PGIMER BSc Nursing Biology

Sample Paper – 1

Duration: 23 Minutes **Maximum Marks: 25**

Instructions

- This paper contains **25** Multiple Choice Questions (Single Correct Answer), modelled on the Biology portion of the **PGIMER BSc Nursing** entrance exam.
- Each correct answer carries **+1 mark**. **0.25 mark** is deducted for every incorrect answer. Unattempted questions carry **0 marks**.
- Only **one** option is correct. Choose carefully.
- Syllabus level: **Class 11 and 12 (NCERT) Biology**.
- The exam is conducted as a computer-based test. Personal calculators, mobile phones, and other electronic gadgets are strictly prohibited.

Q1. The enzyme that begins the chemical digestion of starch in the human mouth is:

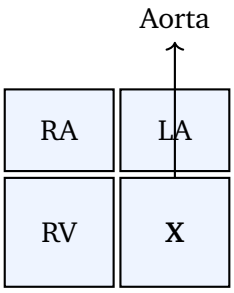
(A) Pepsin

(B) Salivary amylase

(C) Trypsin

(D) Lipase

Q2. The diagram shows a schematic of the human heart. The chamber labelled **X** pumps oxygenated blood to the whole body through the aorta. Chamber **X** is the:



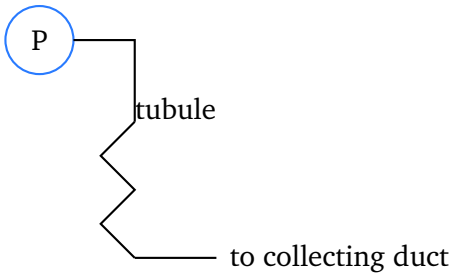
(A) Left ventricle

(B) Right ventricle

(C) Left atrium

(D) Right atrium

Q3. The diagram shows a nephron. The structure labelled **P**, where blood is filtered under pressure, is the:



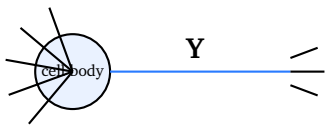
(A) Glomerulus

(B) Loop of Henle

(C) Collecting duct

(D) Ureter

Q4. The diagram shows a neuron. The part labelled **Y**, which carries the nerve impulse away from the cell body towards the next neuron, is the:



(A) Dendrite

(B) Nucleus

(C) Synapse

(D) Axon

Q5. In human blood, the largest fraction of carbon dioxide is transported from the tissues to the lungs in the form of:

(A) Carbaminohaemoglobin

(B) Bicarbonate ions

(C) Dissolved gas in plasma

(D) Carbonic acid crystals

Q6. Which endocrine gland secretes insulin, the hormone that lowers blood glucose level?

(A) Thyroid gland

(B) Adrenal cortex

(C) Islets of Langerhans of the pancreas

(D) Pituitary gland

Q7. In a monohybrid cross between two heterozygous tall pea plants (Tt $\times$ Tt), the phenotypic ratio of tall to dwarf plants in the F_2 generation is:

(A) $1:1$

(B) $3:1$

(C) $9:3:3:1$

(D) $1:2:1$

Q8. Mendel's law of independent assortment is best illustrated by the F_2 phenotypic ratio obtained in a dihybrid cross, which is:

(A) $9:3:3:1$

(B) $3:1$

(C) $1 : 1 : 1 : 1$

(D) $1 : 2 : 1$

Q9. In a double-stranded DNA molecule, adenine always pairs with thymine through hydrogen bonds. The number of hydrogen bonds between an adenine–thymine pair is:

(A) Two

(B) Three

(C) One

(D) Four

Q10. The forelimbs of a human, a whale and a bat have a similar basic bone structure but perform different functions. Such organs are described as:

(A) Analogous organs

(B) Vestigial organs

(C) Homologous organs

(D) Vertigial organs

Q11. The organelle known as the “powerhouse of the cell” because it is the main site of ATP synthesis during aerobic respiration is the:

(A) Ribosome

(B) Golgi apparatus

(C) Lysosome

(D) Mitochondrion

Q12. The movement of water molecules across a selectively permeable membrane from a region of higher water potential to a region of lower water potential is called:

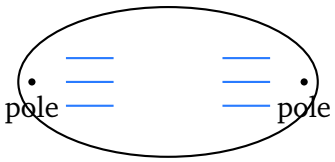
(A) Active transport

(B) Diffusion of solutes

(C) Phagocytosis

(D) Osmosis

Q13. The figure shows a stage of mitosis in which the sister chromatids have separated and are moving towards opposite poles of the cell. This stage is:



(A) Prophase

(B) Metaphase

(C) Anaphase

(D) Telophase

Q14. Meiosis is important for sexually reproducing organisms because it:

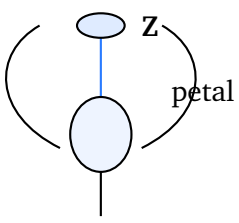
(A) Doubles the chromosome number in gametes

(B) Keeps the chromosome number of gametes the same as body cells

(C) Halves the chromosome number, producing haploid gametes

(D) Produces genetically identical daughter cells

Q15. The figure shows a longitudinal section of a flower. The part labelled **Z**, which is the female reproductive part that receives pollen at its tip, is the:



(A) Anther

(B) Stigma

(C) Filament

(D) Sepal

Q16. In human males, the process of formation of sperms (spermatogenesis) takes place in the:

(A) Prostate gland

(B) Seminiferous tubules of the testis

(C) Vas deferens

(D) Epididymis

Q17. The hormone whose sharp surge in the middle of the human menstrual cycle triggers ovulation is:

(A) Luteinising hormone (LH)

(B) Progesterone

(C) Prolactin

(D) Oxytocin

Q18. In the light reactions of photosynthesis, the oxygen that is released into the atmosphere comes from the splitting of:

(A) Carbon dioxide

(B) Glucose

(C) Water

(D) Chlorophyll

Q19. The loss of water in the form of vapour from the aerial parts of a plant, mainly through the stomata, is called:

(A) Guttation

(B) Translocation

(C) Transpiration

(D) Imbibition

Q20. In Whittaker's five-kingdom classification, bacteria, which are prokaryotic organisms, are placed in the kingdom:

(A) Protista

(B) Fungi

(C) Plantae

(D) Monera

Q21. Ferns are placed in the group Pteridophyta because they are the first land plants to possess:

(A) Vascular tissue (xylem and phloem)

(B) Flowers and fruits

(C) Seeds enclosed in fruits

(D) Naked seeds

Q22. The figure shows a simple grassland food chain. The organism at position **W**, which occupies the trophic level of primary consumer, is the:

$$\text{Grass} \longrightarrow \mathbf{W} \longrightarrow \text{Snake} \rightarrow \text{Hawk}$$

(A) Hawk

(B) Snake

(C) Fungus

(D) Grasshopper

Q23. According to the ten per cent law of energy transfer, if the producers in an ecosystem trap $10{,}000$ units of energy, the amount of energy available to the primary consumers is about:

(A) $10{,}000$ units

(B) 1000 units

(C) 100 units

(D) 5000 units

Q24. The type of immunity that a newborn baby receives through the mother's milk (colostrum), which contains antibodies, is an example of:

(A) Passive natural immunity

(B) Active natural immunity

(C) Active artificial immunity

(D) Innate immunity

Q25. The enzymes used in genetic engineering to cut DNA at specific base sequences, acting as "molecular scissors", are:

(A) Restriction endonucleases

(B) DNA ligases

(C) DNA polymerases

(D) Amylases

Detailed Solutions

Q1.

Solution

Concept — Chemical digestion in the mouth: Digestion begins in the buccal cavity, where saliva secreted by the salivary glands mixes with food during chewing.

Step 1 — Identify the enzyme in saliva: Saliva contains the enzyme salivary amylase, also called ptyalin.

Step 2 — Identify its action: Salivary amylase acts on cooked starch and breaks it down into the disaccharide maltose.

Why other options are wrong:

- Option A (Pepsin): acts on proteins in the acidic stomach, not on starch in the mouth.
- Option C (Trypsin): a protein-digesting enzyme secreted by the pancreas, active in the small intestine.
- Option D (Lipase): digests fats, and only a very small amount is active in the mouth.

Final Answer: Starch digestion in the mouth begins with salivary amylase $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q1

Q2.

Solution

Concept — Chambers of the human heart: The heart has four chambers, two atria above and two ventricles below. The ventricles are the pumping chambers.

Step 1 — Trace the oxygenated blood: Oxygenated blood returns from the lungs into the left atrium, then passes into the left ventricle.

Step 2 — Identify the chamber that pumps to the body: The left ventricle pumps this oxygenated blood into the aorta, which distributes it to the whole body. Chamber **X** in the diagram, connected to the aorta, is therefore the left ventricle.

Why other options are wrong:

- Option B (Right ventricle): pumps deoxygenated blood to the lungs through

the pulmonary artery.
- Option C (Left atrium): only receives blood from the lungs and passes it to the left ventricle.
- Option D (Right atrium): receives deoxygenated blood from the body.

Final Answer: The chamber pumping oxygenated blood to the aorta is the left ventricle $\Rightarrow$ A

Answer: (A) Go Back to Q2

Q3.

Solution

Concept — Structure of a nephron: The nephron is the functional unit of the kidney. It begins with a cup-shaped Bowman's capsule that encloses a ball of capillaries.

Step 1 — Identify the filtering structure: The ball of capillaries inside Bowman's capsule is called the glomerulus.

Step 2 — Explain the function: Blood enters the glomerulus under high pressure, and this pressure forces water, salts, glucose and urea out into the capsule as the filtrate. The labelled part **P** is therefore the glomerulus.

Why other options are wrong:

- Option B (Loop of Henle): concentrates the urine by reabsorbing water and salts; it does not filter blood.
- Option C (Collecting duct): carries the final urine, and reabsorbs water under ADH.
- Option D (Ureter): only transports urine from the kidney to the urinary bladder.

Final Answer: The site of blood filtration under pressure is the glomerulus $\Rightarrow$ A

Answer: (A) Go Back to Q3

Q4.

Solution

Concept — Structure of a neuron: A neuron has three main parts: dendrites that receive impulses, a cell body, and a single long axon that carries impulses away.

Step 1 — Identify the direction of the impulse: The nerve impulse travels from the dendrites, through the cell body, and out along the axon towards the axon terminals.

Step 2 — Match the label: The long fibre labelled **Y** that carries the impulse away from the cell body to the next neuron is the axon.

Why other options are wrong:

- Option A (Dendrite): receives impulses and carries them towards the cell body, the opposite direction.
- Option B (Nucleus): a structure inside the cell body, not a fibre.
- Option C (Synapse): the junction between two neurons, not a part of a single neuron.

Final Answer: The fibre carrying the impulse away from the cell body is the axon $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q4

Q5.

Solution

Concept — Transport of carbon dioxide in blood: Carbon dioxide produced by tissues is carried to the lungs in three ways, but not in equal amounts.

Step 1 — Recall the three forms: About 70% is carried as bicarbonate ions, about 20–25% as carbaminohaemoglobin, and about 7% dissolved in plasma.

Step 2 — Pick the largest fraction: The largest fraction, roughly 70%, travels as bicarbonate ions (HCO_3^-) formed in the red blood cells and carried in the plasma.

Why other options are wrong:

- Option A (Carbaminohaemoglobin): carries only about a fifth of the total.
- Option C (Dissolved gas): only about 7% dissolves directly in plasma.
- Option D (Carbonic acid crystals): carbon dioxide is not transported as solid crystals.

Final Answer: Most carbon dioxide is carried as bicarbonate ions $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q5

Q6.

Solution

Concept — Endocrine control of blood glucose: Blood glucose is regulated mainly by hormones from the pancreas, which is both an exocrine and an endocrine gland.

Step 1 — Locate the source of insulin: The endocrine part of the pancreas is made of clusters of cells called the islets of Langerhans.

Step 2 — Identify the cells and hormone: The beta cells of the islets of Langerhans secrete insulin, which lowers blood glucose by promoting its uptake and storage as glycogen.

Why other options are wrong:

- Option A (Thyroid gland): secretes thyroxine, which controls metabolic rate, not blood sugar directly.
- Option B (Adrenal cortex): secretes cortisol, which raises blood glucose.
- Option D (Pituitary gland): the master gland, but it does not secrete insulin.

Final Answer: Insulin is secreted by the islets of Langerhans of the pancreas $\Rightarrow$ C

Answer: (C) Go Back to Q6

Q7.

Solution

Concept — Mendel's monohybrid cross: A monohybrid cross follows the inheritance of a single pair of contrasting traits, here plant height.

Step 1 — Set up the cross: Cross Tt $\times$ Tt. The gametes from each parent are T and t.

Step 2 — Fill the Punnett square: The offspring genotypes are TT, Tt, Tt and tt, in the ratio $1:2:1$.

Step 3 — Convert to phenotypes: T is dominant, so TT, Tt and Tt are all tall (three plants), and tt is dwarf (one plant). The phenotypic ratio is $3:1$.

Why other options are wrong:

- Option A $(1:1)$: is a test-cross ratio (Tt $\times$ tt), not a monohybrid F_2.
- Option C $(9:3:3:1)$: is the dihybrid F_2 ratio.
- Option D $(1:2:1)$: is the genotypic, not the phenotypic, ratio.

Final Answer: The monohybrid F_2 phenotypic ratio is $3:1 \Rightarrow \boxed{B}$

Answer: (B) Go Back to Q7

Q8.

Solution

Concept — Law of independent assortment: This law states that during gamete formation the alleles of one gene assort independently of the alleles of another gene.

Step 1 — Recall the dihybrid cross: Mendel crossed plants differing in two traits (for example, seed shape and seed colour), RrYy $\times$ RrYy.

Step 2 — Identify the F_2 ratio: The F_2 generation shows four phenotypes in the ratio $9:3:3:1$, which demonstrates independent assortment.

Why other options are wrong:

- Option B $(3:1)$: is the monohybrid ratio, involving only one gene.
- Option C $(1:1:1:1)$: is the gamete ratio or a dihybrid test-cross ratio.
- Option D $(1:2:1)$: is a monohybrid genotypic ratio.

Final Answer: Independent assortment gives the dihybrid ratio $9:3:3:1 \Rightarrow \boxed{A}$

Answer: (A) Go Back to Q8

Q9.

Solution

Concept — Base pairing in DNA: The two strands of DNA are held together by hydrogen bonds between complementary nitrogenous bases, following Chargaff's rule.

Step 1 — Recall the pairing rule: Adenine (A) pairs with thymine (T), and guanine (G) pairs with cytosine (C).

Step 2 — Count the hydrogen bonds: The A–T pair is joined by two hydrogen bonds, while the G–C pair is joined by three hydrogen bonds.

Why other options are wrong:

- Option B (Three): is the number of bonds in a G–C pair, not A–T.
- Option C (One): no base pair in DNA is held by a single hydrogen bond.
- Option D (Four): exceeds the number formed in any DNA base pair.

Final Answer: An adenine–thymine pair has two hydrogen bonds $\Rightarrow$ $\boxed{A}$

Answer: (A) Go Back to Q9

Q10.

Solution

Concept — Homologous versus analogous organs: Structures are compared both by their basic anatomy and by their function to trace evolutionary relationships.

Step 1 — Examine the forelimbs: The forelimbs of a human, a whale and a bat all share the same basic bone plan (humerus, radius, ulna, carpals) inherited from a common ancestor.

Step 2 — Apply the definition: Organs with the same basic structure but different functions are homologous organs, and they indicate divergent evolution.

Why other options are wrong:

- Option A (Analogous organs): have different structures but the same function, such as the wings of a bird and an insect.
- Option B (Vestigial organs): reduced, non-functional remnants like the human appendix.
- Option D (Vertigial organs): not a valid biological term.

Final Answer: Similar structure with different function makes them homologous organs $\Rightarrow$ $\boxed{C}$

Answer: (C) Go Back to Q10

Q11.

Solution

Concept — Function of mitochondria: Cell organelles divide labour within the cell, and energy release is centred on one of them.

Step 1 — Recall the site of ATP synthesis: Aerobic respiration, especially the Krebs cycle and the electron transport chain, takes place in the mitochondrion.

Step 2 — Explain the nickname: Because it produces most of the cell's ATP (energy currency), the mitochondrion is called the powerhouse of the cell.

Why other options are wrong:

- Option A (Ribosome): the site of protein synthesis, not energy release.
- Option B (Golgi apparatus): packages and modifies proteins for secretion.
- Option C (Lysosome): contains digestive enzymes for breaking down waste.

Final Answer: The powerhouse of the cell is the mitochondrion $\Rightarrow$ $\boxed{D}$

Answer: (D) Go Back to Q11

Q12.

Solution

Concept — Osmosis: Movement of substances across membranes can be passive or active; osmosis is a special case for water.

Step 1 — Define the movement: Osmosis is the net movement of water molecules across a selectively permeable membrane.

Step 2 — State the direction: Water moves from a region of higher water potential (dilute solution) to a region of lower water potential (concentrated solution), which matches the statement.

Why other options are wrong:

- Option A (Active transport): moves solutes against a gradient and needs ATP.
- Option B (Diffusion of solutes): refers to the spread of solute particles, not the special movement of water.
- Option C (Phagocytosis): the engulfing of solid particles by a cell.

Final Answer: Water movement across a selectively permeable membrane is osmosis $\Rightarrow$ $\boxed{D}$

Answer: (D) Go Back to Q12

Q13.

Solution

Concept — Stages of mitosis: Mitosis proceeds through prophase, metaphase, anaphase and telophase, each with a distinct chromosome arrangement.

Step 1 — Read the figure: The sister chromatids have separated and are moving towards opposite poles of the cell.

Step 2 — Match the stage: Separation of sister chromatids and their poleward movement is the defining event of anaphase.

Why other options are wrong:

- Option A (Prophase): chromosomes condense and the spindle begins to form; chromatids are still joined.
- Option B (Metaphase): chromosomes line up at the equator, not yet separated.
- Option D (Telophase): chromosomes have already reached the poles and nuclear envelopes reform.

Final Answer: Separation of chromatids towards the poles is anaphase $\Rightarrow$ C

Answer: (C) Go Back to Q13

Q14.

Solution

Concept — Significance of meiosis: Meiosis is a reduction division that occurs during gamete formation in sexually reproducing organisms.

Step 1 — Recall the chromosome change: Meiosis halves the chromosome number, so a diploid (2n) cell gives rise to haploid (n) gametes.

Step 2 — Explain why this matters: When two haploid gametes fuse at fertilisation, the diploid number is restored, keeping the species' chromosome number constant across generations.

Why other options are wrong:

- Option A (Doubles the number): meiosis reduces, it does not double.
- Option B (Keeps it the same): that describes mitosis, not meiosis.

- Option D (Identical daughter cells): meiosis produces genetically varied cells due to crossing over.

Final Answer: Meiosis halves the chromosome number to form haploid gametes $\Rightarrow$ C

Answer: (C) Go Back to Q14

Q15.

Solution

Concept — Parts of a flower: A flower has four whorls; the innermost whorl, the gynoecium, is the female reproductive part.

Step 1 — Recall the parts of the gynoecium: The gynoecium (pistil) has three parts: the ovary at the base, the style in the middle, and the stigma at the top.

Step 2 — Match the label: The tip of the female part that receives pollen grains is the stigma. The labelled part **Z** at the top of the pistil is therefore the stigma.

Why other options are wrong:

- Option A (Anther): the pollen-producing part of the male stamen.
- Option C (Filament): the stalk of the stamen that supports the anther.
- Option D (Sepal): the green outer protective whorl of the flower.

Final Answer: The pollen-receiving tip of the female part is the stigma $\Rightarrow$ B

Answer: (B) Go Back to Q15

Q16.

Solution

Concept — Spermatogenesis: Sperm formation in males occurs inside the paired testes, which lie in the scrotum.

Step 1 — Locate the site: Each testis is packed with coiled seminiferous tubules.

Step 2 — Describe the process: The germ cells lining the seminiferous tubules undergo meiosis to form spermatids, which mature into sperms. So spermatogenesis takes place in the seminiferous tubules of the testis.

Why other options are wrong:

- Option A (Prostate gland): adds secretions to semen but does not make

sperm.
- Option C (Vas deferens): only transports mature sperm.
- Option D (Epididymis): stores and matures sperm after they are formed, not the site of formation.

Final Answer: Spermatogenesis occurs in the seminiferous tubules of the testis $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q16

Q17.

Solution

Concept — Hormonal control of the menstrual cycle: The cycle is controlled by pituitary hormones (FSH and LH) and ovarian hormones (estrogen and progesterone).

Step 1 — Identify the mid-cycle event: Around day 14 of the cycle, the mature follicle releases its egg, an event called ovulation.

Step 2 — Link it to the hormone: Ovulation is triggered by a sharp surge in luteinising hormone (LH) from the anterior pituitary.

Why other options are wrong:

- Option B (Progesterone): rises after ovulation to maintain the uterine lining, it does not trigger ovulation.
- Option C (Prolactin): stimulates milk production, unrelated to ovulation.
- Option D (Oxytocin): causes uterine contractions during childbirth.

Final Answer: The mid-cycle LH surge triggers ovulation $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q17

Q18.

Solution

Concept — Source of oxygen in photosynthesis: Photosynthesis has a light reaction and a dark reaction; oxygen is released only in the light reaction.

Step 1 — Recall photolysis: In the light reaction, water molecules are split by light energy, a process called photolysis: $2H_2O \rightarrow 4H^+ + 4e^- + O_2$.

Step 2 — Identify the origin of oxygen: The oxygen released into the atmosphere

comes from this splitting of water, not from carbon dioxide.

Why other options are wrong:

- Option A (Carbon dioxide): supplies carbon for glucose in the dark reaction, not the released oxygen.
- Option B (Glucose): is a product of photosynthesis, not a source of oxygen.
- Option D (Chlorophyll): traps light energy but is not split to release oxygen.

Final Answer: The oxygen released in photosynthesis comes from water $\Rightarrow$ C

Answer: (C) Go Back to Q18

Q19.

Solution

Concept — Water loss from plants: Plants lose water by several routes; the main one is through tiny pores on the leaves.

Step 1 — Define transpiration: Transpiration is the loss of water in the form of vapour from the aerial parts of a plant, mostly through the stomata of leaves.

Step 2 — Note its role: This process creates a pull that helps in the upward movement of water (the transpiration pull) and cools the plant.

Why other options are wrong:

- Option A (Guttation): loss of liquid water (not vapour) through special pores called hydathodes.
- Option B (Translocation): the transport of food through the phloem, not water loss.
- Option D (Imbibition): the absorption of water by solid particles such as dry seeds.

Final Answer: Loss of water vapour through stomata is transpiration $\Rightarrow$ C

Answer: (C) Go Back to Q19

Q20.

Solution

Concept — Five-kingdom classification: R. H. Whittaker classified organisms into five kingdoms: Monera, Protista, Fungi, Plantae and Animalia.

Step 1 — Recall the basis: The classification uses cell structure (prokaryotic or eukaryotic), body organisation, and mode of nutrition.

Step 2 — Place bacteria: Bacteria are prokaryotes, lacking a true nucleus and membrane-bound organelles, so they are placed in kingdom Monera.

Why other options are wrong:

- Option A (Protista): includes single-celled eukaryotes such as Amoeba and Paramecium.
- Option B (Fungi): eukaryotic, mostly multicellular decomposers with cell walls of chitin.
- Option C (Plantae): multicellular eukaryotic autotrophs.

Final Answer: Prokaryotic bacteria belong to kingdom Monera $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q20

Q21.

Solution

Concept — Pteridophytes: The plant kingdom is divided into groups by increasing complexity: Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms.

Step 1 — Recall the key feature of pteridophytes: Ferns and their relatives are the first plants to have well-developed vascular tissue, xylem and phloem, for the conduction of water and food.

Step 2 — Apply it: Because they possess this conducting tissue, ferns are grouped under Pteridophyta.

Why other options are wrong:

- Option B (Flowers and fruits): are found only in angiosperms.
- Option C (Seeds enclosed in fruits): again an angiosperm feature; ferns are seedless.
- Option D (Naked seeds): are characteristic of gymnosperms, not ferns.

Final Answer: Ferns are pteridophytes because they first possess vascular tissue

$\Rightarrow \boxed{A}$

Answer: (A) Go Back to Q21

Q22.

Solution

Concept — Trophic levels in a food chain: Energy flows through a food chain from producers to a series of consumers at successive trophic levels.

Step 1 — Identify the trophic levels: Grass is the producer (first level). The organism that eats grass is the primary consumer (herbivore, second level).

Step 2 — Match position W: In the chain Grass $\rightarrow$ **W** $\rightarrow$ Snake $\rightarrow$ Hawk, **W** eats grass and is eaten by the snake. A herbivore such as the grasshopper fits this primary-consumer position.

Why other options are wrong:

- Option A (Hawk): is the top carnivore at the last trophic level.
- Option B (Snake): is the secondary consumer, already shown later in the chain.
- Option C (Fungus): is a decomposer, not a link in this grazing food chain.

Final Answer: The primary consumer feeding on grass is the grasshopper $\Rightarrow \boxed{D}$

Answer: (D) Go Back to Q22

Q23.

Solution

Concept — Ten per cent law of energy transfer: Lindeman's ten per cent law states that only about 10% of the energy at one trophic level is passed on to the next level.

Step 1 — Start with the producers: Producers trap $10{,}000$ units of energy.

Step 2 — Apply the ten per cent law: Energy passed to primary consumers $= 10\%$ of $10{,}000 = \dfrac{10}{100} \times 10{,}000 = 1000$ units.

Why other options are wrong:

- Option A ($10{,}000$ units): assumes no energy is lost, which is impossible.
- Option C (100 units): is 10% of 1000, the level of secondary consumers.
- Option D (5000 units): wrongly assumes 50% transfer.

Final Answer: Primary consumers receive about 1000 units $\Rightarrow$ B

Answer: (B) Go Back to Q23

Q24.

Solution

Concept — Types of immunity: Immunity is broadly innate or acquired; acquired immunity is further divided into active and passive types.

Step 1 — Distinguish active and passive: In active immunity the body makes its own antibodies. In passive immunity ready-made antibodies are received from an outside source.

Step 2 — Classify the example: A baby receiving antibodies through mother's milk gets ready-made antibodies naturally, without producing its own, so this is passive natural immunity.

Why other options are wrong:

- Option B (Active natural immunity): develops after actually suffering an infection.
- Option C (Active artificial immunity): produced by vaccination.
- Option D (Innate immunity): the non-specific defence a person is born with, such as skin barriers.

Final Answer: Antibodies through mother's milk give passive natural immunity $\Rightarrow$ A

Answer: (A) Go Back to Q24

Q25.

Solution

Concept — Tools of genetic engineering: Recombinant DNA technology needs enzymes to cut and join DNA fragments precisely.

Step 1 — Identify the cutting enzyme: Restriction endonucleases recognise specific base sequences (recognition sites) in DNA and cut the strands there, acting as molecular scissors.

Step 2 — Contrast with the joining enzyme: The cut fragments are later joined by DNA ligase, which acts as molecular glue.

Why other options are wrong:

- Option B (DNA ligases): join DNA fragments, they do not cut.
- Option C (DNA polymerases): synthesise new DNA strands during replication.
- Option D (Amylases): digest starch and have no role in cutting DNA.

Final Answer: The molecular scissors of genetic engineering are restriction endonucleases $\Rightarrow$ A

Answer: (A) Go Back to Q25

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	A	3	A	4	D	5	B
6	C	7	B	8	A	9	A	10	C
11	D	12	D	13	C	14	C	15	B
16	B	17	A	18	C	19	C	20	D
21	A	22	D	23	B	24	A	25	A