A-Level Biology Practice Test 8

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 present in plant cells but absent from most animal cells?

(A) Mitochondrion
(B) Chloroplast
(C) Golgi body
(D) Nucleus

Q2. Which structure allows direct cytoplasmic continuity between adjacent plant cells?

(A) Tight junction
(B) Desmosome
(C) Gap junction in animals only
(D) Plasmodesma

Q3. The rough endoplasmic reticulum is studded with ribosomes. What does this suggest about its function?

(A) It synthesises and transports proteins
(B) It synthesises lipids for membranes
(C) It breaks down hydrogen peroxide
(D) It produces ATP

Biological molecules

Q4. Which monosaccharides combine to form lactose?

(A) Glucose and fructose
(B) Two glucose molecules
(C) Glucose and galactose
(D) Glucose and ribose

Q5. Why is cellulose suitable as a structural material in plant walls?

(A) It is highly branched and soluble
(B) Its beta-glucose chains form strong hydrogen-bonded microfibrils
(C) It is easily hydrolysed by plant enzymes
(D) Its chains coil into compact granules

Q6. Which type of lipid forms the bulk of cell membranes?

(A) Triglyceride
(B) Cholesterol alone
(C) Wax alone
(D) Phospholipid

Enzymes

Q7. What does Km represent in Michaelis-Menten kinetics?

(A) The substrate concentration giving half of Vmax
(B) The maximum rate of reaction
(C) The enzyme concentration at saturation
(D) The pH optimum of the enzyme

Q8. How does a competitive inhibitor affect Km and Vmax?

(A) Km decreases, Vmax decreases
(B) Km unchanged, Vmax increases
(C) Km increases, Vmax unchanged
(D) Both Km and Vmax increase

Q9. An enzyme catalyses the breakdown of maltose but not sucrose, although both are disaccharides. Which property best explains this observation?

(A) One enzyme catalyses all reactions in a metabolic pathway
(B) The active site is complementary in shape and chemistry only to maltose
(C) Any disaccharide can fit into any enzyme active site
(D) Specificity is lost whenever temperature falls slightly

Q10. In a metabolic pathway, the end product inhibits the first enzyme. What is this called?

(A) Competitive activation
(B) Denaturation
(C) Substrate saturation
(D) End-product inhibition, a form of negative feedback

Cell membranes and transport

Q11. Which protein type spans the membrane and provides a hydrophilic channel?

(A) Intrinsic protein forming a channel
(B) Peripheral protein on the surface only
(C) Glycolipid
(D) Cholesterol molecule

Q12. A cell is placed in a solution with a higher water potential than the cell. What is the net movement of water?

(A) Out of the cell
(B) No net movement
(C) Into the cell
(D) Into the cell by active transport only

Q13. Which transport process requires ATP and a carrier protein, but moves only one type of solute?

(A) Facilitated diffusion
(B) Active transport by a pump
(C) Simple diffusion
(D) Osmosis

Q14. Why do carrier proteins show saturation kinetics?

(A) They are denatured at high solute concentration
(B) They only work in one direction
(C) They require light energy
(D) All binding sites become occupied at high concentration

The mitotic cell cycle

Q15. What happens during prophase of mitosis?

(A) Chromosomes condense and the spindle forms
(B) Chromatids separate to opposite poles
(C) The nuclear envelope reforms
(D) DNA replicates

Q16. Which cells in a plant divide by mitosis to increase length?

(A) Xylem vessel elements only
(B) Guard cells only
(C) Meristem cells at root and shoot tips
(D) Sieve tube elements

Q17. A cell has 2n equals 6. How many chromosomes will each daughter cell have after mitosis?

(A) 3
(B) 6
(C) 12
(D) 9

Q18. In plant cells, cytokinesis differs from animal cells because a cell plate forms across the equator. Why is a cell plate needed in plant cells?

(A) The nucleus divides differently in plant cells
(B) DNA is not replicated before plant cell division
(C) Chromosomes do not condense in plant cells
(D) The rigid cell wall cannot be pinched inward, so vesicles fuse to build a new wall across the cell

Nucleic acids and protein synthesis

Q19. Which molecule is produced by transcription?

(A) A single-stranded mRNA copy of a gene
(B) A new DNA double helix
(C) A polypeptide chain
(D) A tRNA anticodon only

Q20. Where does translation occur in a eukaryotic cell?

(A) In the nucleus
(B) In the Golgi body only
(C) At ribosomes in the cytoplasm or on rough endoplasmic reticulum
(D) In the lysosome

Q21. In eukaryotes, what happens to pre-mRNA before it leaves the nucleus?

(A) It is translated immediately
(B) Introns are removed and exons are spliced together
(C) It is copied back into DNA
(D) Its bases are all changed to thymine

Transport in plants

Q22. Which process explains how water moves from root hairs into the xylem?

(A) Active transport of water itself
(B) Mass flow in phloem
(C) Diffusion of sucrose only
(D) Osmosis along a water potential gradient through the cortex

Q23. At a sink, sucrose is removed from phloem. What follows?

(A) Water potential in phloem rises, water leaves by osmosis, and pressure falls
(B) Water potential falls and water enters, raising pressure further
(C) Xylem pressure increases directly
(D) Sucrose diffuses back to the source

Q24. Which environmental factor would most increase transpiration rate?

(A) High humidity and still air
(B) Low temperature and darkness
(C) Low humidity and wind
(D) High humidity and low temperature

Transport in mammals

Q25. Which chamber of the heart has the thickest muscle wall, and why?

(A) Right atrium, to pump to the lungs
(B) Left ventricle, to pump blood around the whole body
(C) Right ventricle, to pump to the brain
(D) Left atrium, to pump to the ventricle

Q26. Why does tissue fluid contain glucose and amino acids but almost no plasma proteins or red blood cells?

(A) Because lymph nodes filter proteins and cells out of tissue fluid
(B) Because capillaries actively pump all proteins back into the blood
(C) Because red blood cells dissolve as they pass through capillaries
(D) Because gaps in the capillary endothelium allow small molecules through but retain large proteins and cells

Q27. Which feature of capillaries suits exchange?

(A) Walls one cell thick, narrow lumen and slow flow
(B) Thick walls and fast flow
(C) Valves and thick muscle
(D) No endothelial lining

Gas exchange

Q28. In a fish gill, what is the function of gill filaments and lamellae?

(A) They pump water actively
(B) They filter food particles
(C) They greatly increase surface area for diffusion
(D) They store oxygen

Q29. Which mechanism ventilates the mammalian lung during inspiration?

(A) Diaphragm relaxes and ribs move down
(B) Diaphragm contracts and external intercostal muscles raise the ribs
(C) Abdominal muscles force air out
(D) Alveoli actively pump air in

Q30. Why is the trachea supported by C-shaped cartilage rings?

(A) To allow gas exchange through its wall
(B) To secrete mucus
(C) To contract during breathing
(D) To keep the airway open while allowing the oesophagus to expand behind it

Infectious diseases

Q31. Which disease is caused by a virus and spread by the bite of an infected mosquito?

(A) Dengue fever
(B) Cholera
(C) Tuberculosis
(D) Malaria

Q32. How does the cholera toxin cause diarrhoea?

(A) It destroys red blood cells
(B) It blocks nerve impulses to the gut
(C) It causes intestinal cells to secrete chloride ions and water into the gut lumen
(D) It prevents absorption of fats only

Q33. Why is drug resistance a growing problem in tuberculosis treatment?

(A) The bacterium is a virus
(B) Patients often stop treatment early, selecting resistant bacteria
(C) Antibiotics cannot reach the lungs
(D) Vaccines cause resistance

Immunity

Q34. Which cells present antigens to helper T cells?

(A) Plasma cells
(B) Red blood cells
(C) Platelets
(D) Phagocytes such as macrophages

Q35. What is the role of helper T cells in the immune response?

(A) They stimulate B cells and cytotoxic T cells
(B) They directly produce antibodies
(C) They phagocytose bacteria directly
(D) They block all inflammation

Q36. A child receives a vaccine containing a weakened virus. Two weeks later, a blood test shows antibodies specific to that virus but no virus in the blood. What does this result show?

(A) The child received ready-made antibodies for long-term protection
(B) Existing memory cells were destroyed by the vaccine
(C) A primary immune response occurred and memory cells formed, without the child developing the disease
(D) The vaccine works only against bacteria

Energy and respiration

Q37. Which stage of aerobic respiration produces the most ATP per glucose molecule?

(A) Glycolysis
(B) The Krebs cycle and oxidative phosphorylation together
(C) The link reaction alone
(D) Anaerobic fermentation

Q38. What happens to pyruvate in anaerobic respiration in mammalian muscle?

(A) It is converted to ethanol
(B) It enters the Krebs cycle only
(C) It is oxidised to water directly
(D) It is reduced to lactate, regenerating NAD

Q39. Chemiosmosis in mitochondria depends on which gradient?

(A) A proton gradient across the inner membrane
(B) A sodium gradient across the outer membrane
(C) A glucose gradient across the cristae
(D) An oxygen gradient in the matrix

Photosynthesis

Q40. Which pigment absorbs light most strongly in the blue and red regions?

(A) Carotene only
(B) Xanthophyll only
(C) Chlorophyll a and b
(D) Anthocyanin in leaves

Q41. In cyclic photophosphorylation, what is produced?

(A) ATP and reduced NADP, with oxygen
(B) ATP only, with no reduced NADP or oxygen
(C) Glucose directly
(D) Water only

Q42. Why is triose phosphate an important product of the Calvin cycle?

(A) It is a waste product excreted from the leaf
(B) It directly splits water
(C) It stores light energy as ATP
(D) It is used to regenerate ribulose bisphosphate and to make glucose, amino acids and lipids

Homeostasis

Q43. Which structure in the kidney creates the water potential gradient in the medulla?

(A) The loop of Henle with its hairpin countercurrent system
(B) The glomerulus alone
(C) The Bowman's capsule
(D) The ureter

Q44. In diabetes mellitus, why does glucose appear in urine?

(A) The glomerulus is blocked completely
(B) ADH secretion stops
(C) Blood glucose exceeds the reabsorption capacity of the proximal tubule
(D) The collecting duct becomes impermeable to glucose

Q45. Which is an example of negative feedback in thermoregulation?

(A) A rise in temperature triggers shivering
(B) A rise in core temperature triggers sweating, which cools the body back toward normal
(C) A fall in temperature triggers vasodilation
(D) Sweating increases temperature further

Control and coordination

Q46. How does myelination increase conduction speed?

(A) It allows continuous depolarisation along the whole axon
(B) It increases axon diameter to zero
(C) It blocks all ion movement
(D) It restricts depolarisation to nodes of Ranvier, so impulses jump between nodes

Q47. Which plant response is controlled by auxin redistribution in roots?

(A) Positive gravitropism, with growth inhibited on the lower side
(B) Positive phototropism only
(C) Negative gravitropism in shoots only
(D) Flowering in short days

Q48. At a neuromuscular junction, what removes acetylcholine from the synaptic cleft?

(A) It diffuses into the muscle fibre nucleus
(B) It is stored in the postsynaptic membrane
(C) Acetylcholinesterase breaks it down
(D) Calcium ions destroy it

Inheritance

Q49. What is the expected genotypic ratio from a cross between two heterozygotes for one gene?

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

Q50. If allele frequencies are p equals 0.6 and q equals 0.4, what is the expected frequency of homozygous recessive individuals?

(A) 0.36
(B) 0.48
(C) 0.60
(D) 0.16

Q51. Which cross would reveal whether a dihybrid organism is heterozygous at both loci?

(A) A test cross with a homozygous recessive organism
(B) A cross with a homozygous dominant organism
(C) Self-fertilisation only
(D) A cross with an unrelated species

Selection and evolution

Q52. Which process can cause speciation without geographical separation?

(A) Allopatric speciation
(B) Artificial selection only
(C) Sympatric speciation, for example by polyploidy in plants
(D) Genetic drift in a large population only

Q53. Directional selection on beak size in finches during drought is an example of what?

(A) Selection favouring intermediates
(B) Selection favouring one extreme phenotype as conditions change
(C) Selection favouring both extremes
(D) No selection acting

Q54. Why does a small founder population often have reduced genetic diversity?

(A) Mutation stops in small populations
(B) Natural selection stops acting
(C) It always has more alleles
(D) It carries only a sample of the original gene pool

Classification, biodiversity and conservation

Q55. Which taxonomic group includes all organisms descended from a common ancestor?

(A) A monophyletic group or clade
(B) A polyphyletic group
(C) A kingdom only
(D) A genus with unrelated species

Q56. What does species richness measure, on its own?

(A) The evenness of species abundance
(B) The genetic diversity within one species
(C) The number of different species in an area
(D) The total biomass

Q57. Which is an ex situ conservation method?

(A) A national park protecting habitat
(B) A seed bank storing seeds away from their habitat
(C) A marine reserve
(D) A protected forest corridor

Genetic technology

Q58. What is the function of primers in PCR?

(A) To cut DNA into fragments
(B) To separate DNA by size
(C) To insert DNA into a vector
(D) To provide a starting point for Taq polymerase on each strand

Q59. A scientist wants to insert a human insulin gene into bacteria. Which component is first joined to the gene to form recombinant DNA before it enters the host cell?

(A) A plasmid, acting as a vector
(B) A restriction enzyme, acting alone
(C) A primer sequence only
(D) A gel used for electrophoresis

Q60. Which is a potential benefit of genetically modified crops?

(A) Guaranteed elimination of all weeds
(B) No need for any farming inputs
(C) Increased yield or resistance to pests and herbicides
(D) Complete immunity to drought in all climates

Answer Key

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

Q10: D	Q20: C	Q30: D	Q40: C	Q50: D	Q60: C

Worked explanations for all 60 questions: quaidianpoint.com/alevel-biology-practice-test-8/