PGIMER BSc Nursing Biology

Sample Paper – 8

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 gastric glands of the human stomach contain different types of cells. The cells that secrete hydrochloric acid, which makes the stomach contents acidic, are the:

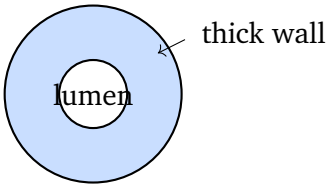
(A) Chief (zymogen) cells

(B) Parietal (oxyntic) cells

(C) Goblet cells

(D) Mucous neck cells

Q2. The diagram shows the cross-section of a blood vessel that has a thick, muscular wall and a narrow lumen, and that carries blood away from the heart. This vessel is a(n):



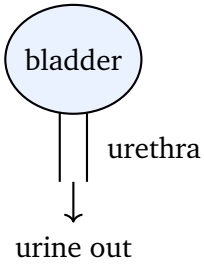
(A) Vein

(B) Capillary

(C) Venule

(D) Artery

Q3. The diagram shows the urinary bladder emptying to the outside. The process labelled here, the release of stored urine from the urinary bladder through the urethra, is called:



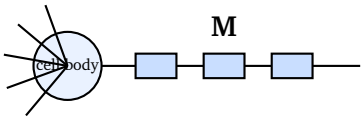
(A) Micturition

(B) Ultrafiltration

(C) Tubular reabsorption

(D) Osmoregulation

Q4. The diagram shows a neuron. The fatty insulating layer labelled **M** that wraps around the axon in segments and speeds up the conduction of the nerve impulse is the:



(A) Node of Ranvier

(B) Dendrite

(C) Myelin sheath

(D) Synaptic knob

Q5. Glycolysis is the first stage of cellular respiration, in which one molecule of glucose is broken down into two molecules of pyruvate. In the cell, glycolysis takes place in the:

(A) Mitochondrial matrix

(B) Cytoplasm

(C) Inner mitochondrial membrane

(D) Nucleus

Q6. The main female sex hormone, secreted by the ovary, which brings about the development of the secondary sexual characters in females, is:

(A) Estrogen

(B) Testosterone

(C) Thyroxine

(D) Insulin

Q7. The two alternative forms of a gene that occupy the same locus on a pair of homologous chromosomes and control a pair of contrasting characters are called:

(A) Genomes

(B) Chromatids

(C) Alleles

(D) Codons

Q8. Down syndrome in humans is caused by the presence of an extra copy of chromosome number 21 (trisomy 21). The total number of chromosomes present in the body cells of such a person is:

(A) 44

(B) 45

(C) 48

(D) 47

Q9. During protein synthesis at the ribosome, the molecule that picks up specific amino acids and brings them to be matched with the codons on the messenger RNA is:

(A) Messenger RNA (mRNA)

(B) Transfer RNA (tRNA)

(C) Ribosomal RNA (rRNA)

(D) DNA

Q10. According to the Hardy–Weinberg principle, in a large, randomly mating population that is free of mutation, migration, selection and genetic drift, the allele frequencies of a gene will remain:

(A) Continuously increasing

(B) Continuously decreasing

(C) Randomly fluctuating every generation

(D) Constant from generation to generation

Q11. The large, fluid-filled organelle that occupies most of the volume of a mature plant cell, stores cell sap and helps to keep the cell firm (turgid) is the:

(A) Central vacuole

(B) Nucleus

(C) Chloroplast

(D) Mitochondrion

Q12. When a plant cell is placed in a strongly salty (hypertonic) solution, water moves out of the cell and the protoplasm shrinks away from the cell wall. This phenomenon is called:

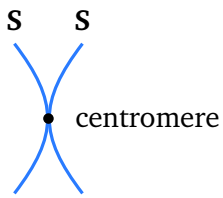
(A) Turgidity

(B) Endosmosis

(C) Plasmolysis

(D) Imbibition

Q13. The diagram shows a duplicated chromosome as it appears before cell division. The two identical halves (each labelled **S**) that are joined together at the centromere are called:



(A) Homologous chromosomes

(B) Sister chromatids

(C) Bivalents

(D) Alleles

Q14. In humans and other sexually reproducing organisms, the gametes (sperms and egg cells) are formed by a special type of reduction division called:

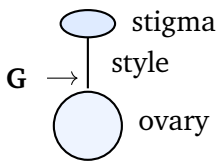
(A) Mitosis

(B) Binary fission

(C) Budding

(D) Meiosis

Q15. The diagram shows the female reproductive whorl of a flower, made up of the stigma, style and ovary. The whorl labelled **G** is the:



(A) Androecium

(B) Corolla

(C) Gynoecium

(D) Calyx

Q16. The appearance of facial hair, deepening of the voice and broadening of the shoulders in human males around the age of 13 to 14 years are examples of:

(A) Secondary sexual characters

(B) Primary sexual characters

(C) Vestigial characters

(D) Acquired characters

Q17. The permanent stoppage of the menstrual cycle in human females, which usually occurs around the age of 45 to 50 years, is called:

(A) Menarche

(B) Ovulation

(C) Gestation

(D) Menopause

Q18. On a bright, sunny day, when light and water are freely available to a healthy green plant, the factor that most often limits the rate of photosynthesis is the:

(A) Intensity of light

(B) Concentration of carbon dioxide

(C) Amount of chlorophyll

(D) Availability of water

Q19. When a potted plant is laid on its side, the roots bend and grow downward towards gravity while the shoots grow upward. The downward growth of the roots in response to gravity is an example of:

(A) Positive geotropism

(B) Negative geotropism

(C) Positive phototropism

(D) Negative hydrotropism

Q20. Members of the kingdom Animalia differ from members of the kingdom Plantae mainly in that the animal cells:

(A) Are prokaryotic

(B) Contain chloroplasts

(C) Lack a cell wall

(D) Are always unicellular

Q21. The presence of a notochord, a dorsal tubular (hollow) nerve cord and pharyngeal gill slits at some stage of the life cycle is the defining feature of the phylum:

(A) Arthropoda

(B) Porifera

(C) Annelida

(D) Chordata

Q22. The figure shows a simple food chain. The organism that feeds directly on the green plant, and is therefore the plant-eating herbivore of this chain, is the:

Grass $\longrightarrow$ Deer $\longrightarrow$ Tiger

(A) Grass

(B) Deer

(C) Tiger

(D) Vulture

Q23. The biogeochemical cycle in which the gas released by green plants during photosynthesis and used up by all living organisms during respiration is circulated through the environment is the:

(A) Oxygen cycle

(B) Nitrogen cycle

(C) Carbon cycle

(D) Phosphorus cycle

Q24. The unbroken skin and the mucus lining of the respiratory and digestive tracts, which prevent most germs from entering the body, together form the:

(A) Acquired immunity

(B) Passive artificial immunity

(C) Innate (non-specific) immunity, the first line of defence

(D) Active artificial immunity

Q25. The technique of growing a large number of genetically identical plants from small pieces of plant tissue on a sterile nutrient medium in the laboratory is called:

(A) Hybridisation

(B) Tissue culture (micropropagation)

(C) Grafting

(D) Fermentation

Detailed Solutions

Q1.

Solution

Concept — Cells of the gastric glands: The wall of the stomach contains gastric glands made of several types of secretory cells, each producing a different substance.

Step 1 — List the cell types: The gastric glands have chief (zymogen) cells, parietal (oxyntic) cells, and mucous neck cells.

Step 2 — Match cell to secretion: Chief cells secrete pepsinogen, mucous neck cells secrete mucus, and the parietal (oxyntic) cells secrete hydrochloric acid.

Step 3 — Explain the role of HCl: The hydrochloric acid from the parietal cells makes the stomach acidic, kills germs, and converts inactive pepsinogen into active pepsin.

Why other options are wrong:

- Option A (Chief cells): secrete the enzyme precursor pepsinogen, not acid.
- Option C (Goblet cells): secrete mucus and are found mainly in the intestinal lining.
- Option D (Mucous neck cells): secrete protective mucus, not hydrochloric acid.

Final Answer: Hydrochloric acid is secreted by the parietal (oxyntic) cells $\Rightarrow$ B

Answer: (B) Go Back to Q1

Q2.

Solution

Concept — Types of blood vessels: Blood vessels are of three kinds, arteries, veins and capillaries, each suited to its function.

Step 1 — Read the diagram: The vessel shown has a thick, muscular wall and a narrow lumen, and it carries blood away from the heart.

Step 2 — Match the features: Arteries carry blood away from the heart under high pressure, so they have thick, elastic, muscular walls and a comparatively narrow lumen to withstand that pressure.

Step 3 — Conclude: The features in the figure exactly match those of an artery.

Why other options are wrong:

- Option A (Vein): carries blood towards the heart, has thin walls, a wide lumen and valves.
- Option B (Capillary): a one-cell-thick microscopic vessel for exchange, with no muscular wall.
- Option C (Venule): a small vein that collects blood from capillaries; it too has thin walls.

Final Answer: A thick-walled vessel carrying blood away from the heart is an artery $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q2

Q3.

Solution

Concept — Emptying of the urinary bladder: Urine formed by the kidneys is stored in the urinary bladder and released to the outside at intervals.

Step 1 — Trace the path of urine: Urine passes from the kidneys through the ureters into the urinary bladder, where it is stored.

Step 2 — Name the release: When the bladder is full, its muscular wall contracts and the urine is expelled to the outside through the urethra. This release of urine is called micturition.

Why other options are wrong:

- Option B (Ultrafiltration): the filtering of blood in Bowman's capsule of the nephron, not the emptying of the bladder.
- Option C (Tubular reabsorption): the taking back of useful substances by the kidney tubule.
- Option D (Osmoregulation): the control of the body's water and salt balance, a broader process.

Final Answer: The release of stored urine from the bladder is micturition $\Rightarrow$ $\boxed{\text{A}}$

Answer: (A) Go Back to Q3

Q4.

Solution

Concept — Structure of a nerve fibre: The long axon of many neurons is covered by an insulating fatty layer that affects how fast the impulse travels.

Step 1 — Identify the layer: The fatty layer wrapped in segments around the axon, shown as **M** in the figure, is the myelin sheath.

Step 2 — Explain its role: The myelin sheath insulates the axon, and the impulse jumps from one gap (node of Ranvier) to the next, so conduction becomes much faster.

Why other options are wrong:

- Option A (Node of Ranvier): the tiny gap between two myelin segments, not the insulating layer itself.
- Option B (Dendrite): a short branch that receives impulses towards the cell body.
- Option D (Synaptic knob): the swollen tip of the axon that releases neurotransmitter.

Final Answer: The fatty insulating layer around the axon is the myelin sheath $\Rightarrow$ C

Answer: (C) Go Back to Q4

Q5.

Solution

Concept — Stages of cellular respiration: Aerobic respiration occurs in stages that take place in different parts of the cell.

Step 1 — Recall glycolysis: Glycolysis is the first stage, in which one six-carbon glucose molecule is split into two three-carbon pyruvate molecules.

Step 2 — Locate where it occurs: Glycolysis does not need oxygen and its enzymes are present in the cytoplasm (cytosol) of the cell, so this stage takes place in the cytoplasm.

Why other options are wrong:

- Option A (Mitochondrial matrix): is the site of the Krebs cycle, a later stage.
- Option C (Inner mitochondrial membrane): carries out the electron transport chain, not glycolysis.

- Option D (Nucleus): controls the cell and stores DNA; it is not the site of glycolysis.

Final Answer: Glycolysis takes place in the cytoplasm $\Rightarrow$ B

Answer: (B) Go Back to Q5

Q6.

Solution

Concept — Sex hormones: The gonads secrete sex hormones that control reproduction and the secondary sexual characters.

Step 1 — Identify the female hormone: The ovary secretes estrogen, the main female sex hormone.

Step 2 — State its function: Estrogen brings about the female secondary sexual characters, such as the development of breasts and the broadening of the hips, and it regulates the menstrual cycle.

Why other options are wrong:

- Option B (Testosterone): the male sex hormone secreted by the testes.
- Option C (Thyroxine): from the thyroid gland, it controls the metabolic rate, not sexual characters.
- Option D (Insulin): from the pancreas, it lowers blood glucose.

Final Answer: The main female sex hormone is estrogen $\Rightarrow$ A

Answer: (A) Go Back to Q6

Q7.

Solution

Concept — Genes and their forms: A character is controlled by a gene, and a gene may exist in more than one form.

Step 1 — Define the term: The different forms of a gene that occur at the same position (locus) on homologous chromosomes are called alleles.

Step 2 — Give an example: For plant height in pea, the gene has two alleles, T (tall) and t (dwarf), which control the contrasting characters.

Why other options are wrong:

- Option A (Genomes): the complete set of genes of an organism, not a pair of gene forms.
- Option B (Chromatids): the two identical copies of a duplicated chromosome.
- Option D (Codons): triplets of bases on mRNA that code for amino acids.

Final Answer: The alternative forms of a gene are alleles $\Rightarrow$ C

Answer: (C) Go Back to Q7

Q8.

Solution

Concept — Chromosome number in Down syndrome: A normal human body cell has 46 chromosomes, that is 23 pairs.

Step 1 — Recall the normal number: The diploid number in humans is $2n = 46$.

Step 2 — Add the extra chromosome: In Down syndrome there is an extra copy of chromosome 21 (trisomy 21), so one chromosome is added to the normal set: $46 + 1 = 47$.

Step 3 — State the total: The body cells of a person with Down syndrome therefore contain 47 chromosomes.

Why other options are wrong:

- Option A (44): would mean two chromosomes are missing from the normal 46.
- Option B (45): would mean one chromosome is missing (monosomy), not an extra one.
- Option C (48): would mean two extra chromosomes, not the single extra of trisomy 21.

Final Answer: Trisomy 21 gives $46 + 1 = 47$ chromosomes $\Rightarrow$ D

Answer: (D) Go Back to Q8

Q9.

Solution

Concept — The RNAs of protein synthesis: Three kinds of RNA work together to build proteins, and each has a distinct job.

Step 1 — Recall the role of tRNA: Transfer RNA (tRNA) carries a specific amino acid at one end and has an anticodon at the other end.

Step 2 — Explain the matching: At the ribosome, the anticodon of the tRNA pairs with the matching codon on the messenger RNA, so the correct amino acid is added to the growing chain.

Why other options are wrong:

- Option A (mRNA): carries the coded message from DNA; it does not itself carry amino acids.
- Option C (rRNA): forms part of the ribosome, the site of synthesis, but does not ferry amino acids.
- Option D (DNA): stores the genetic information and stays in the nucleus during translation.

Final Answer: Amino acids are brought to the ribosome by transfer RNA $\Rightarrow$ $\boxed{\text{B}}$

Answer: (B) Go Back to Q9

Q10.

Solution

Concept — Hardy–Weinberg principle: This principle describes the genetic make-up of an ideal, non-evolving population.

Step 1 — State the conditions: The population must be large, mating must be random, and there should be no mutation, no migration, no natural selection and no genetic drift.

Step 2 — State the outcome: Under these conditions the allele frequencies (and genotype frequencies) stay constant from one generation to the next, so the population is said to be in genetic equilibrium.

Why other options are wrong:

- Option A (Continuously increasing): would mean the population is evolving, which the principle rules out.
- Option B (Continuously decreasing): again would indicate a change in fre-

quency, not equilibrium.
- Option C (Randomly fluctuating): describes genetic drift, one of the disturbing factors that is assumed to be absent.

Final Answer: Allele frequencies remain constant from generation to generation $\Rightarrow$ D

Answer: (D) Go Back to Q10

Q11.

Solution

Concept — The plant cell vacuole: A mature plant cell has one very large vacuole, unlike animal cells which have several small ones.

Step 1 — Describe the vacuole: The central vacuole is a large sac bounded by a membrane (the tonoplast) and filled with cell sap, water and dissolved substances.

Step 2 — Explain turgidity: When the vacuole is full of water it presses the cell contents against the wall, giving turgor pressure that keeps the cell and the plant firm.

Why other options are wrong:

- Option B (Nucleus): controls cell activities and stores DNA; it does not maintain turgidity.
- Option C (Chloroplast): the site of photosynthesis, not a storage sac for cell sap.
- Option D (Mitochondrion): releases energy as ATP; it is small and has no role in turgor.

Final Answer: The large sap-filled organelle maintaining turgidity is the central vacuole $\Rightarrow$ A

Answer: (A) Go Back to Q11

Q12.

Solution

Concept — Effect of a hypertonic solution on a cell: The direction of water movement depends on the concentration outside the cell compared with inside.

Step 1 — Identify the water movement: A hypertonic (strongly salty) solution has less water potential than the cell sap, so water moves out of the cell by osmosis (exosmosis).

Step 2 — Name the result: As water leaves, the protoplasm shrinks and pulls away from the cell wall. This shrinkage of the protoplasm is called plasmolysis.

Why other options are wrong:

- Option A (Turgidity): the swollen, firm state of a cell that has gained water, the opposite of this.
- Option B (Endosmosis): the movement of water into the cell, which happens in a hypotonic solution.
- Option D (Imbibition): the absorption of water by dry solids such as seeds, not the shrinking of a living cell.

Final Answer: Shrinking of the protoplasm in a hypertonic solution is plasmolysis $\Rightarrow$ C

Answer: (C) Go Back to Q12

Q13.

Solution

Concept — A duplicated chromosome: After DNA replication, each chromosome is made of two identical copies held together.

Step 1 — Read the figure: The figure shows an X-shaped chromosome with two identical halves (labelled **S**) joined at a point called the centromere.

Step 2 — Name the halves: The two identical copies of a duplicated chromosome, joined at the centromere, are called sister chromatids.

Why other options are wrong:

- Option A (Homologous chromosomes): are two separate chromosomes, one from each parent, not the two halves of a single one.
- Option C (Bivalents): a pair of homologous chromosomes joined during meiosis, made of four chromatids.

- Option D (Alleles): alternative forms of a gene, not physical parts of a chromosome.

Final Answer: The two identical halves joined at the centromere are sister chromatids $\Rightarrow$ B

Answer: (B) Go Back to Q13

Q14.

Solution

Concept — Formation of gametes: Gametes must have half the chromosome number so that fertilisation restores the normal number.

Step 1 — Recall the requirement: A human body cell is diploid (2n = 46); the gametes must be haploid (n = 23).

Step 2 — Name the division: The division that halves the chromosome number and forms four haploid gametes is called meiosis. So gamete formation occurs by meiosis.

Why other options are wrong:

- Option A (Mitosis): keeps the chromosome number the same and is used for growth and repair, not gamete formation.
- Option B (Binary fission): an asexual division seen in bacteria and Amoeba.
- Option C (Budding): an asexual method of reproduction, as in yeast and Hydra.

Final Answer: Gametes are formed by meiosis $\Rightarrow$ D

Answer: (D) Go Back to Q14

Q15.

Solution

Concept — Whorls of a flower: A typical flower has four whorls; the innermost, female whorl is made of one or more carpels.

Step 1 — Recall the female whorl: The female reproductive whorl is the gynoecium (pistil), and each carpel has three parts: the stigma, the style and the ovary.

Step 2 — Match the label: The whorl in the figure, made of stigma, style and

ovary, and labelled **G**, is therefore the gynoecium.

Why other options are wrong:

- Option A (Androecium): the male whorl, made of stamens (anther and filament).
- Option B (Corolla): the whorl of petals that attracts pollinators.
- Option D (Calyx): the outermost whorl of green sepals that protects the bud.

Final Answer: The female whorl of stigma, style and ovary is the gynoecium $\Rightarrow$ C

Answer: (C) Go Back to Q15

Q16.

Solution

Concept — Changes at puberty: At puberty the sex hormones bring about visible body changes that mark sexual maturity.

Step 1 — Recall the type of character: Features that appear at puberty and distinguish the two sexes, but are not the reproductive organs themselves, are called secondary sexual characters.

Step 2 — Apply to the example: Facial hair, a deep voice and broad shoulders in males are brought about by testosterone and are examples of secondary sexual characters.

Why other options are wrong:

- Option B (Primary sexual characters): are the reproductive organs (like the testes) present from birth.
- Option C (Vestigial characters): reduced, functionless remnants such as the appendix.
- Option D (Acquired characters): traits gained during a lifetime through use or environment, not hormone-driven puberty changes.

Final Answer: Facial hair and a deep voice at puberty are secondary sexual characters $\Rightarrow$ A

Answer: (A) Go Back to Q16

Q17.

Solution

Concept — End of the reproductive phase in females: The menstrual cycle runs from puberty to a natural stopping point in middle age.

Step 1 — Identify the event: Around 45 to 50 years of age, the ovaries stop releasing eggs and the menstrual cycle stops permanently.

Step 2 — Name it: This permanent stoppage of the menstrual cycle is called menopause.

Why other options are wrong:

- Option A (Menarche): the first menstruation, which marks the beginning, not the end, of the cycle.
- Option B (Ovulation): the release of an egg from the ovary during each cycle.
- Option C (Gestation): the period of pregnancy, from fertilisation to birth.

Final Answer: The permanent end of the menstrual cycle is menopause $\Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q17

Q18.

Solution

Concept — Limiting factors of photosynthesis: The rate of photosynthesis is controlled by whichever factor is in shortest supply at a given moment.

Step 1 — List the factors: Light intensity, carbon dioxide concentration, temperature and water availability all affect the rate.

Step 2 — Apply the condition: On a bright, sunny day, light is plentiful and the plant is well watered, so these are not limiting. The atmosphere has only about 0.04% carbon dioxide, so the low carbon dioxide concentration becomes the limiting factor.

Why other options are wrong:

- Option A (Light intensity): already high on a bright day, so it is not limiting.
- Option C (Amount of chlorophyll): a healthy green plant has enough chlorophyll; it is not the shortage here.
- Option D (Water availability): the plant is well watered, so water is not in short supply.

Final Answer: On a bright day the limiting factor is usually the carbon dioxide concentration $\Rightarrow$ B

Answer: (B) Go Back to Q18

Q19.

Solution

Concept — Tropic movements: A tropism is the directional growth of a plant part in response to a stimulus; response to gravity is geotropism.

Step 1 — Note the stimulus and response: Gravity is the stimulus. The roots grow towards gravity (downward), while the shoots grow away from gravity (upward).

Step 2 — Name the root response: Growth towards the stimulus is called positive. Since the roots grow towards gravity, this is positive geotropism.

Why other options are wrong:

- Option B (Negative geotropism): growth away from gravity, which is shown by the shoot, not the root.
- Option C (Positive phototropism): growth towards light, shown by the shoot, and unrelated to gravity here.
- Option D (Negative hydrotropism): growth away from water, whereas roots actually grow towards water.

Final Answer: Downward growth of roots towards gravity is positive geotropism $\Rightarrow$ A

Answer: (A) Go Back to Q19

Q20.

Solution

Concept — Animalia versus Plantae: The five-kingdom system separates animals from plants using cell structure and mode of nutrition.

Step 1 — Recall animal cell features: Animal cells are eukaryotic and, unlike plant cells, they have no rigid cell wall and no chloroplasts.

Step 2 — Pick the key difference: The main structural difference asked here is that animal cells lack a cell wall, whereas plant cells have a cellulose cell wall.

Why other options are wrong:

- Option A (Are prokaryotic): wrong, both animals and plants are eukaryotic.
- Option B (Contain chloroplasts): chloroplasts are a plant feature, not an animal one.
- Option D (Are always unicellular): animals are multicellular, so this is incorrect.

Final Answer: Animal cells differ from plant cells mainly in lacking a cell wall $\Rightarrow$ C

Answer: (C) Go Back to Q20

Q21.

Solution

Concept — Defining features of Chordata: Each animal phylum is defined by a set of characteristic features present at some stage of life.

Step 1 — List the chordate features: Chordates possess a notochord, a dorsal tubular (hollow) nerve cord and paired pharyngeal gill slits at some stage of their life.

Step 2 — Match to the phylum: These three features together define the phylum Chordata, which includes fishes, amphibians, reptiles, birds and mammals.

Why other options are wrong:

- Option A (Arthropoda): defined by a jointed exoskeleton and jointed legs, with a solid ventral nerve cord.
- Option B (Porifera): sponges with pores and no true tissues, lacking a notochord.
- Option C (Annelida): segmented worms with a ventral nerve cord, not a dorsal hollow one.

Final Answer: Notochord and dorsal hollow nerve cord define the phylum Chordata $\Rightarrow$ D

Answer: (D) Go Back to Q21

Q22.

Solution

Concept — Herbivores and carnivores in a food chain: In a food chain, the organism that eats the producer is a herbivore, and one that eats other animals is a carnivore.

Step 1 — Read the chain: The chain is Grass → Deer → Tiger. Grass is the producer.

Step 2 — Identify the herbivore: The deer feeds directly on the grass (a plant), so the deer is the plant-eating herbivore, the primary consumer of this chain.

Why other options are wrong:

- Option A (Grass): is the producer (autotroph), not a consumer or herbivore.
- Option C (Tiger): eats the deer, so it is a flesh-eating carnivore, not a herbivore.
- Option D (Vulture): a scavenger that is not even part of this particular chain.

Final Answer: The plant-eating herbivore in the chain is the deer ⇒ B

Answer: (B) Go Back to Q22

Q23.

Solution

Concept — Biogeochemical cycles: Elements and gases move between living things and the environment in cyclic pathways.

Step 1 — Identify the gas: The gas released by green plants during photosynthesis and taken up by all organisms during respiration is oxygen.

Step 2 — Name the cycle: The circulation of this gas through plants, animals and the atmosphere is called the oxygen cycle.

Why other options are wrong:

- Option B (Nitrogen cycle): deals with the movement of nitrogen, including fixation by bacteria such as Rhizobium.
- Option C (Carbon cycle): follows carbon, mainly as carbon dioxide, not the oxygen released in photosynthesis.
- Option D (Phosphorus cycle): concerns phosphorus in rocks, soil and living things, with no gaseous atmospheric step.

Final Answer: The cycling of the gas released in photosynthesis is the oxygen

cycle $\Rightarrow$ A

Answer: (A) Go Back to Q23

Q24.

Solution

Concept — Lines of defence of the body: Immunity is broadly of two types, innate (non-specific) and acquired (specific).

Step 1 — Recall the first line of defence: Innate immunity is present from birth and acts against all germs in general. Its first line is made of physical and chemical barriers.

Step 2 — Apply to the example: The unbroken skin and the mucus lining of the respiratory and digestive tracts are barriers that stop germs from entering, so they are part of innate (non-specific) immunity.

Why other options are wrong:

- Option A (Acquired immunity): develops after exposure to a specific germ; it is not the ready-made barrier.
- Option B (Passive artificial immunity): the injection of ready-made antibodies (antiserum), not a body barrier.
- Option D (Active artificial immunity): produced by vaccination, which makes the body form its own antibodies.

Final Answer: Skin and mucus barriers form the innate (non-specific) immunity, the first line of defence $\Rightarrow$ C

Answer: (C) Go Back to Q24

Q25.

Solution

Concept — Growing plants in the laboratory: Whole plants can be raised from small pieces of tissue using aseptic laboratory methods.

Step 1 — Describe the method: A small piece of plant tissue (explant) is placed on a sterile nutrient medium containing the right hormones, where it grows into a mass of cells and then into many plantlets.

Step 2 — Name it: Because it produces a large number of genetically identical plants from a tiny piece of tissue, this technique is called tissue culture or micro-

propagation.

Why other options are wrong:

- Option A (Hybridisation): crossing two different varieties to combine their traits, not growing plants from tissue.
- Option C (Grafting): joining a shoot of one plant onto the stem of another, done in the field.
- Option D (Fermentation): the breakdown of sugars by microbes, used in making curd, bread and alcohol.

Final Answer: Growing many identical plants from small tissue pieces is tissue culture (micropropagation) $\Rightarrow$ B

Answer: (B) Go Back to Q25

Answer Key

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