A-Level Biology Practice Test 14

60 original multiple-choice questions covering all 19 Cambridge A-Level Biology 9700 topics. Choose one answer for each question. The full answer key is on the last page — worked explanations for every question are free on the test page at QuaidianPoint.com.

Name: _____ Class: _____ Score: _____ / 60

Cell structure

Q1. Which statement about the nucleus is correct?

(A) It modifies proteins and packages them into vesicles
(B) It is the site of ATP synthesis in the cell
(C) It contains DNA in chromatin and is the site of transcription
(D) It contains chlorophyll for photosynthesis

Q2. Which organelle is present in plant cells but absent from animal cells, and what is its function?

(A) The mitochondrion, which carries out aerobic respiration
(B) The Golgi apparatus, which modifies proteins
(C) The chloroplast, which carries out photosynthesis
(D) The lysosome, which digests material

Q3. Which statement about the cell wall of a plant cell is correct?

(A) It is made of chitin and is fully impermeable to water
(B) It is a phospholipid bilayer that controls entry of substances
(C) It is made mainly of cellulose microfibrils, which give strength and prevent bursting when the cell is turgid
(D) It is present only in root cells

Biological molecules

Q4. Which statement about water as a solvent is correct?

(A) Water is non-polar, so it dissolves only non-polar substances
(B) Water cannot dissolve gases such as oxygen
(C) Water is polar, so it dissolves ionic and polar substances and acts as a medium for metabolic reactions
(D) Water dissolves only sugars

Q5. Two amino acids join during translation on a ribosome. What type of reaction forms the bond between them, and what molecule is released?

(A) A hydrolysis reaction forming a glycosidic bond
(B) An esterification releasing glycerol
(C) A condensation reaction forming a peptide bond and releasing water
(D) A hydrogen bond forming between R groups only

Q6. Which statement about haemoglobin as a globular protein is correct?

(A) It is insoluble in water and forms strong fibres
(B) It consists of a single long helix with no folding
(C) It is soluble and compact, with a specific shape that allows it to bind oxygen reversibly
(D) It is a storage polysaccharide

Q7. A sample gives a positive biuret test but a negative Benedict's test. What does this suggest?

(A) The sample contains starch but no protein
(B) The sample contains reducing sugar but no protein
(C) The sample contains protein but no reducing sugar
(D) The sample contains lipid but no protein

Enzymes

Q8. Which statement about cofactors is correct?

(A) Cofactors are always proteins that act as enzymes themselves
(B) Cofactors permanently change the substrate into the product
(C) Some enzymes need a non-protein cofactor, such as a metal ion or a coenzyme, to function properly
(D) Cofactors are destroyed in every reaction they assist

Q9. A student plots rate against substrate concentration for an enzyme with and without an inhibitor. The inhibitor lowers Vmax but does not change Km. What type of inhibitor is it?

(A) Competitive
(B) A substrate analogue that binds only to the active site
(C) Non-competitive
(D) An activator

Q10. Why does the rate of an enzyme-catalysed reaction initially increase when substrate concentration is increased at low concentrations?

(A) More active sites are created
(B) The enzyme becomes denatured more slowly
(C) Collisions between enzyme and substrate become more frequent, so more enzyme-substrate complexes form
(D) The temperature of the mixture rises

Q11. Which statement about the activation energy of a reaction is correct?

(A) Enzymes increase the activation energy, making reactions faster
(B) Enzymes change the energy of the products
(C) Enzymes lower the activation energy by providing an alternative pathway with a lower energy barrier
(D) Activation energy is the total energy released by a reaction

Cell membranes and transport

Q12. Which statement about carrier proteins is correct?

(A) They form open pores that never change shape
(B) They transport water only
(C) They are found only in the nuclear envelope
(D) They bind a specific molecule, change shape, and release it on the other side of the membrane

Q13. Which statement about the role of cholesterol in membranes is correct?

(A) It makes the membrane completely impermeable
(B) It replaces phospholipids in animal cell membranes
(C) It acts as the main energy source for active transport
(D) At low temperatures it prevents phospholipids packing too tightly, and at high temperatures it restricts excessive movement

Q14. A cell takes up glucose by facilitated diffusion. Which statement is correct?

(A) Glucose is engulfed by endocytosis in every case
(B) Glucose moves against its gradient using ATP directly
(C) Glucose diffuses directly through the phospholipid bilayer at a fast rate
(D) Glucose moves down its concentration gradient through a specific carrier protein, without ATP

Q15. Which statement about membrane fluidity is correct?

(A) Membranes are rigid structures with fixed components
(B) Temperature has no effect on membrane fluidity
(C) Saturated fatty acids increase fluidity more than unsaturated ones
(D) Unsaturated fatty acids in phospholipids increase fluidity because their kinks prevent tight packing

The mitotic cell cycle

Q16. Which statement about the G1 and G2 phases of interphase is correct?

(A) G1 is the phase of DNA replication, and G2 is the phase of cell division
(B) G1 and G2 occur after mitosis has finished
(C) Both G1 and G2 involve DNA replication
(D) G1 involves growth and protein synthesis before DNA replication, and G2 involves growth and preparation after replication

Q17. What is the function of the spindle in mitosis?

(A) To break down the nuclear envelope permanently
(B) To form the cell plate in animal cells
(C) To synthesise new DNA
(D) To attach to centromeres and separate sister chromatids to opposite poles

Q18. Which statement about telophase is correct?

(A) Chromosomes condense and the spindle forms
(B) Chromatids separate to opposite poles
(C) Nuclear envelopes reform, chromosomes decondense, and the spindle breaks down
(D) Chromosomes line up on the equator

Nucleic acids and protein synthesis

Q19. Which base pairing rule applies in DNA?

(A) Adenine pairs with guanine, and thymine pairs with cytosine
(B) All bases pair randomly
(C) Adenine pairs with cytosine, and thymine pairs with guanine
(D) Adenine pairs with thymine, and guanine pairs with cytosine

Q20. During translation, what happens at the ribosome when a stop codon is reached?

(A) Another amino acid is added and translation continues
(B) The ribosome splits into DNA strands
(C) The mRNA is converted back into DNA
(D) No tRNA matches the codon, a release factor binds, and the completed polypeptide is released

Q21. Which statement about a frameshift mutation is correct?

(A) It changes one codon only and never affects later codons
(B) It changes the DNA sequence but never the protein
(C) It always creates a stop codon immediately
(D) It inserts or deletes a number of bases that is not a multiple of three, shifting the reading frame for all following codons

Transport in plants

Q22. Which statement about root pressure is correct?

(A) It is the main force moving water to the top of a tall tree
(B) It pushes sugars up the phloem
(C) It is caused by transpiration from the leaves
(D) It is a relatively small force caused by active loading of ions into the xylem, drawing water in by osmosis

Q23. Which statement about stomata is correct?

(A) Stomata are open at all times in all plants
(B) Stomata are found only on roots
(C) Guard cells lose water and become turgid to open the pore
(D) Guard cells become turgid and the pore opens when potassium ions and water enter them

Q24. Which statement about the transport of assimilates is correct?

(A) Assimilates move only from leaves to roots
(B) Assimilates are transported as starch in the phloem
(C) Assimilates move in the xylem with the transpiration stream
(D) Assimilates move from sources to sinks in the phloem, and the direction can vary

Transport in mammals

Q25. Which statement about arteries is correct?

(A) Arteries have thin walls and valves to prevent backflow
(B) Arteries have walls one cell thick for exchange
(C) Arteries carry blood at low pressure towards the heart
(D) Arteries have thick muscular and elastic walls to withstand high pressure and maintain flow

Q26. Which statement about veins is correct?

(A) Veins have thick elastic walls and no valves
(B) Veins carry blood under high pressure away from the heart
(C) Veins have a wide lumen, thin walls and valves to prevent backflow at low pressure
(D) Veins are the site of exchange with tissues

Q27. Which statement about the mammalian heart valves is correct?

(A) The atrioventricular valves prevent backflow from ventricles to atria when the ventricles contract
(B) The semilunar valves prevent backflow from atria to ventricles
(C) Valves are made of cardiac muscle and contract with the heart
(D) There are no valves between the atria and ventricles

Gas exchange

Q28. Which statement about the tracheal system of an insect is correct?

(A) Air enters through spiracles, which can close to reduce water loss
(B) Air is pumped into the blood by the heart
(C) Oxygen diffuses across a lung surface into the blood
(D) Tracheae are filled with blood at all times

Q29. Which statement about ventilation in a fish is correct?

(A) Water flows in through the operculum and out through the mouth
(B) The fish breathes air through lungs
(C) Water flows over the gills only when the fish swims forward
(D) The fish opens its mouth, lowers the buccal cavity floor to draw water in, then pumps it over the gills as the operculum opens

Q30. Which statement about gas exchange in a leaf is correct?

(A) Gases diffuse through stomata into air spaces, then across mesophyll cell walls and membranes
(B) Gases enter only through the roots
(C) Carbon dioxide is taken up through the cuticle in large amounts
(D) Oxygen is released only at night

Infectious diseases

Q31. A health worker explains HIV prevention to a community group. Which statement correctly separates real transmission routes from myths?

(A) HIV is spread by coughing, sharing food, or insect bites
(B) HIV is spread only through the air
(C) HIV is spread through contaminated drinking water
(D) HIV is spread through blood, sexual contact, and from mother to child during birth or breastfeeding, but not by coughing or sharing food

Q32. A hospital notices resistant bacteria spreading between patients despite careful antibiotic use in that ward. Which mechanism best explains the spread of resistance between bacterial cells?

(A) Antibiotics cause viruses to transfer resistance to bacteria
(B) Transfer of resistance plasmids between bacteria by conjugation
(C) Antibiotics deliberately mutate bacteria to make them resistant
(D) Resistance is never transferred between bacterial cells

Q33. Which statement about the control of malaria is correct?

(A) Draining standing water and using insecticide-treated bed nets reduce contact with mosquito vectors
(B) Providing clean drinking water alone eliminates malaria
(C) Antibiotics are the main treatment for malaria
(D) Malaria can be controlled by vaccinating mosquitoes

Immunity

Q34. Which statement about the primary immune response is correct?

(A) It is fast because memory cells are already present
(B) It is slow at first, because a suitable lymphocyte must be selected and cloned before large amounts of antibody are made
(C) It produces no antibodies at all
(D) It occurs only after vaccination

Q35. How does vaccination give long-lasting protection without causing the disease?

(A) Vaccines contain live pathogens that always cause the full disease
(B) Vaccines expose the immune system to an antigen in a safe form, triggering memory cell production without causing the disease
(C) Vaccines give passive immunity by injecting antibodies
(D) Vaccines work only if given after infection

Q36. Which statement about autoimmune disease is correct?

(A) The immune system fails to respond to any pathogen
(B) The immune system mistakenly attacks the body’s own tissues
(C) Autoimmune disease is caused by a lack of antibodies
(D) Autoimmune disease affects only plants

Energy and respiration

Q37. Which statement about the electron transport chain is correct?

(A) Electrons are passed along carriers, releasing energy used to pump hydrogen ions across the inner mitochondrial membrane
(B) Electrons are passed directly to glucose to make ATP
(C) The chain operates in the cytoplasm
(D) The chain produces carbon dioxide

Q38. Which statement about ATP synthesis by substrate-level phosphorylation is correct?

(A) It occurs when ATP is made directly by an enzyme-catalysed reaction, as in glycolysis and the Krebs cycle
(B) It requires a proton gradient and ATP synthase
(C) It occurs only in photosynthesis
(D) It produces no ATP at all

Q39. A muscle cell respires aerobically. Approximately how many molecules of ATP are produced per glucose molecule in total?

(A) 2
(B) 4
(C) 32
(D) 100

Photosynthesis

Q40. Which statement about the role of NADP in photosynthesis is correct?

(A) NADP is reduced in the light-dependent stage and oxidised in the Calvin cycle, carrying hydrogen to reduce glycerate 3-phosphate
(B) NADP is produced in the Calvin cycle and used in photolysis
(C) NADP carries oxygen to the thylakoids
(D) NADP is a pigment that absorbs light

Q41. Which statement about the absorption and action spectra of photosynthesis is correct?

(A) The action spectrum shows the rate of photosynthesis at each wavelength and closely follows the absorption spectrum of chlorophyll
(B) The action spectrum is the opposite of the absorption spectrum
(C) Photosynthesis occurs fastest in green light
(D) The absorption spectrum measures the rate of oxygen release

Q42. In the Calvin cycle, how many molecules of carbon dioxide are needed to produce one molecule of triose phosphate for export, after RuBP regeneration is accounted for?

(A) 1
(B) 2
(C) 3
(D) 6

Homeostasis

Q43. Which statement about ADH and the collecting duct is correct?

(A) ADH increases the number of aquaporins in collecting duct membranes, increasing water reabsorption
(B) ADH decreases aquaporins, increasing urine volume
(C) ADH acts on the glomerulus to increase ultrafiltration
(D) ADH is released when blood water potential is high

Q44. Which statement about diabetes mellitus is correct?

(A) Type 1 diabetes results from failure to produce insulin, while type 2 often involves reduced sensitivity to insulin
(B) Both types result from overproduction of insulin
(C) Diabetes is caused by excess ADH
(D) Diabetes prevents glucose from entering the urine in all cases

Q45. Which statement about excretion in mammals is correct?

(A) The liver deaminates excess amino acids, producing ammonia that is converted to urea
(B) The kidney converts urea directly into amino acids
(C) Carbon dioxide is excreted only by the kidneys
(D) The liver stores urea permanently

Control and coordination

Q46. Which statement about the endocrine system compared with the nervous system is correct?

(A) Hormones act faster and more locally than nerve impulses
(B) Hormones travel in the blood, act more slowly, and generally have longer-lasting effects than nerve impulses
(C) Hormones are transmitted only across synapses
(D) The endocrine system cannot coordinate responses at all

Q47. Which statement about a synapse is correct?

(A) Synapses allow impulses to pass in either direction equally
(B) Synapses ensure impulses travel in one direction, allow summation of stimuli, and filter out low-level background noise
(C) Synapses speed up impulses by myelination
(D) Synapses are found only in the brain

Q48. Which statement about rod cells in the retina is correct?

(A) Rod cells are sensitive to low light intensity and give black-and-white vision
(B) Rod cells give colour vision in bright light
(C) Rod cells are concentrated in the fovea
(D) Rod cells detect only red light

Inheritance

Q49. What pattern of variation is produced when many genes and the environment act together?

(A) It shows distinct categories with no intermediates, controlled by one gene
(B) It shows a range of phenotypes influenced by many genes and the environment, such as height
(C) It is unaffected by the environment
(D) It is always sex-linked

Q50. Which statement about discontinuous variation is correct?

(A) It is controlled by many genes and the environment
(B) It shows distinct phenotypes with no intermediates, such as blood group
(C) It always shows a normal distribution
(D) It cannot be inherited

Q51. A cross between two heterozygous individuals for a gene with complete dominance gives a 3:1 phenotypic ratio. What genotypic ratio underlies it?

(A) 3:1
(B) 1:2:1
(C) 1:1
(D) 9:3:3:1

Selection and evolution

Q52. Which statement about disruptive selection is correct?

(A) It favours the intermediate phenotype
(B) It favours both extreme phenotypes over the intermediate, increasing variation and sometimes leading to polymorphism
(C) It has no effect on phenotypes
(D) It always eliminates one extreme completely

Q53. A small island population of birds is founded by ten individuals. After a storm, only three survive by chance, and their allele frequencies differ sharply from the original population. Which process is illustrated?

(A) A non-random change in allele frequencies caused by selection
(B) Genetic drift, including a bottleneck effect, with a larger effect in small populations
(C) A change that only occurs in large populations
(D) A change that always increases genetic diversity

Q54. Which statement about sympatric speciation is correct?

(A) It requires a geographical barrier
(B) It occurs when populations diverge while living in the same area, for example through polyploidy in plants
(C) It cannot occur in plants
(D) It requires gene flow to continue throughout

Classification, biodiversity and conservation

Q55. Which statement about species is correct?

(A) A species is a group of organisms that can interbreed to produce fertile offspring
(B) A species is any group of organisms that look similar
(C) A species is defined only by its habitat
(D) Members of the same species always have identical DNA

Q56. Which statement about in situ conservation is correct?

(A) It protects species in their natural habitat, for example in a nature reserve
(B) It involves keeping organisms in zoos only
(C) It involves storing seeds in a bank
(D) It removes species from their habitat permanently

Q57. Why do conservationists monitor species richness and abundance over time?

(A) To prove that all species are increasing
(B) To detect changes in biodiversity and assess whether conservation measures are working
(C) To eliminate species that are declining
(D) To increase the Simpson's index artificially

Genetic technology

Q58. Which statement about DNA profiling in forensic science is correct?

(A) It compares the entire genome sequence of two people base by base
(B) It compares patterns of short tandem repeats, which are highly variable between unrelated people
(C) It can prove guilt on its own without other evidence
(D) It works only with blood samples

Q59. Which statement about the use of plasmids as vectors is correct?

(A) Plasmids are large linear chromosomes found only in eukaryotes
(B) Plasmids are small circular DNA molecules in bacteria that can be cut and joined with a gene of interest
(C) Plasmids cannot replicate inside bacterial cells
(D) Plasmids are proteins that carry genes

Q60. Which statement about electrophoresis is correct?

(A) DNA fragments are separated by size in an agarose gel under an electric field
(B) DNA fragments move towards the negative electrode because they are positively charged
(C) Larger fragments move further than smaller fragments
(D) Electrophoresis copies DNA

Answer Key

Q1: C	Q11: C	Q21: D	Q31: D	Q41: A	Q51: B
Q2: C	Q12: D	Q22: D	Q32: B	Q42: C	Q52: B
Q3: C	Q13: D	Q23: D	Q33: A	Q43: A	Q53: B
Q4: C	Q14: D	Q24: D	Q34: B	Q44: A	Q54: B
Q5: C	Q15: D	Q25: D	Q35: B	Q45: A	Q55: A
Q6: C	Q16: D	Q26: C	Q36: B	Q46: B	Q56: A
Q7: C	Q17: D	Q27: A	Q37: A	Q47: B	Q57: B
Q8: C	Q18: C	Q28: A	Q38: A	Q48: A	Q58: B
Q9: C	Q19: D	Q29: D	Q39: C	Q49: B	Q59: B
Q10: C	Q20: D	Q30: A	Q40: A	Q50: B	Q60: A

Worked explanations for all 60 questions: quaidianpoint.com/alevel-biology-practice-test-14/