A-Level Biology Practice Test 7

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. A student wants to view the internal structure of a mitochondrion, including its cristae. Why is a transmission electron microscope more suitable than a light microscope for this task?

(A) Electrons are larger than photons
(B) Electron microscopes use living specimens only
(C) Electron microscopes magnify colour better
(D) Electrons have a shorter wavelength than visible light, giving higher resolution

Q2. In cell fractionation, which organelle pellets first at the lowest centrifugation speed?

(A) Ribosomes
(B) Lysosomes
(C) Nuclei
(D) Mitochondria

Q3. Which cytoskeletal component is involved in the movement of chromosomes during mitosis?

(A) Intermediate filaments of the nuclear lamina only
(B) Microtubules of the spindle
(C) Cellulose microfibrils
(D) Plasmodesmata

Q4. A student calculates magnification as image size divided by actual size. The image is 40 mm and the actual size is 0.02 mm. What is the magnification?

(A) 2000
(B) 200
(C) 800
(D) 20000

Biological molecules

Q5. Which property of water is most important for its role as a solvent in cells?

(A) Its low specific heat capacity
(B) Its low density as ice
(C) Its inability to dissolve ions
(D) Its polarity, allowing hydrogen bonds with solutes

Q6. Which level of protein structure is formed by hydrogen bonding between amino acids in the chain?

(A) Primary structure
(B) Quaternary structure only
(C) Secondary structure
(D) Primary and quaternary together

Q7. A triglyceride is formed from glycerol and three fatty acids. How many water molecules are released?

(A) One
(B) Three
(C) Two
(D) Four

Q8. A food sample gives a purple colour in the biuret test and remains blue after heating with Benedict's reagent. What does this combination indicate?

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

Enzymes

Q9. A competitive inhibitor is added to an enzyme reaction. What happens if substrate concentration is greatly increased?

(A) Inhibition cannot be overcome
(B) Vmax falls permanently
(C) The enzyme is denatured
(D) The effect of the inhibitor is reduced because substrate outcompetes it

Q10. Which factor would denature an enzyme rather than simply slow it?

(A) A small fall in substrate concentration
(B) A small fall in temperature
(C) Extreme pH that disrupts bonds holding the tertiary structure
(D) A competitive inhibitor binding briefly

Q11. In an immobilised enzyme reactor, what is a major advantage over using free enzyme?

(A) The enzyme is used once and discarded easily
(B) The enzyme can be reused and the product is not contaminated with enzyme
(C) The enzyme works only at one temperature
(D) The substrate cannot reach the enzyme

Cell membranes and transport

Q12. Which molecules can pass directly through the phospholipid bilayer by simple diffusion?

(A) Small non-polar molecules such as oxygen
(B) Large polar proteins
(C) Ions such as sodium
(D) Glucose without a carrier

Q13. Co-transport of glucose in the ileum depends on which gradient?

(A) A glucose gradient created by diffusion alone
(B) A water potential gradient in the blood
(C) A potassium gradient in the lumen
(D) A sodium ion gradient created by active transport

Q14. A white blood cell engulfs a bacterium by extending its membrane around it until the bacterium is enclosed in a vesicle. Which process is this an example of?

(A) Exocytosis, the release of substances by vesicle fusion
(B) Diffusion of water across a membrane
(C) Phagocytosis, a form of endocytosis
(D) Active pumping of single ions

The mitotic cell cycle

Q15. Bone marrow stem cells are used to treat a patient whose blood cells are failing. Which property of stem cells makes this treatment possible?

(A) They are already specialised blood cells that cannot divide further
(B) They are unspecialised and can divide by mitosis to produce specialised blood cells
(C) They have no DNA of their own
(D) They can divide only once in a lifetime

Q16. Why is uncontrolled mitosis dangerous?

(A) It can form a tumour of genetically identical cells
(B) It always produces haploid cells
(C) It prevents DNA replication
(D) It stops all cell division elsewhere

Q17. During metaphase, where are chromosomes positioned?

(A) Randomly throughout the cytoplasm
(B) At opposite poles
(C) Inside the reforming nucleus only
(D) On the equator, attached to spindle fibres

Nucleic acids and protein synthesis

Q18. Which enzyme unwinds DNA and which joins Okazaki fragments during replication?

(A) DNA polymerase unwinds; helicase joins
(B) Ligase unwinds; polymerase joins
(C) Helicase unwinds; DNA ligase joins
(D) RNA polymerase unwinds; ligase copies

Q19. A tRNA molecule with anticodon UAC arrives at a ribosome during translation. Which statement correctly describes the mRNA codon it pairs with?

(A) A sequence of three bases on tRNA
(B) AUG on mRNA, a sequence of three bases coding for one amino acid, methionine
(C) A gene that codes for a ribosome
(D) A stop signal in DNA only

Q20. A mutation changes one base in a codon, but the amino acid stays the same. What is the most likely explanation?

(A) The code is degenerate
(B) The mutation occurred in an intron
(C) The gene was deleted
(D) Transcription stopped

Transport in plants

Q21. Which cells load sucrose into phloem at a source?

(A) Guard cells
(B) Xylem parenchyma only
(C) Epidermal cells
(D) Companion cells, using ATP

Q22. How can a potometer be used to compare transpiration rates?

(A) By counting stomata directly
(B) By measuring root pressure only
(C) By measuring bubble movement as water is taken up to replace water lost
(D) By weighing dry mass after a week

Q23. Why do xylem vessels have lignified walls?

(A) To allow active transport of sucrose
(B) To withstand tension and prevent collapse, and to waterproof the vessel
(C) To photosynthesise
(D) To store starch

Transport in mammals

Q24. What is the Bohr effect?

(A) Oxygen is released more readily where carbon dioxide concentration is high
(B) Oxygen binds more tightly where carbon dioxide is high
(C) Haemoglobin carries more oxygen at low pH in the lungs
(D) Carbon dioxide is carried only as carbamino compounds

Q25. Which sequence correctly describes the cardiac cycle after atrial systole?

(A) Ventricular diastole, then atrial systole again immediately
(B) Atrial diastole with closed semilunar valves only
(C) Ventricular systole with open atrioventricular valves
(D) Ventricular systole, then ventricular diastole

Q26. How is most carbon dioxide transported in blood?

(A) Dissolved directly in plasma only
(B) Bound to haemoglobin as oxyhaemoglobin
(C) As hydrogencarbonate ions in plasma
(D) As carbonic acid in red cells only

Gas exchange

Q27. Which feature is an adaptation of insect tracheoles for gas exchange?

(A) They have thick, impermeable walls
(B) They have thin walls and are in close contact with muscle cells
(C) They carry blood to tissues
(D) They open only during flight

Q28. In the mammalian lung, what maintains a steep diffusion gradient for oxygen?

(A) Ventilation replacing air and blood flow removing oxygenated blood
(B) Slow blood flow and thick alveolar walls
(C) Mucus trapping oxygen
(D) Surfactant blocking diffusion

Q29. Why do large, active mammals need a specialised gas exchange surface?

(A) Their surface area to volume ratio is too large
(B) They cannot diffuse gases at all
(C) Their skin is too thin
(D) Diffusion across the body surface alone would be too slow for their metabolic demand

Infectious diseases

Q30. Which statement about the life cycle of Plasmodium is correct?

(A) It reproduces only in the mosquito gut
(B) It is a bacterium spread by water
(C) It infects liver cells and then red blood cells in humans
(D) It infects only mosquitoes

Q31. Why is it difficult to develop a vaccine against HIV?

(A) HIV is a bacterium with a thick wall
(B) HIV has a very high mutation rate and attacks immune cells
(C) HIV cannot be grown in a laboratory
(D) HIV does not trigger any immune response

Q32. Which control measure most directly reduces cholera transmission in a community?

(A) Providing clean drinking water and sanitation
(B) Vaccinating against the toxin only
(C) Using insecticide-treated nets
(D) Quarantining all healthy people

Immunity

Q33. What is the difference between active and passive immunity?

(A) Active immunity is always short-lived
(B) Passive immunity creates memory cells
(C) Active immunity requires antibiotics
(D) Active immunity involves making your own antibodies; passive immunity involves receiving ready-made antibodies

Q34. Which antibody function helps phagocytes recognise a pathogen?

(A) Neutralisation only
(B) Agglutination of red cells only
(C) Opsonisation, marking the pathogen for phagocytosis
(D) Direct lysis by antibodies alone

Q35. Why does a second exposure to the same antigen produce more antibodies faster?

(A) Phagocytes are larger
(B) Memory B cells divide rapidly into plasma cells
(C) Antigens are smaller the second time
(D) T cells block antibody production

Energy and respiration

Q36. Where in the cell does glycolysis occur?

(A) In the cytoplasm
(B) In the mitochondrial matrix
(C) On the inner mitochondrial membrane
(D) In the chloroplast stroma

Q37. In anaerobic respiration in yeast, what are the products?

(A) Lactate and ATP only
(B) Water and carbon dioxide only
(C) Pyruvate and oxygen
(D) Ethanol, carbon dioxide and ATP

Q38. A muscle cell during intense exercise produces lactate. Why does NAD need to be regenerated from reduced NAD in this process?

(A) It acts as the final electron acceptor forming water
(B) It phosphorylates ADP directly
(C) Reduced NAD must be oxidised so that glycolysis can continue producing ATP
(D) It splits water in the chloroplast

Photosynthesis

Q39. Which stage of photosynthesis involves photolysis of water?

(A) The Calvin cycle
(B) The light-dependent reactions on thylakoid membranes
(C) Starch synthesis in the stroma
(D) Carbon fixation in the dark

Q40. How many carbon dioxide molecules must enter the Calvin cycle to produce one molecule of glucose?

(A) Six
(B) One
(C) Three
(D) Twelve

Q41. A plant is kept at low temperature. Why does photosynthesis slow even in bright light?

(A) Light-dependent reactions stop completely
(B) Chlorophyll is destroyed by cold
(C) Stomata open wider
(D) Enzymes of the Calvin cycle work more slowly

Homeostasis

Q42. Which part of the nephron is the main site of selective reabsorption?

(A) Glomerulus
(B) Collecting duct only
(C) Proximal convoluted tubule
(D) Loop of Henle only

Q43. When blood water potential falls, what sequence restores it?

(A) Osmoreceptors detect the fall, ADH release falls, less water is reabsorbed
(B) Osmoreceptors detect the fall, ADH release rises, more water is reabsorbed
(C) ADH is released by the kidney directly
(D) Insulin release rises and water is excreted

Q44. Which response helps a mammal conserve heat in cold conditions?

(A) Vasoconstriction and shivering
(B) Vasodilation in the skin
(C) Sweating
(D) Lowering metabolic rate to zero

Control and coordination

Q45. What is the resting potential of a neurone, and how is it maintained?

(A) Positive inside, maintained by sodium-potassium pumps
(B) Zero, maintained by diffusion alone
(C) Negative outside, maintained by myelin
(D) Negative inside, maintained by sodium-potassium pumps

Q46. Why is transmission at a synapse one-way only?

(A) Vesicles exist on both sides
(B) Ions cannot cross the synaptic cleft
(C) Neurotransmitter is released only from the presynaptic membrane and receptors are only postsynaptic
(D) Myelin blocks reverse flow

Q47. Which hormone is released in a fight-or-flight response, and what is one effect?

(A) Insulin, lowering blood glucose
(B) Adrenaline, increasing heart rate and blood glucose
(C) ADH, increasing water reabsorption
(D) Thyroxine, slowing metabolism

Inheritance

Q48. A woman is heterozygous for a recessive X-linked condition. What proportion of her sons will be affected?

(A) One half
(B) None
(C) One quarter
(D) All

Q49. In a test cross, an organism with the dominant phenotype is crossed with a homozygous recessive organism. What does a 1:1 offspring ratio indicate?

(A) The parent is homozygous dominant
(B) The gene is sex-linked
(C) The gene shows codominance
(D) The parent is heterozygous

Q50. Which inheritance pattern explains AB blood group in a child of parents with groups A and B?

(A) Complete dominance
(B) Recessive inheritance
(C) Codominance
(D) Sex linkage

Selection and evolution

Q51. Which statement best defines natural selection?

(A) Organisms choose to mutate to suit the environment
(B) Individuals with advantageous alleles survive and reproduce more successfully
(C) All individuals in a population survive equally
(D) Humans select the best individuals to breed

Q52. Stabilising selection is most likely when the environment is stable. What happens to the population?

(A) Intermediate phenotypes are favoured and variation decreases
(B) Extreme phenotypes increase
(C) The mean phenotype shifts in one direction
(D) The population splits into two species immediately

Q53. Which factor increases genetic variation in a population?

(A) Inbreeding only
(B) Stabilising selection alone
(C) A population bottleneck alone
(D) Mutation and meiosis, including crossing over

Classification, biodiversity and conservation

Q54. Which kingdom includes organisms with chitin cell walls that absorb nutrients?

(A) Plantae
(B) Animalia
(C) Fungi
(D) Protoctista

Q55. Why is genetic diversity important for conservation?

(A) It guarantees larger body size
(B) It increases the chance that some individuals survive environmental change
(C) It prevents all mutations
(D) It makes species easier to classify by appearance

Q56. Why are endemic species often prioritised in conservation assessments even when their total population seems stable?

(A) Their entire range is small, so a single local disturbance can threaten all individuals
(B) They are found on every continent
(C) They migrate annually to new habitats
(D) They were introduced by humans and spread rapidly

Genetic technology

Q57. What is the first step in a PCR cycle?

(A) Annealing of primers at a low temperature
(B) Extension by Taq polymerase
(C) Gel electrophoresis
(D) Denaturation of DNA at about 95 degrees Celsius

Q58. Which enzyme seals a gene into a plasmid during genetic engineering?

(A) Restriction endonuclease
(B) Reverse transcriptase
(C) DNA ligase
(D) DNA polymerase only

Q59. Why is a marker gene included in a plasmid vector?

(A) To make the plasmid larger
(B) To identify cells that have taken up the plasmid
(C) To prevent bacterial growth
(D) To cut the plasmid open

Q60. Which application uses DNA profiling?

(A) Identifying individuals from variable DNA regions
(B) Producing insulin in bacteria only
(C) Fixing nitrogen in plants
(D) Cloning whole animals only

Answer Key

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

Worked explanations for all 60 questions: quaidianpoint.com/alevel-biology-practice-test-7/