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Biology

Higher level

Paper 1A

11 May 2026

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

2 hours [Paper 1A and Paper 1B]

Instructions to students

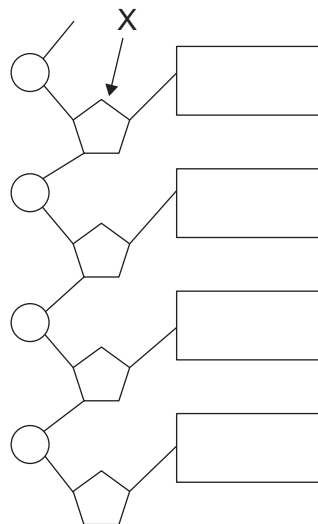
- Do not open this examination paper until instructed to do so.
- Answer all questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- A calculator is required for this paper.
- The maximum mark for paper 1A is **[40 marks]**.
- The maximum mark for paper 1A and paper 1B is **[75 marks]**.

1. Which features are common to all viruses?

- I. Non-living
- II. Contain genetic material
- III. Contain DNA

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

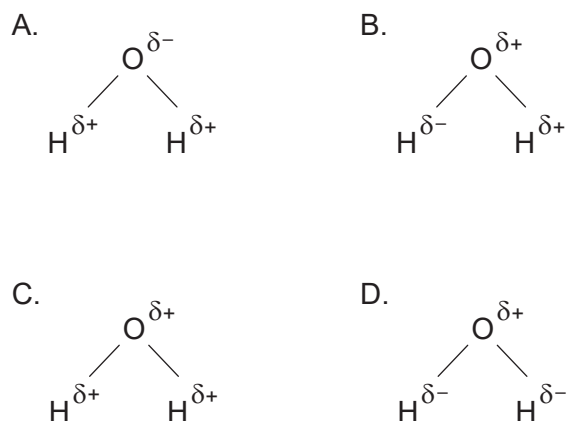
2. The diagram shows part of a polymer.



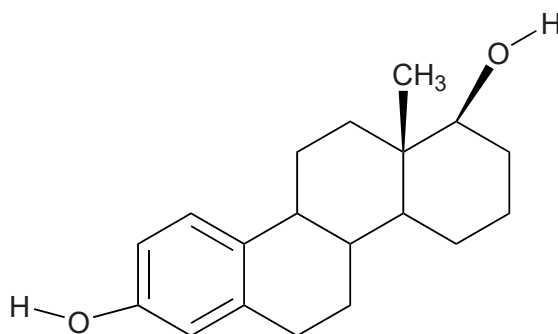
What is X?

- A. Phosphate
- B. Nitrogenous base
- C. Pentose sugar
- D. Hexose sugar

3. Which diagram shows the polarity of a water molecule?



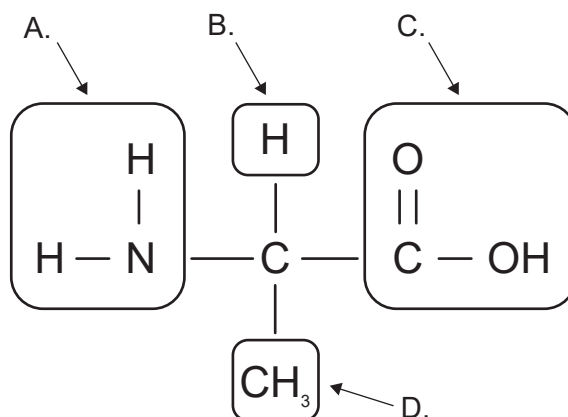
4. The diagram shows oestradiol.



What are properties of this molecule?

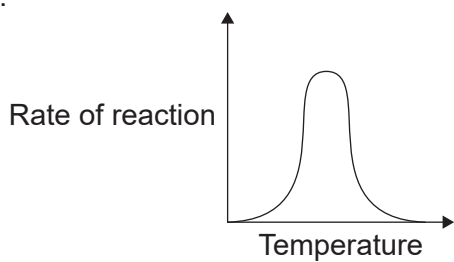
	Type of molecule	Ability to pass through lipid bilayer	Polarity
A.	steroid	can pass freely	non-polar
B.	steroid	cannot pass freely	polar
C.	nucleic acid	can pass freely	non-polar
D.	nucleic acid	cannot pass freely	polar

5. The diagram shows the structure of the amino acid alanine. Which group would be different in other amino acids?

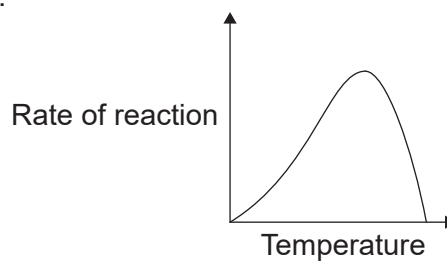


6. Which graph shows the effect of temperature on the rate of enzyme activity?

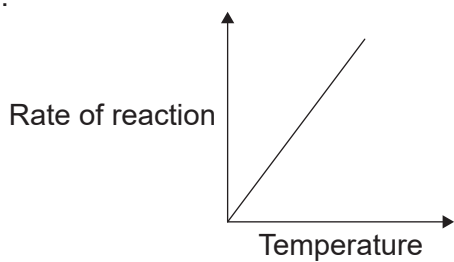
A.



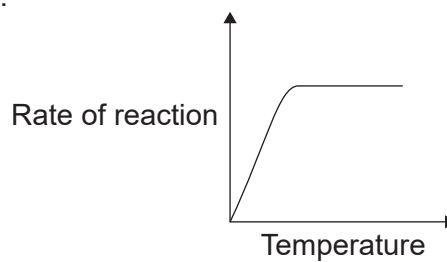
B.



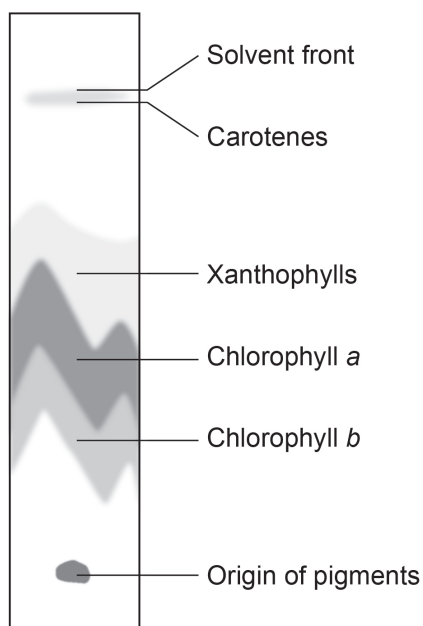
C.



D.



7. The diagram shows photosynthetic pigments separated by chromatography.



Which would have the highest R_f value?

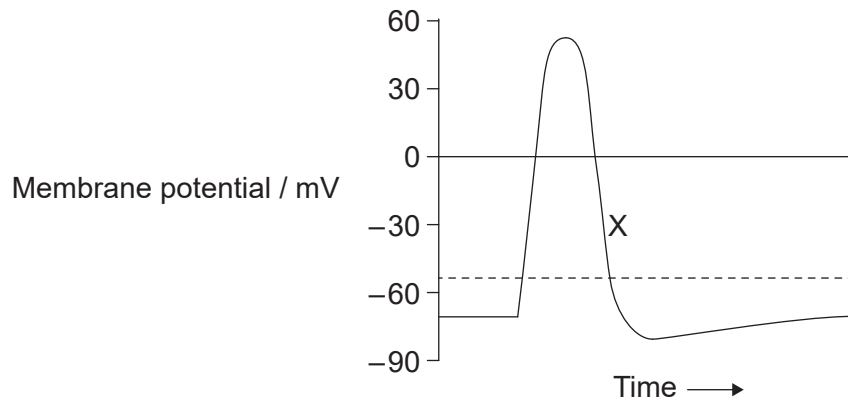
- A. Carotenes
 - B. Chlorophyll *a*
 - C. Chlorophyll *b*
 - D. Xanthophylls
8. Which type of inhibition occurs when statins are used to lower blood cholesterol levels?
- A. Competitive inhibition at an allosteric site
 - B. Competitive inhibition at the active site
 - C. Non-competitive inhibition at an allosteric site
 - D. Non-competitive inhibition at the active site

9. What describes adenosine triphosphate (ATP)?
- A. A fatty acid with high energy content
 - B. A fatty acid with low energy content
 - C. A nucleotide that transfers energy slowly
 - D. A nucleotide that transfers energy quickly
10. Which technique could be used to investigate the function of a gene?
- A. Gene sequencing
 - B. Gene knockout
 - C. Gel electrophoresis
 - D. Polymerase chain reaction (PCR)
11. Which type of mutation has occurred in the replicated DNA sequence?
- GTTTCGTACTAAGCA → GTTCGTACGAAGCA
- A. Frameshift
 - B. Substitution
 - C. Insertion
 - D. Deletion
12. Which feature of RNA supports the hypothesis that, in the earliest cells, RNA preceded DNA as the genetic material?
- A. Single-stranded
 - B. Can have catalytic activity
 - C. Contains uracil instead of thymine
 - D. Contains ribose instead of deoxyribose

- 13.** Which molecules were used in the Miller–Urey experiment to test if the production of organic molecules is possible under early Earth conditions?
- A. Water vapour and hydrogen
 - B. Water vapour, hydrogen and methane
 - C. Water vapour, hydrogen, methane and ammonia
 - D. Water vapour, hydrogen, methane and oxygen
- 14.** Which stem cells are totipotent?
- A. Hair follicle
 - B. Bone marrow
 - C. Very early-stage animal embryonic
 - D. Late-stage animal embryonic
- 15.** What is the role of clathrin in cells?
- A. Prevents lysosomes from releasing contents
 - B. Facilitates the formation of vesicles
 - C. Facilitates the production of cAMP
 - D. Prevents secretion of proteins
- 16.** What is the site of production of insulin within pancreatic cells, and what bonds are made during its synthesis?

	Site of production	Bonding
A.	free ribosomes	sugar–phosphate bonds
B.	ribosomes on the rough endoplasmic reticulum	sugar–phosphate bonds
C.	ribosomes on the rough endoplasmic reticulum	peptide bonds
D.	free ribosomes	peptide bonds

17. The graph shows an action potential.



What is the state of the ion channels at the location labelled X?

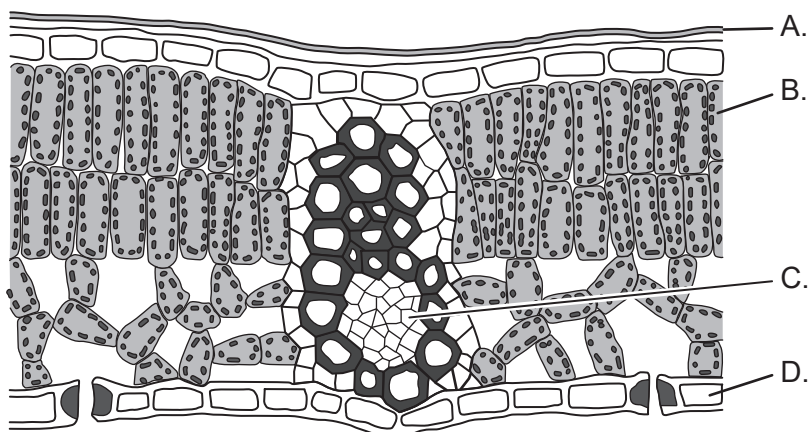
	Potassium ion (K^+) channels	Sodium ion (Na^+) channels
A.	open	closed
B.	closed	open
C.	open	open
D.	closed	closed

18. Which substances can act as signalling chemicals in animals?

- I. Calcium
- II. Neurotransmitters
- III. Cytokines

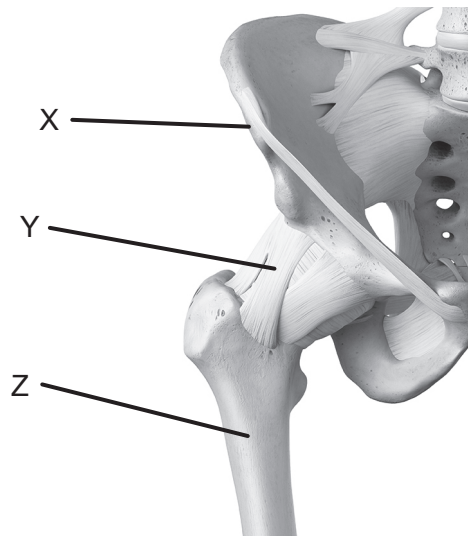
- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II and III

19. What happens when plant tissue is bathed in a solution that has a lower solute concentration than the plant tissue?
- A. The cells swell, and pressure potential decreases.
 - B. The cells swell, and pressure potential increases.
 - C. The cells shrink, and pressure potential decreases.
 - D. The cells shrink, and pressure potential increases.
20. Which cell results from unequal cytokinesis?
- A. A human egg cell
 - B. A human sperm cell
 - C. A human skin cell
 - D. A bacterial cell
21. *Ursus americanus* and *Bufo americanus* are both native to North America. What conclusion can be drawn about an *Ursus americanus* individual and a *Bufo americanus* individual that are living in the same ecosystem?
- A. They are members of the same genus.
 - B. They are members of the same species.
 - C. They are members of the same population.
 - D. They are members of the same community.
22. The diagram shows a transverse section of a dicotyledonous leaf. Which labelled structure is responsible for transporting materials through the leaf?



23. What is the role of the protein titin in muscle?
- A. Maintaining the central location of actin in the sarcomere
 - B. Preventing recoil of myosin after stretching
 - C. Preventing the binding of actin and myosin filaments
 - D. Recoiling of sarcomeres after stretching

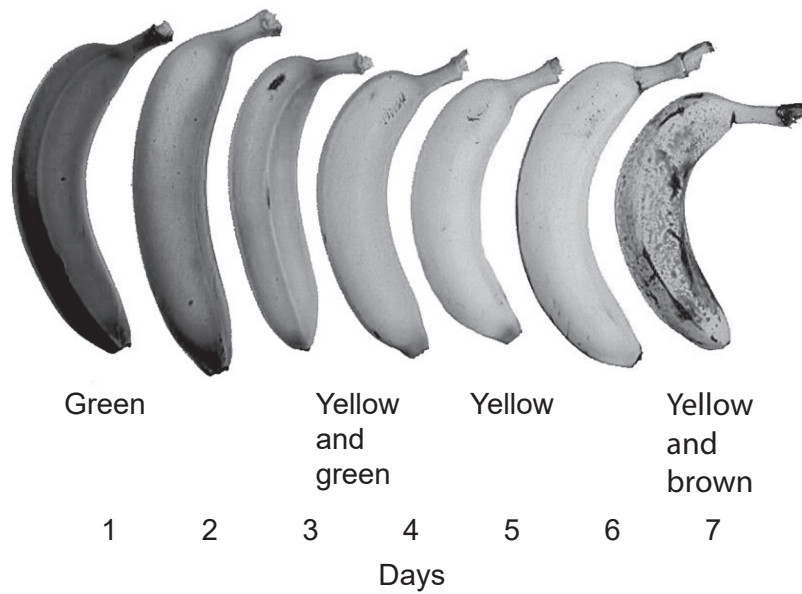
24. The image shows a human hip joint.



Which structures are identified in the image?

	Structure X	Structure Y	Structure Z
A.	pelvis	tendon	femur
B.	pelvis	ligament	femur
C.	femur	ligament	pelvis
D.	femur	tendon	pelvis

25. The image shows ripening in bananas over a 7-day period.



What describes the ethylene level and type of feedback needed for the ripening of the fruit?

	Ethylene level	Type of feedback
A.	increasing	negative
B.	decreasing	negative
C.	decreasing	positive
D.	increasing	positive

26. What transmits signals to skeletal muscle cells?

- A. Interneurons
- B. Pain receptors
- C. Dendrites
- D. Motor neurons

27. Which characteristic of COVID-19 makes it a zoonosis?

- A. Can affect all animals
- B. Transferred from another species to humans
- C. Resistant to antibiotics
- D. Rapidly mutating and evolving

28. Which changes in oxytocin and progesterone levels result in the onset of childbirth?

	Oxytocin	Progesterone
A.	decreases	decreases
B.	increases	increases
C.	increases	decreases
D.	decreases	increases

29. What is the sequence of events during spermatogenesis?

- A. mitosis → two divisions of meiosis → differentiation
- B. two divisions of meiosis → differentiation → mitosis
- C. mitosis → one division of meiosis → differentiation
- D. differentiation → mitosis → two divisions of meiosis

30. What is an example of polygenic inheritance?

- A. Phenylketonuria
- B. ABO blood types
- C. Skin colour
- D. Haemophilia

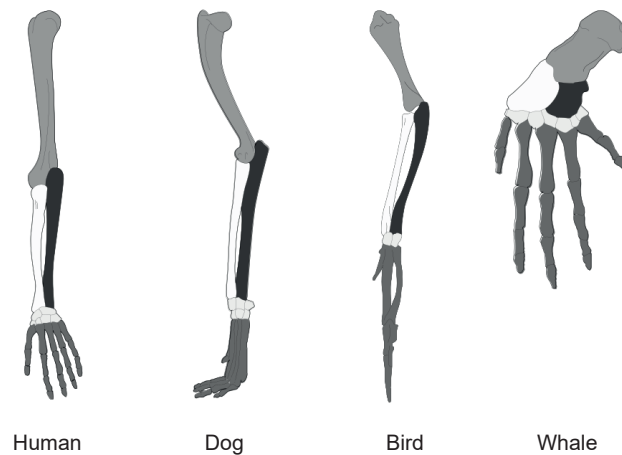
31. Which responses occur when human body temperature becomes too high?

	Sweat production	Skin blood vessels	Uncoupled respiration in brown adipose tissue
A.	increases	dilate	increases
B.	decreases	constrict	decreases
C.	increases	dilate	decreases
D.	decreases	constrict	increases

32. Which hormone is detected in a positive pregnancy test?

- A. Antidiuretic hormone (ADH)
- B. Follicle-stimulating hormone (FSH)
- C. Luteinizing hormone (LH)
- D. Human chorionic gonadotropin (hCG)

33. The diagram shows evidence for common ancestry based on limb development in vertebrates.



What describes this type of evidence?

- A. Homologous structures
- B. Analogous structures
- C. Convergent evolution
- D. Selective breeding

34. Which statement about the number of species on Earth is supported by evidence?
- A. There are very few species left to be discovered.
 - B. The biodiversity is the same as it was at any time in the past.
 - C. All the species on Earth have been discovered.
 - D. There are more species alive on Earth today than at any time in the past.
35. Coral reefs have formed in tropical seas. Which changes in these seas could inhibit coral reef formation?
- I. Decrease in pH
 - II. Decrease in clarity
 - III. Increase in temperature
- A. I and II only
 - B. I and III only
 - C. II and III only
 - D. I, II and III
36. The image shows Fabaceae (legume family) root nodules, which host bacteria.



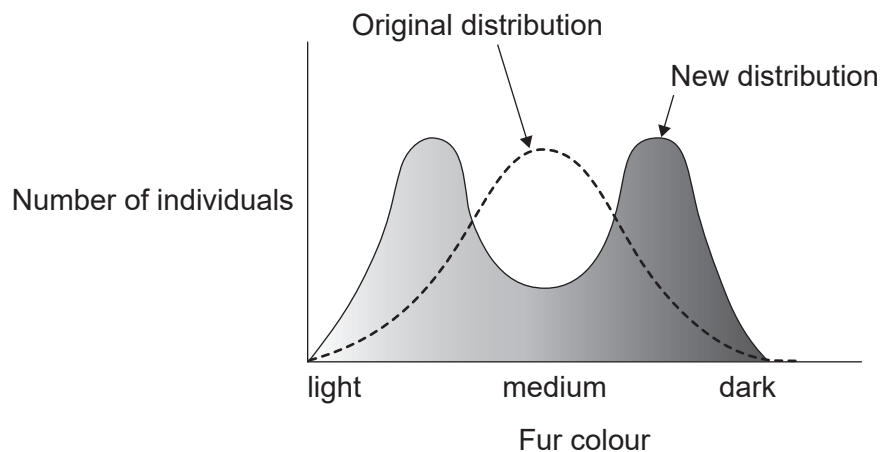
Which type of relationship exists between the bacteria and the plant?

- A. Mutualistic and intraspecific
- B. Parasitic and intraspecific
- C. Parasitic and interspecific
- D. Mutualistic and interspecific

37. Which process adds carbon to carbon sinks in ecosystems?

- A. Respiration
- B. Decomposition
- C. Photosynthesis
- D. Feeding

38. The graph shows changes in phenotype frequencies for fur colour in a population of mice.



What could cause the changes seen in fur colour?

- A. Changes in allele frequency due to directional selection
- B. Allele frequency remains constant due to stabilizing selection
- C. Changes in allele frequency due to disruptive selection
- D. Allele frequency remains constant due to disruptive selection

39. What are possible effects of leaching of nitrogen fertilizers into a river?

	Population of algae	Biochemical oxygen demand (BOD)
A.	decreases	increases
B.	increases	decreases
C.	increases	increases
D.	decreases	decreases

40. What causes an increase in genetic variation within populations?

- A. Nuclear division by mitosis
- B. Asexual reproduction
- C. Random orientation of bivalents in meiosis
- D. Cytokinesis following mitosis

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