A-Level Biology Practice Test 4

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 feature distinguishes eukaryotic from prokaryotic cells?

(A) Circular DNA
(B) Membrane-bound organelles
(C) A cell wall
(D) Ribosomes

Q2. What is the function of rough endoplasmic reticulum?

(A) It synthesises lipids
(B) It produces ATP
(C) It stores water
(D) It synthesises and transports proteins

Q3. Why are mitochondria described as having a double membrane?

(A) They have inner and outer membranes from their evolutionary origin
(B) They have a cell wall
(C) They are surrounded by chloroplasts
(D) They lack membranes

Biological molecules

Q4. Which disaccharide is formed from glucose and fructose?

(A) Maltose
(B) Lactose
(C) Sucrose
(D) Cellulose

Q5. What is the difference between alpha and beta glucose?

(A) The number of carbon atoms
(B) The presence of nitrogen
(C) The position of the hydroxyl group on carbon 1
(D) The molecular mass

Q6. Which lipid is a major component of cell membranes?

(A) Phospholipid
(B) Triglyceride only
(C) Steroid only
(D) Wax only

Enzymes

Q7. What is an enzyme-substrate complex?

(A) A permanent product
(B) An inhibitor bound forever
(C) A denatured enzyme
(D) A temporary association during catalysis

Q8. Which graph shows enzyme activity against pH?

(A) A straight line increasing forever
(B) A bell-shaped curve with an optimum
(C) A plateau at all pH values
(D) A curve decreasing to zero only

Q9. Why are enzymes specific?

(A) They are large molecules
(B) They work at all temperatures
(C) They are made of lipids
(D) Their active site shape matches only certain substrates

Cell membranes and transport

Q10. A plant cell is placed in a concentrated sucrose solution. Water leaves the cell and the protoplast shrinks away from the wall. Which process is occurring across the cell surface membrane?

(A) Movement of solutes against a gradient
(B) Movement of water using ATP
(C) Osmosis, movement of water down its water potential gradient through a partially permeable membrane
(D) Diffusion of ions through channels

Q11. Which organelle is involved in exocytosis?

(A) The nucleus
(B) The Golgi apparatus
(C) The ribosome
(D) The chloroplast

Q12. What happens to a plant cell in pure water?

(A) It becomes turgid but does not burst
(B) It bursts immediately
(C) It becomes plasmolysed
(D) It loses all water

The mitotic cell cycle

Q13. What is the purpose of mitosis in growth?

(A) It produces genetically identical cells for growth and repair
(B) It produces gametes
(C) It increases genetic variation
(D) It halves chromosome number

Q14. Which phase follows metaphase in mitosis?

(A) Prophase
(B) Anaphase
(C) Telophase
(D) Interphase

Q15. What is a chromatid?

(A) A whole chromosome before replication
(B) A spindle fibre
(C) One of two identical copies of a chromosome after replication
(D) A nuclear membrane fragment

Nucleic acids and protein synthesis

Q16. What is semi-conservative replication?

(A) Both strands are completely new
(B) Both strands are completely old
(C) DNA is copied by RNA only
(D) Each new DNA molecule contains one old and one new strand

Q17. What is the role of tRNA?

(A) It copies DNA
(B) It forms the ribosome alone
(C) It splices mRNA
(D) It brings a specific amino acid to the ribosome

Q18. Which process removes introns?

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

Transport in plants

Q19. Which cells load sucrose into phloem?

(A) Xylem vessels
(B) Guard cells
(C) Companion cells using active transport
(D) Sieve tube elements alone

Q20. What is the Casparian strip?

(A) A layer in the leaf cuticle
(B) A waterproof band in the endodermis forcing water through cells
(C) A part of the phloem
(D) A root hair structure

Q21. Which route does water take through cell walls?

(A) The symplast pathway only
(B) The apoplast pathway
(C) The vacuolar pathway only
(D) The phloem pathway

Transport in mammals

Q22. What is the function of the sinoatrial node?

(A) It prevents backflow
(B) It carries oxygenated blood
(C) It initiates the heartbeat as the pacemaker
(D) It filters blood

Q23. Which vessel carries blood from the heart to the body?

(A) The aorta
(B) The pulmonary vein
(C) The vena cava
(D) The renal vein

Q24. Fluid collected from around body cells is analysed. It resembles plasma but contains very few proteins and no cells. What is this fluid?

(A) Blood inside capillaries
(B) Lymph in lymph nodes only
(C) Fluid inside red blood cells
(D) Tissue fluid, bathing cells and formed from blood plasma

Gas exchange

Q25. What is ventilation?

(A) Diffusion across alveoli
(B) Transport of oxygen in blood
(C) Movement of air in and out of the lungs
(D) Cellular respiration

Q26. Which gas diffuses fastest across the alveolar wall?

(A) Oxygen diffuses faster than carbon dioxide
(B) Nitrogen diffuses fastest
(C) Both gases diffuse equally
(D) Carbon dioxide diffuses faster than oxygen

Q27. What is the role of haemoglobin in carbon dioxide transport?

(A) It carries oxygen only
(B) It forms carbamino compounds with carbon dioxide
(C) It buffers pH only in plasma
(D) It transports glucose

Infectious diseases

Q28. Which disease is caused by a virus?

(A) Influenza
(B) Cholera
(C) Tuberculosis
(D) Malaria

Q29. What is a pathogen?

(A) An organism that causes disease
(B) A type of white blood cell
(C) An antibody
(D) A vaccine component

Q30. How does HIV weaken immunity?

(A) It increases antibody production
(B) It blocks phagocytosis only
(C) It causes red blood cells to burst
(D) It destroys helper T cells

Q31. Which antibiotic action is correct?

(A) Penicillin kills viruses
(B) Penicillin increases bacterial growth
(C) Penicillin inhibits bacterial cell wall synthesis
(D) Penicillin replaces antibodies

Immunity

Q32. A transplanted organ is rejected because the recipient's lymphocytes recognise proteins on its cells as foreign. What name is given to these foreign molecules?

(A) An antibody
(B) An antigen, a molecule that triggers an immune response
(C) A type of phagocyte
(D) A vaccine virus only

Q33. What is the primary immune response?

(A) A faster response on second exposure
(B) The first response to an antigen, slower and smaller
(C) Immunity from injected antibodies
(D) A response that never produces memory

Q34. How do antibodies help destroy pathogens?

(A) They agglutinate pathogens and mark them for phagocytosis
(B) They directly digest pathogens
(C) They produce memory cells alone
(D) They block all blood flow

Q35. What is autoimmunity?

(A) An immune response to a vaccine
(B) Lack of any immune response
(C) Immunity to all pathogens
(D) An immune response against the body's own tissues

Energy and respiration

Q36. What is the Krebs cycle?

(A) A reaction that fixes carbon dioxide
(B) A stage of photosynthesis
(C) A series of reactions that oxidises acetyl CoA and produces reduced carriers
(D) A reaction in the cytoplasm only

Q37. What is oxidative phosphorylation?

(A) ATP synthesis by direct phosphate transfer only
(B) Breakdown of glucose in the cytoplasm
(C) Photolysis of water
(D) ATP synthesis using energy from the electron transport chain

Q38. Which compound is regenerated in the Krebs cycle?

(A) Pyruvate
(B) Oxaloacetate
(C) Glucose
(D) Lactate

Q39. What happens during anaerobic respiration in yeast?

(A) Glucose is converted to ethanol and carbon dioxide
(B) Glucose is converted to lactate
(C) Glucose is fully oxidised
(D) No ATP is produced

Photosynthesis

Q40. Which factor is limiting when light intensity is high but carbon dioxide is low?

(A) Light intensity
(B) Temperature only
(C) Carbon dioxide concentration
(D) Water only

Q41. What is a photosystem?

(A) A type of chloroplast
(B) A Calvin cycle enzyme
(C) A cluster of pigments and proteins that absorbs light
(D) A stomatal structure

Q42. Which molecule is produced by cyclic photophosphorylation?

(A) Reduced NADP
(B) ATP only
(C) Oxygen
(D) Glucose

Homeostasis

Q43. What is osmoregulation?

(A) Control of blood glucose only
(B) Control of body temperature only
(C) Control of heart rate
(D) Control of water and solute balance in the body

Q44. Which part of the nephron creates a salt gradient in the medulla?

(A) The loop of Henle
(B) The glomerulus
(C) The Bowman's capsule
(D) The ureter

Q45. What triggers glucagon release?

(A) Low blood glucose concentration
(B) High blood glucose concentration
(C) High ADH levels
(D) Low body temperature

Control and coordination

Q46. What is the function of the myelin sheath?

(A) It carries impulses to muscles
(B) It produces neurotransmitters
(C) It insulates the axon and speeds conduction
(D) It receives stimuli

Q47. What happens at the end of an action potential?

(A) Sodium channels remain open permanently
(B) The neurone dies
(C) The impulse reverses direction
(D) The membrane repolarises as potassium channels open

Q48. What is thigmotropism?

(A) Growth towards light
(B) Growth in response to touch
(C) Growth towards water
(D) Growth away from gravity

Inheritance

Q49. What is a pedigree diagram used for?

(A) Measuring allele frequencies only
(B) Tracing inheritance of a trait through a family
(C) Cloning organisms
(D) Sequencing DNA

Q50. What is incomplete dominance?

(A) One allele completely masks another
(B) Both alleles are fully expressed
(C) No phenotype is expressed
(D) The heterozygote shows an intermediate phenotype

Q51. What is the expected phenotypic ratio for a dihybrid cross with complete dominance?

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

Selection and evolution

Q52. In a population of beetles, green beetles are better camouflaged on leaves than brown beetles, so green beetles leave more offspring. Over generations, green becomes more common. Which process is this?

(A) Natural selection, differential survival and reproduction due to inherited variation
(B) Random change in allele frequencies only
(C) Artificial breeding by humans
(D) Mutation alone

Q53. Which statement about antibiotic resistance is correct?

(A) Antibiotics create resistant genes directly
(B) All bacteria become resistant immediately
(C) Resistance cannot be inherited
(D) It evolves by selection of resistant bacteria

Q54. What is an example of convergent evolution?

(A) Similar traits evolving independently in unrelated species
(B) Identical species evolving together
(C) Speciation by isolation only
(D) Extinction of similar species

Classification, biodiversity and conservation

Q55. What is a phylogenetic tree?

(A) A food web diagram
(B) A diagram showing evolutionary relationships
(C) A classification of habitats
(D) A map of species distribution

Q56. Which method estimates population size by marking and recapture?

(A) Simpson’s index
(B) Chi-squared test
(C) The Lincoln index
(D) Quadrats only

Q57. What is sustainable management?

(A) Using resources at a rate that allows replenishment
(B) Using all resources immediately
(C) Protecting one species only
(D) Preventing all human use

Genetic technology

Q58. What is the purpose of gel electrophoresis in DNA profiling?

(A) To amplify DNA
(B) To cut DNA
(C) To separate DNA fragments by size
(D) To join DNA fragments

Q59. Which enzyme seals DNA fragments in genetic engineering?

(A) Restriction enzyme
(B) DNA ligase
(C) DNA polymerase
(D) RNA polymerase

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

(A) Reduced genetic diversity always
(B) No need for water
(C) Guaranteed higher nutrition in every case
(D) Increased yield or pest resistance

Answer Key

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

Worked explanations for all 60 questions: quaidianpoint.com/alevel-biology-practice-test-4/