A-Level Biology Practice Test 18

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 organelle is responsible for producing most of the ATP in an animal cell, and which structural feature increases its efficiency?

(A) Mitochondrion, with folded inner membranes (cristae) giving a large surface for electron transport
(B) Ribosome, with a large subunit that binds mRNA
(C) Lysosome, with hydrolytic enzymes in an acidic interior
(D) Nucleus, with pores that allow mRNA to leave

Q2. Centrioles are found in animal cells and play a role in which process?

(A) Protein secretion through vesicles
(B) Formation of spindle fibres during cell division
(C) Photosynthesis in the cytoplasm
(D) Storage of starch grains

Q3. An electron microscope gives much higher resolution than a light microscope mainly because it uses what?

(A) Visible light of a longer wavelength
(B) Stains that colour organelles brightly
(C) A beam of electrons with a much shorter wavelength than light
(D) A larger lens that magnifies the specimen more

Biological molecules

Q4. The Benedict test for reducing sugars gives a positive result when what happens?

(A) A blue-black colour appears on heating with iodine solution
(B) A brick-red precipitate forms on heating with Benedict reagent
(C) A purple colour appears on adding sodium hydroxide and copper sulfate
(D) A white emulsion forms on adding ethanol

Q5. Amylose and amylopectin are both components of starch. How do they differ structurally?

(A) Amylose is branched and amylopectin is unbranched
(B) Amylose is made of beta-glucose and amylopectin of alpha-glucose
(C) Amylose is an unbranched helix of alpha-glucose, while amylopectin is branched with 1,6-glycosidic bonds at branch points
(D) Amylose is a protein and amylopectin is a lipid

Q6. Which test would confirm the presence of protein in a food sample?

(A) Iodine test giving a blue-black colour
(B) Benedict test giving a brick-red precipitate
(C) Emulsion test giving a cloudy white suspension
(D) Biuret test giving a purple colour

Enzymes

Q7. In an investigation of enzyme activity, the rate increases with substrate concentration and then levels off. What explains the plateau?

(A) The enzyme is denatured by excess substrate
(B) The pH of the solution changes at high concentration
(C) All active sites are occupied, so the enzyme is working at its maximum rate
(D) Substrate molecules stop colliding with enzyme molecules

Q8. Immobilised lactase is used to produce lactose-free milk. Which advantage is specific to immobilisation in this process?

(A) Lactase becomes able to digest starch as well as lactose
(B) Lactase works at any temperature without denaturing
(C) Lactase no longer needs lactose as a substrate
(D) Lactase can be retained in the reactor and reused, so it does not remain in the milk

Q9. A student investigates the effect of pH on amylase activity using a buffer. Why is a buffer important in this experiment?

(A) It keeps the pH constant so that only the chosen pH variable is tested
(B) It increases the temperature of the reaction mixture
(C) It supplies extra substrate for the enzyme
(D) It prevents the enzyme from being denatured at any pH

Cell membranes and transport

Q10. A red blood cell placed in a solution of lower water potential than its cytoplasm will do what?

(A) Gain water by osmosis and burst
(B) Remain unchanged because its membrane is impermeable to water
(C) Gain solutes by active transport until equilibrium is reached
(D) Lose water by osmosis and crenate

Q11. Carrier proteins differ from channel proteins in facilitated diffusion in that carrier proteins do what?

(A) Change shape to move a specific molecule across the membrane
(B) Form a permanently open water-filled pore
(C) Use ATP directly for every molecule transported
(D) Transport only water molecules

Q12. Plasmolysis of a plant cell occurs when the cell is placed in a concentrated solution because of what?

(A) Water entering the vacuole faster than solutes leave
(B) Water leaving the cell by osmosis, so the protoplast shrinks away from the cell wall
(C) The cell wall dissolving in the concentrated solution
(D) Active transport of water out of the cell using ATP

The mitotic cell cycle

Q13. Which event characterises metaphase of mitosis?

(A) Chromosomes line up along the equator, attached to spindle fibres at their centromeres
(B) Sister chromatids separate to opposite poles
(C) DNA replicates to form sister chromatids
(D) Two daughter nuclei form and cytokinesis begins

Q14. Mitosis is important for growth and repair because it produces daughter cells that are what?

(A) Haploid and genetically different from the parent
(B) Genetically identical to the parent cell and to each other
(C) Diploid but with half the chromosomes of the parent
(D) Specialised immediately and unable to divide again

Q15. Which statement correctly contrasts mitosis with binary fission in bacteria?

(A) Binary fission produces four genetically different cells
(B) Mitosis occurs only in prokaryotes
(C) Mitosis involves a spindle and a nucleus, while binary fission copies a circular chromosome and divides the cell without mitotic apparatus
(D) Binary fission involves meiosis and fertilisation

Nucleic acids and protein synthesis

Q16. Which property of the genetic code means that most amino acids are encoded by more than one codon?

(A) It is non-overlapping
(B) It is degenerate
(C) It is universal in all organisms
(D) It contains start and stop codons

Q17. During mRNA processing in eukaryotes, introns are removed and exons are joined. What is this process called?

(A) Translation
(B) Replication
(C) Splicing
(D) Transcription

Q18. An insertion of a single nucleotide into a coding sequence is usually more harmful than a substitution because it does what?

(A) Changes only one amino acid in the protein
(B) Prevents mRNA from leaving the nucleus
(C) Stops ribosomes from binding to mRNA
(D) Shifts the reading frame, changing all downstream codons

Transport in plants

Q19. Evidence for the mass flow hypothesis includes the observation that phloem sap moves at speeds that are what?

(A) Far too slow to be explained by diffusion alone
(B) Identical in all directions at all times
(C) Much faster than diffusion could achieve, consistent with bulk flow under pressure
(D) Independent of source and sink activity

Q20. Aphids feeding on phloem provide evidence about translocation because their stylets do what?

(A) Block phloem transport completely
(B) Inject toxins that kill sieve tube elements
(C) Absorb water only from xylem vessels
(D) Penetrate a single sieve tube, allowing sap to be collected and analysed under pressure

Q21. Companion cells are closely associated with sieve tube elements in phloem. Which feature of companion cells most directly supports active loading of sucrose?

(A) Many mitochondria supplying ATP for co-transport of sucrose into sieve tubes
(B) Dead, hollow tubes with lignified walls
(C) Chloroplasts that carry out photosynthesis for the sieve tube
(D) Lignified walls that withstand tension from transpiration pull

Transport in mammals

Q22. During the cardiac cycle, the atrioventricular valves close when what happens?

(A) The atria contract and fill the ventricles
(B) Blood flows from the veins into the atria
(C) The semilunar valves open
(D) Ventricular pressure exceeds atrial pressure as the ventricles contract

Q23. Fetal haemoglobin has a higher affinity for oxygen than adult haemoglobin. Why is this advantageous?

(A) It allows oxygen to be transferred from maternal blood to fetal blood across the placenta
(B) It allows the fetus to release oxygen more easily in its tissues
(C) It prevents the mother from losing oxygen to the fetus
(D) It increases the oxygen-carrying capacity of maternal blood

Q24. Myoglobin in muscle has a very high affinity for oxygen and a dissociation curve shifted far to the left. What does this imply?

(A) Myoglobin releases oxygen readily at normal tissue oxygen levels
(B) Myoglobin stores oxygen and releases it only when tissue oxygen levels fall very low
(C) Myoglobin transports oxygen in the blood plasma
(D) Myoglobin replaces haemoglobin in red blood cells

Gas exchange

Q25. In leaves, gas exchange for photosynthesis occurs mainly through which structures, and what controls their opening?

(A) Stomata, whose guard cells change turgidity in response to light, carbon dioxide and water availability
(B) Lenticels, which open and close with temperature
(C) Root hairs, which absorb gases from soil
(D) Xylem vessels, which carry gases upward

Q26. Insects can close their spiracles. What is the advantage of this control?

(A) It increases oxygen uptake during flight
(B) It reduces water loss while still allowing periodic gas exchange
(C) It allows insects to breathe underwater
(D) It prevents carbon dioxide from leaving the body

Q27. Which feature of fish gill lamellae increases gas exchange efficiency?

(A) Thick walls that protect against water damage
(B) A small surface area to reduce water flow
(C) A large surface area, thin walls and a rich blood supply
(D) A countercurrent flow of blood in the same direction as water

Infectious diseases

Q28. Cholera toxin causes severe diarrhoea by acting on intestinal cells in which way?

(A) It destroys red blood cells in the gut wall
(B) It causes chloride ions and water to be secreted into the gut lumen
(C) It blocks all absorption of glucose in the small intestine
(D) It prevents the liver from producing bile

Q29. Which factor most increases the spread of infectious disease in a population?

(A) Widespread vaccination coverage
(B) Clean water supplies and effective sewage treatment
(C) Overcrowding, poor sanitation and limited access to healthcare
(D) Quarantine of symptomatic individuals

Q30. A virus differs from a bacterium in that a virus does what?

(A) Has its own ribosomes and mitochondria
(B) Reproduces independently outside a host cell
(C) Carries out aerobic respiration in its cytoplasm
(D) Must infect a host cell and use its machinery to replicate

Immunity

Q31. Helper T cells coordinate the immune response by doing what?

(A) Directly producing antibodies against pathogens
(B) Engulfing pathogens by phagocytosis
(C) Releasing cytokines that activate B cells, killer T cells and phagocytes
(D) Forming the physical barrier of the skin

Q32. Killer T cells destroy infected body cells by recognising what on their surface?

(A) Antibodies bound to the cell membrane
(B) Complement proteins in the blood plasma
(C) Hormones secreted by the infected cell
(D) Foreign antigens presented on the cell surface

Q33. Herd immunity protects unvaccinated individuals in a population because of what effect?

(A) High vaccination coverage reduces transmission, so the pathogen rarely reaches susceptible people
(B) Vaccinated people produce antibodies that pass to unvaccinated neighbours
(C) The pathogen becomes less virulent in vaccinated populations
(D) Unvaccinated people develop memory cells by contact with vaccinated people

Energy and respiration

Q34. Chemiosmosis in mitochondria depends on which gradient and structure?

(A) A glucose gradient across the outer membrane and ATP synthase in the matrix
(B) A sodium gradient across the cell surface membrane and carrier proteins
(C) An oxygen gradient across the cristae and ribosomes
(D) A proton gradient across the inner mitochondrial membrane and ATP synthase channels

Q35. Which feature adapts mitochondria for their function in active cells?

(A) A large inner membrane surface area, many ATP synthase molecules and enzymes for the Krebs cycle
(B) A single membrane with no internal compartments
(C) Chlorophyll pigments for capturing light energy
(D) Ribosomes that synthesise all mitochondrial proteins independently

Q36. Anaerobic respiration in plants (for example, in waterlogged roots) produces ethanol. Why is this harmful if it continues?

(A) It yields no ATP at all
(B) It produces toxic ethanol and yields far less ATP than aerobic respiration, so energy supply is limited
(C) It consumes all available carbon dioxide
(D) It prevents glycolysis from occurring

Photosynthesis

Q37. In the light-dependent stage, excited electrons from photosystem II are replaced by electrons from what source?

(A) Photolysis of water
(B) Reduction of NADP
(C) The Calvin cycle
(D) Chlorophyll b alone

Q38. Triose phosphate produced in the Calvin cycle has which two main fates?

(A) It is always converted directly to starch in the chloroplast
(B) It is used to regenerate ribulose bisphosphate or exported to make glucose, sucrose, amino acids and lipids
(C) It is oxidised immediately in respiration with no other use
(D) It is stored as chlorophyll in the thylakoids

Q39. A student separates leaf pigments by chromatography. Which pigment would travel furthest if it is most soluble in the solvent and least attracted to the paper?

(A) The pigment with the lowest Rf value
(B) The pigment that remains at the origin
(C) The pigment with the highest Rf value
(D) The pigment that is insoluble in the solvent

Homeostasis

Q40. When blood water potential falls, osmoreceptors in the hypothalamus trigger which response?

(A) Reduced ADH release and more dilute urine
(B) Increased ADH release, more water reabsorbed in the collecting duct, and more concentrated urine
(C) Increased insulin release from the pancreas
(D) Vasodilation of skin arterioles

Q41. The loop of Henle creates a solute gradient in the kidney medulla mainly by which mechanism?

(A) Active pumping of water out of the descending limb
(B) Reabsorption of glucose in the ascending limb
(C) Active transport of sodium and chloride ions out of the ascending limb, which is impermeable to water
(D) Secretion of urea into the glomerular filtrate

Q42. Glucagon raises blood glucose by acting on the liver to promote which processes?

(A) Glycogenesis and lipogenesis only
(B) Uptake of glucose by muscle cells
(C) Conversion of glucose to fat in adipose tissue
(D) Glycogenolysis and gluconeogenesis

Q43. In cold conditions, shivering helps maintain body temperature because it does what?

(A) Generates heat by rapid involuntary muscle contractions, increasing respiration rate
(B) Reduces blood flow to the skin
(C) Increases sweat evaporation from the skin
(D) Causes hairs to stand erect, trapping air

Control and coordination

Q44. Auxin promotes phototropism in a shoot by doing what?

(A) Inhibiting cell elongation on the shaded side
(B) Causing equal growth on both sides of the shoot
(C) Accumulating on the shaded side and promoting faster cell elongation there, bending the shoot toward light
(D) Destroying cells on the illuminated side

Q45. At the neuromuscular junction, acetylcholine is released from the motor neurone and binds to receptors on the muscle fibre. What follows if threshold is reached?

(A) The muscle fibre becomes permanently contracted
(B) Calcium ions are pumped out of the sarcoplasm immediately
(C) The motor neurone stops releasing neurotransmitter forever
(D) An action potential spreads over the muscle membrane and triggers contraction

Q46. The pupil constricts in bright light as part of a reflex. Which effector is involved?

(A) Circular muscles of the iris contracting
(B) Radial muscles of the iris contracting
(C) Ciliary muscles relaxing
(D) Suspensory ligaments tightening

Q47. Hormonal coordination differs from nervous coordination in that hormonal responses are generally what?

(A) Faster and more localised
(B) Transmitted electrically along neurones
(C) Limited to a single target cell
(D) Slower, longer-lasting and more widespread, travelling in the blood

Inheritance

Q48. If two genes are linked, a dihybrid test cross is expected to produce which pattern?

(A) Equal numbers of all four phenotypes, as with independent assortment
(B) Only the two parental phenotypes, with no recombinants at all
(C) Only recombinant phenotypes
(D) Mostly parental phenotypes, with fewer recombinant phenotypes from crossing over

Q49. Epistasis occurs when one gene does what to another gene?

(A) Masks or modifies the expression of a different gene
(B) Is located on the same chromosome as another gene
(C) Codes for the same protein as another gene
(D) Is inherited only on the X chromosome

Q50. A chi-squared test is used in genetics to assess what?

(A) The exact genotype of every offspring
(B) Whether observed offspring ratios differ significantly from expected ratios, or are consistent with chance variation
(C) The mutation rate in a population
(D) The age of a fossil lineage

Q51. Polygenic inheritance, such as human height, is characterised by what?

(A) Two discrete phenotypes controlled by one gene
(B) Continuous variation controlled by many genes plus environmental influences
(C) Inheritance only through the maternal line
(D) A fixed 3:1 ratio in every cross

Selection and evolution

Q52. Disruptive selection favours which phenotypes?

(A) Both extremes over the intermediate phenotype
(B) Only the intermediate phenotype
(C) Only one extreme phenotype
(D) All phenotypes equally

Q53. Antibiotic resistance in bacteria is an example of evolution in action because it shows what?

(A) Antibiotics create resistant mutations on demand
(B) Selection increases the frequency of resistant alleles already present in the population
(C) All bacteria become resistant after one exposure
(D) Resistance is inherited through learned behaviour

Q54. Fossil evidence supports evolution because fossils show what?

(A) That all species alive today existed unchanged in the earliest rocks
(B) That species appear suddenly with no predecessors
(C) A sequence of forms over geological time, with transitional features linking groups
(D) That extinction has never occurred

Classification, biodiversity and conservation

Q55. A newly discovered single-celled organism has no nucleus, a cell wall without peptidoglycan, and lives in a hot acidic spring. In which domain is it most likely classified?

(A) Eukarya
(B) Archaea
(C) Plantae and Animalia
(D) Fungi and Protista

Q56. A binomial name, such as Homo sapiens, is written with which convention?

(A) Both words capitalised and underlined separately
(B) Common name first, then genus
(C) Genus capitalised and species lower case, both italicised or underlined
(D) Species capitalised and genus lower case

Q57. CITES is an international agreement that aims to protect biodiversity by doing what?

(A) Banning all scientific research on endangered species
(B) Funding zoos in every country
(C) Requiring all habitats to become national parks
(D) Regulating international trade in endangered plants and animals

Genetic technology

Q58. Which sequence correctly lists the main steps in producing recombinant human insulin in bacteria?

(A) Insert gene into plasmid, transform bacteria, culture bacteria, extract insulin
(B) Culture bacteria, extract insulin, insert gene, transform bacteria
(C) Cut human DNA and plasmid with the same restriction enzyme, join them with ligase, transform bacteria, culture and harvest product
(D) Transform bacteria, cut plasmid, join gene, extract insulin without culturing

Q59. Gene therapy for a genetic disorder aims to do what?

(A) Remove all genes from the affected tissue
(B) Change the DNA of every cell in the body permanently in all treatments
(C) Prevent the disorder from being inherited by altering gametes in somatic therapy
(D) Replace a faulty gene with a working copy in affected cells, or add a functional gene

Q60. PCR is useful in forensic science because it can do what?

(A) Amplify tiny amounts of DNA from a sample to produce enough material for profiling
(B) Sequence an entire genome in a single step without primers
(C) Repair damaged DNA in a crime scene sample
(D) Identify a suspect from fingerprints alone

Answer Key

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

Q9: A	Q19: C	Q29: C	Q39: C	Q49: A	Q59: D
Q10: D	Q20: D	Q30: D	Q40: B	Q50: B	Q60: A

Worked explanations for all 60 questions: quaidianpoint.com/alevel-biology-practice-test-18/