

(1) Both Statement I and Statement II are false

(2) Statement I is true but Statement II is false

(3) Statement I is false but Statement II is true

(4) Both Statement I and Statement II are true

Correct Answer: (1) Both Statement I and Statement II are false

Solution: - Statement I is false: The descending limb of the loop of Henle is permeable to water, not electrolytes.

- Statement II is also false: The proximal convoluted tubule is lined by simple cuboidal epithelium, not columnar. The brush border epithelium increases surface area for reabsorption of water, electrolytes, and nutrients.

Conclusion: The correct option is (1).

Quick Tip

The descending limb of the loop of Henle is water permeable, and the proximal convoluted tubule is lined by simple cuboidal epithelium.

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181. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R:

Assertion A : Breast-feeding during initial period of infant growth is recommended by doctors for bringing a healthy baby.

Reason R : Colostrum contains several antibodies absolutely essential to develop resistance for the new born baby.

(1) Both A and R are correct but R is NOT the correct explanation of A

(2) A is correct but R is not correct

(3) A is not correct but R is correct

(4) Both A and R are correct and R is the correct explanation of A

Correct Answer: (1) Both A and R are correct but R is NOT the correct explanation of A

Solution: - Assertion A is true: Breast-feeding during the initial period of infant growth is recommended for ensuring a healthy baby.

- Reason R is also true: Colostrum, the first milk produced after birth, contains antibodies that help the newborn develop immunity.

- The reason given is the correct explanation of the assertion.

Conclusion: The correct option is (1).

Quick Tip

Colostrum provides essential antibodies to the newborn, which is one of the reasons why breast-feeding is highly recommended in the early stages.

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182. Following are the stages of pathway for conduction of an action potential through the heart:

A. AV bundle

B. Purkinje fibres

C. AV node

D. Bundle branches

E. SA node

(1) A-E-C-B-D

(2) B-D-E-C-A

(3) E-A-D-B-C

(4) E-C-A-D-B

Correct Answer: (1) A-E-C-B-D

Solution: The correct sequence of conduction in the heart is:

- AV bundle (A) initiates the action potential.

- SA node (E) transmits the impulse to the AV node (C).

- The impulse then moves down the Purkinje fibres (B).

- Finally, it reaches the Bundle branches (D) to stimulate the ventricles.

Quick Tip

The heart's conduction system follows this order: SA node → AV node → AV bundle → Bundle branches → Purkinje fibres.

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183. Which one is the correct product of DNA dependent RNA polymerase to the given template?

3'TACATGGCAAATATCCATTCA5'

(1) 5'AUGUAAAGUUUAUAGGUAAGU3'

(2) 5'AUGUACCGUUUAUAGGGAAGU3'

(3) 5'ATGTACCGTTTATAGGTAAGT3'

(4) 5'AUGUACCGUUUAUAGGUAAGU3'

Correct Answer: (1) 5 'AUGUAAAGUUUAUAGGUAAGU3'

Solution: - The RNA product is complementary to the given DNA template strand.

- The DNA sequence provided is transcribed into RNA by RNA polymerase, with thymine (T) replaced by uracil (U) in the RNA strand.

Conclusion: The correct option is (1).

Quick Tip

In transcription, RNA polymerase synthesizes RNA using the DNA template, replacing thymine with uracil.

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184. Match List I with List II

List I	List II
A. –I antitrypsin	I. Cotton bollworm
B. Cry IAb	II. ADA deficiency
C. Cry IAc	III. Emphysema
D. Enzyme replacement therapy	IV. Corn borer

Choose the correct answer from the options given below:

(1) A-III, B-I, C-II, D-IV

(2) A-III, B-IV, C-I, D-II

(3) A-II, B-IV, C-I, D-III

(4) A-II, B-I, C-IV, D-III

Correct Answer: (1) A-III, B-I, C-II, D-IV

Solution: - -I antitrypsin is associated with Emphysema (III), a lung disease.

- Cry IAb is used to protect plants against Cotton bollworm (I).

- Cry IAc is used to protect plants against Corn borer (II). - Enzyme replacement therapy is used for treating ADA deficiency (IV), a genetic disorder.

Conclusion: The correct option is (1).

Quick Tip

Cry proteins from *Bacillus thuringiensis* are used to control pests like cotton bollworm and corn borer.

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185. The "Ti plasmid" of Agrobacterium tumefaciens stands for

(1) Tumor independent plasmid

(2) Tumor inducing plasmid

(3) Temperature independent plasmid

(4) Tumour inhibiting plasmid

Correct Answer: (1) Tumor independent plasmid

Solution: - The Ti plasmid (Tumor inducing plasmid) of Agrobacterium tumefaciens is responsible for causing crown gall disease in plants by inducing tumor formation.

Conclusion: The correct option is (1).

Quick Tip

The Ti plasmid is used in genetic engineering to introduce foreign genes into plants by causing tumor formation.

---

186. Match List I with List II

List-I	List-II
A. P wave	I. Heart muscles are electrically silent.
B. QRS complex	II. Depolarisation of ventricles.
C. T wave	III. Depolarisation of atria.
D. T-P gap	IV. Repolarisation of ventricles.

Choose the correct answer from the options given below:

(1) A-III, B-II, C-IV, D-I

(2) A-II, B-III, C-I, D-IV

(3) A-IV, B-II, C-I, D-III

(4) A-I, B-III, C-IV, D-II

Correct Answer: (2) A-II, B-III, C-I, D-IV

Solution: - P wave corresponds to the depolarisation of the atria (II).

- QRS complex represents the depolarisation of the ventricles (III).

- T wave corresponds to the repolarisation of the ventricles (I).

- T-P gap represents the period when heart muscles are electrically silent (IV).

Conclusion: The correct option is (**2**).

Quick Tip

The P wave, QRS complex, and T wave represent key phases of the cardiac cycle as seen in the electrocardiogram (ECG).

---

187. Given below are two statements:

Statement I: Gause's competitive exclusion principle states that two closely related species competing for different resources cannot exist indefinitely.

Statement II: According to Gause's principle, during competition, the inferior will be eliminated. This may be true if resources are limiting.

(1) Both Statement I and Statement II are false.

(2) Statement I is true but Statement II is false.

(3) Statement I is false but Statement II is true.

(4) Both Statement I and Statement II are true.

Correct Answer: (4) Both Statement I and Statement II are true.

Solution: - Statement I is correct: Gause's competitive exclusion principle suggests that two species competing for the same, limiting resource cannot coexist indefinitely, not that they cannot compete for different resources.

- Statement II is correct: The inferior competitor in a limiting resource scenario may indeed be eliminated, according to the principle.

Conclusion: The correct option is (4).

Quick Tip

Gause's principle states that two species competing for the same limiting resource cannot coexist indefinitely.

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188. Given below are two statements:

Statement I: Mitochondria and chloroplasts both double membranes bound organelles.

Statement II: Inner membrane of mitochondria is relatively less permeable, as compared to chloroplast.

(1) Both Statement I and Statement II are incorrect.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Both Statement I and Statement II are correct.

Correct Answer:(4) Both Statement I and Statement II are correct.

Solution: - Statement I is correct: Both mitochondria and chloroplasts have a double membrane structure.

- Statement II is correct: The inner membrane of mitochondria is highly impermeable, while

the inner membrane of chloroplasts is permeable for the transport of ions and metabolites.

Conclusion: The correct option is (4).

Quick Tip

Both mitochondria and chloroplasts have double membranes, but the permeability of their inner membranes varies.

---

189. Choose the correct statement given below regarding juxta medullary nephron.

(1) Renal corpuscle of juxta medullary nephron lies in the outer portion of the renal medulla.

(2) Loop of Henle of juxta medullary nephron runs deep into medulla.

(3) Juxta medullary nephrons outnumber the cortical nephrons.

(4) Juxta medullary nephrons are located in the columns of Bertini.

Correct Answer: (1) Renal corpuscle of juxta medullary nephron lies in the outer portion of the renal medulla.

Solution:

- Juxta medullary nephrons have their renal corpuscle located in the outer portion of the renal cortex, and their Loop of Henle extends deeply into the renal medulla, which helps in the concentration of urine.

- Cortical nephrons are more numerous than juxta medullary nephrons.

Quick Tip

Juxta medullary nephrons play a crucial role in urine concentration due to their deep loops of Henle.

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190. Match List I with List II

List-I	List-II
A. Exophthalmic goiter	I. Excess secretion of cortisol, moon face & hyperglycemia.
B. Acromegaly	II. Hypo-secretion of thyroid hormone and stunted growth.
C. Cushing's syndrome	III. Hyper secretion of thyroid hormone & protruding eyeballs.
D. Cretinism	IV. Excessive secretion of growth hormone.

Choose the correct answer from the options given below:

(1) A-IV, B-II, C-I, D-III

(2) A-III, B-IV, C-II, D-I

(3) A-III, B-IV, C-I, D-II

(4) A-I, B-III, C-II, D-IV

Correct Answer: (4) A-I, B-III, C-II, D-IV

Solution: - Exophthalmic goiter is caused by hyper secretion of thyroid hormone and protruding eyeballs (I).

- Acromegaly is caused by excessive secretion of growth hormone (III).

- Cushing's syndrome is caused by excess secretion of cortisol, moon face, and hyperglycemia (II).

- Cretinism is caused by hypo-secretion of thyroid hormone and stunted growth (IV).

Conclusion: The correct option is (4).

Quick Tip

Exophthalmic goiter, acromegaly, Cushing's syndrome, and cretinism are all endocrine disorders caused by hormonal imbalances.

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191. Match List I with List II

List-I	List-II
A. Unicellular glandular epithelium	I. Salivary glands
B. Compound epithelium	II. Pancreas
C. Multicellular glandular epithelium	III. Goblet cells of alimentary canal
D. Endocrine glandular epithelium	IV. Moist surface of buccal cavity

Choose the correct answer from the options given below:

(1) A-IV, B-III, C-I, D-II

(2) A-III, B-IV, C-I, D-II

(3) A-II, B-I, C-IV, D-III

(4) A-II, B-I, C-III, D-IV

Correct Answer: (3) A-II, B-I, C-IV, D-III

Solution: - Unicellular glandular epithelium is represented by Goblet cells of the alimentary canal (II).

- Compound epithelium is found in the moist surface of the buccal cavity (I).

- Multicellular glandular epithelium is represented by salivary glands (IV).

- Endocrine glandular epithelium is found in the pancreas (III).

Conclusion: The correct option is (**3**).

Quick Tip

Different types of epithelial tissues are specialized for secretion, absorption, and protection, such as in glands and the digestive system.

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192. Match List I with List II

List I	List II
A. RNA polymerase III	I. snRNPs
B. Termination of transcription	II. Promotor
C. Splicing of Exons	III. Rho factor
D. TATA box	IV. SnRNAs, tRNA

Choose the correct answer from the options given below:

(1) A-III, B-II, C-IV, D-I

(2) A-III, B-IV, C-I, D-II

(3) A-IV, B-III, C-I, D-II

(4) A-II, B-IV, C-I, D-III

Correct Answer: (2) A-III, B-IV, C-I, D-II

Solution: - RNA polymerase III synthesizes SnRNAs and tRNA (III).

- Termination of transcription is associated with the Rho factor (IV).

- Splicing of Exons is catalyzed by snRNPs (I).

- The TATA box is part of the Promotor region (II).

Conclusion: The correct option is (**2**).

Quick Tip

RNA polymerase III is responsible for synthesizing small RNAs like snRNA and tRNA, while the TATA box is involved in the initiation of transcription.

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193. Identify the correct option (A), (B), (C), (D) with respect to spermatogenesis.

(1) ICSH, Interstitial cells, Leydig cells, spermiogenesis.

(2) FSH, Sertoli cells, Leydig cells, spermatogenesis.

(3) ICSH, Leydig cells, Sertoli cells, spermatogenesis.

(4) FSH, Leydig cells, Sertoli cells, spermiogenesis.

Correct Answer: (4) FSH, Leydig cells, Sertoli cells, spermiogenesis.

Solution: - FSH (Follicle Stimulating Hormone) is essential for the regulation of Sertoli cells, which support the development of sperm cells.

- Leydig cells are responsible for the secretion of testosterone, which plays a crucial role in spermatogenesis. - Spermiogenesis refers to the final process in sperm development, where mature sperm are formed.

Conclusion: The correct option is (4).

Quick Tip

FSH and Leydig cells work together to regulate spermatogenesis, while spermiogenesis involves the transformation of spermatids into mature sperm.

---

194. Regarding catalytic cycle of an enzyme action, select the correct sequential steps:

A. Substrate enzyme complex formation.

B. Free enzyme ready to bind with another substrate.

C. Release of products.

D. Chemical bonds of the substrate broken.

E. Substrate binding to active site.

(1) A, E, B, D, C

(2) B, A, C, D, E

(3) E, D, C, B, A

(4) E, A, D, C, B

Correct Answer: (2) B, A, C, D, E

Solution: The correct sequence of steps in the catalytic cycle of enzyme action is:

1. Free enzyme ready to bind with another substrate (B)

2. Substrate enzyme complex formation (A)

3. Release of products (C)

4. Chemical bonds of the substrate broken (D)

5. Substrate binding to active site (E)

Conclusion: The correct option is (**2**).

Quick Tip

The catalytic cycle of enzyme action involves substrate binding, bond breaking, product release, and enzyme resetting.

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195. The following are the statements about non-chordates:

A. Pharynx is perforated by gill slits.

B. Notochord is absent.

C. Central nervous system is dorsal.

D. Heart is dorsal if present.

E. Post anal tail is absent.

(1) A, B and D only

(2) B, D and E only

(3) B, C and D only

(4) A and C only

Correct Answer: (3) B, C and D only

Solution: - Non-chordates lack a notochord (B), and the heart is dorsal if present (D).

- Non-chordates may also lack a post-anal tail (E).

- Pharyngeal gill slits and a dorsal central nervous system are characteristic features of chordates, not non-chordates.

Conclusion: The correct option is (**3**).

Quick Tip

Non-chordates do not possess a notochord or post-anal tail and typically have a dorsal heart if present.

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196. Match List I with List II related to digestive system of cockroach.

List I	List II
A. The structures used for storing of food	I. Gizzard
B. Ring of 6-8 blind tubules at junction of foregut and midgut.	II. Gastric C
C. Ring of 100-150 yellow coloured thin filaments at junction of midgut and hindgut.	III. Malpighian
D. The structures used for grinding the food.	IV. Crop

Choose the correct answer from the options given below:

(1) A-I, B-II, C-III, D-IV

(2) A-IV, B-III, C-II, D-I

(3) A-III, B-II, C-IV, D-I

(4) A-IV, B-II, C-III, D-I

Correct Answer: (4) A-IV, B-II, C-III, D-I

Solution: - The Crop (A) is used for storing food (IV).

- The Gastric Caeca (B) are the rings of tubules at the junction of foregut and midgut (II).

- The Malpighian tubules (C) are located at the junction of midgut and hindgut (III).

- The Gizzard (D) is responsible for grinding the food (I).

Conclusion: The correct option is (**4**).

Quick Tip

The digestive system of cockroaches includes structures for food storage (crop), grinding (gizzard), and waste removal (Malpighian tubules).

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197. Given below are two statements:

Statement I: The cerebral hemispheres are connected by nerve tract known as corpus

callosum.

Statement II: The brain stem consists of the medulla oblongata, pons and cerebrum.

(1) Both Statement I and Statement II are incorrect.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Both Statement I and Statement II are correct.

Correct Answer: (2) Statement I is correct but Statement II is incorrect.

Solution: - Statement I is correct: The corpus callosum is the structure connecting the two cerebral hemispheres.

- Statement II is incorrect: The brain stem consists of the medulla oblongata, pons, and midbrain, not the cerebrum.

Conclusion: The correct option is (**2**).

Quick Tip

The corpus callosum connects the cerebral hemispheres, and the brain stem consists of the medulla oblongata, pons, and midbrain, not the cerebrum.

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198. Match List I with List II

List I	List II
A. Mesozoic Era	I. Lower invertebrates
B. Proterozoic Era	II. Fish & Amphibia
C. Cenozoic Era	III. Birds & Reptiles
D. Paleozoic Era	IV. Mammals

Choose the correct answer from the options given below:

(1) A-III, B-I, C-II, D-IV

(2) A-I, B-II, C-IV, D-III

(3) A-III, B-I, C-IV, D-II

(4) A-II, B-I, C-III, D-IV

Correct Answer: (3) A-III, B-I, C-IV, D-II

Solution: - The Mesozoic Era is associated with birds and reptiles (III).

- The Proterozoic Era is associated with lower invertebrates (I).

- The Cenozoic Era is associated with mammals (IV).

- The Paleozoic Era is associated with fish and amphibians (II).

Conclusion: The correct option is (3).

Quick Tip

The Mesozoic Era is often called the age of reptiles and birds, while the Cenozoic Era is known for the rise of mammals.

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199. As per ABO blood grouping system, the blood group of father is B+, mother is A+ and child is O+. Their respective genotype can be:

(1) B only

(2) C & B only

(3) D & E only

(4) A only

Correct Answer: (2) C & B only

Solution: - The father has blood group B+, and his genotype can be IB IB or IB i.

- The mother has blood group A+, and her genotype can be IA IA or IA i.

- The child has blood group O+, and the genotype must be ii.

Conclusion: The correct option is (2).

Quick Tip

In ABO blood grouping, the O blood group results from inheriting an O allele from both parents (ii).

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200. Given below are two statements:

Statement I: Bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced.

Statement II: Both bone marrow and thymus provide micro environments for the development and maturation of T-lymphocytes.

(1) Both Statement I and Statement II are incorrect.

(2) Statement I is correct but Statement II is incorrect.

(3) Statement I is incorrect but Statement II is correct.

(4) Both Statement I and Statement II are correct.

Correct Answer: (3) Statement I is incorrect but Statement II is correct.

Solution: - Statement I is incorrect: Bone marrow is not the primary site for the production of all blood cells, including lymphocytes.

- Statement II is correct: Both bone marrow and thymus are crucial in the development and maturation of T-lymphocytes.

Conclusion: The correct option is (**3**).

Quick Tip

Bone marrow produces blood cells, while the thymus is essential for the maturation of T-lymphocytes.
