

Biology
Standard level
Paper 1

Monday 14 May 2018 (afternoon)

45 minutes

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- The maximum mark for this examination paper is **[30 marks]**.

1. What feature of both striated muscle and aseptate fungal hyphae is different from typical cell structure?
 - A. They have multiple nuclei within a structural unit.
 - B. They have a cell wall that is not made of cellulose.
 - C. They have plasmids.
 - D. They have an absence of cholesterol in the plasma membrane.

2. Common pesticides used by gardeners contain neonicotinoids.

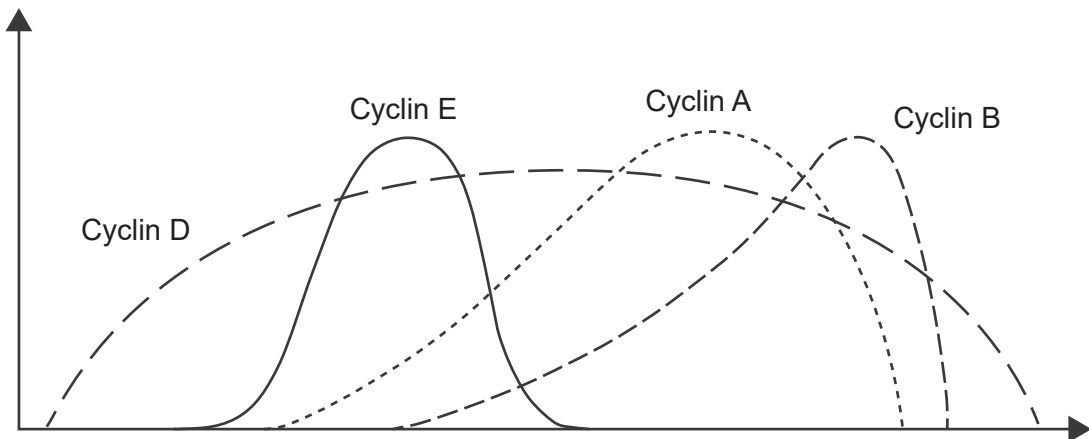


[Source: © International Baccalaureate Organization 2018]

What is the effect of a neonicotinoid pesticide on the transmission of a nerve impulse between neurons in an insect?

- A. It prevents the release of acetylcholine from the presynaptic membrane.
 - B. It widens the synaptic cleft so diffusion of acetylcholine across the gap is slower.
 - C. It irreversibly binds with acetylcholine receptors on the postsynaptic membrane.
 - D. It interferes with the enzymatic breakdown of acetylcholine by acetylcholinesterase.
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3. How does potassium move across the membrane of a neuron during repolarization?
 - A. Simple diffusion
 - B. Facilitated diffusion
 - C. Endocytosis
 - D. Active transport

4. Which organelle provides evidence that eukaryotic cells originated when large prokaryotes engulfed small free-living prokaryotes?
- A. Chloroplast
 - B. Nucleoid
 - C. 80S ribosome
 - D. Vacuole
5. The concentrations of cyclins rise and fall in cells at certain times.



[Source: https://en.wikipedia.org/wiki/Cyclin#/media/File:Cyclin_Expression.svg]

What times are these?

- A. Day and night
 - B. Seasons of the year
 - C. Stages of mitosis and interphase
 - D. Developmental stages in the life cycle
6. What feature of carbon makes it most suitable as a basis for life?
- A. Its abundance in nature
 - B. Its bonding properties
 - C. Its reactivity to light
 - D. Its presence in the early atmosphere of the Earth

Turn over

7. Researchers have developed a skin patch which can detect and measure very small concentrations of ions, sugars, amino acids, proteins and hormones which remain when sweat evaporates. What allows the presence of these substances in sweat?
- A. Cohesion
 - B. Hydrophobic interactions
 - C. Solvent properties
 - D. Thermal properties
8. Which type(s) of fatty acid in the diet is/are positively correlated with an increased risk of coronary heart disease?
- I. Saturated
 - II. Trans unsaturated
 - III. Cis unsaturated
- A. I only
 - B. I and II only
 - C. II only
 - D. II and III only
9. Which protein has the highest tensile strength (ability to resist breaking when stretched)?
- A. Cellulose
 - B. Actin
 - C. Spider silk
 - D. Albumin
10. What is the advantage of using lactase in an immobilized state in the food manufacturing industry?
- A. It functions within cells.
 - B. It dissolves in multiple solvents.
 - C. It converts cellulose into glucose.
 - D. It is less likely to become denatured.

11. Nucleic acids are polymers of nucleotides. What parts of nucleotides are joined together in both DNA and RNA to make these polymers?
- A. Large nitrogenous bases with small nitrogenous bases
 - B. Nitrogenous bases with hexose sugars
 - C. Nitrogenous bases with phosphates
 - D. Pentose sugars with phosphates
12. What do DNA replication, transcription and translation have in common?
- A. Take place in cell nucleus
 - B. Require free nucleotides
 - C. Catalysed by polymerase
 - D. Complementary base pairing
13. Where could genes be located in a prokaryotic cell?

	Nucleoid	Plasmids	Ribosomes
A.		✓	✓
B.	✓	✓	
C.	✓		✓
D.	✓	✓	✓

14. What is the same in all parts of homologous chromosomes?
- A. Base pair sequence
 - B. Alleles
 - C. Sequence of genes
 - D. Deletions

Turn over

15. What helps make the genome of each human unique?

	Orientation of pairs of homologous chromosomes during meiosis	Crossing over during meiosis	Fusion of gametes from two different parents
A.	✓		✓
B.		✓	✓
C.	✓	✓	
D.	✓	✓	✓

16. Which genotype would be seen in a person suffering from Huntington’s disease?

- A. Hh
- B. hh
- C. X^hY
- D. X^hY

17. Animals in the highest trophic level of a food chain will often be the largest in body size but will be few in numbers. What accounts for the small numbers?

- A. Food eaten by animals at the highest trophic level has a lower energy content per gram
- B. Energy losses through the food chain
- C. Conversion of heat energy into chemical energy
- D. Biomass of producers is small

18. Which conditions favour peat formation?

A.	Dry	Aerobic	Acidic
B.	Wet	Anaerobic	Acidic
C.	Dry	Anaerobic	Basic
D.	Wet	Aerobic	Acidic

19. In addition to carbon dioxide, which of these greenhouse gases is the most significant?
- A. Methane
 - B. Ozone
 - C. Nitrogen oxides
 - D. Water vapour
20. Balkan green lizards, *Lacerta trilineata*, living in mainland Greece eat mostly insects but also small amounts of plants. The same species living on Greek islands (where insects are scarce) show a greater percentage of those physical traits useful for eating plants than the mainland lizards.



[Source: Penny Turner/Wikimedia file licensed under CC BY-SA 4.0
<https://creativecommons.org/licenses/by-sa/4.0/deed.en>]

What is the biological explanation for these observations?

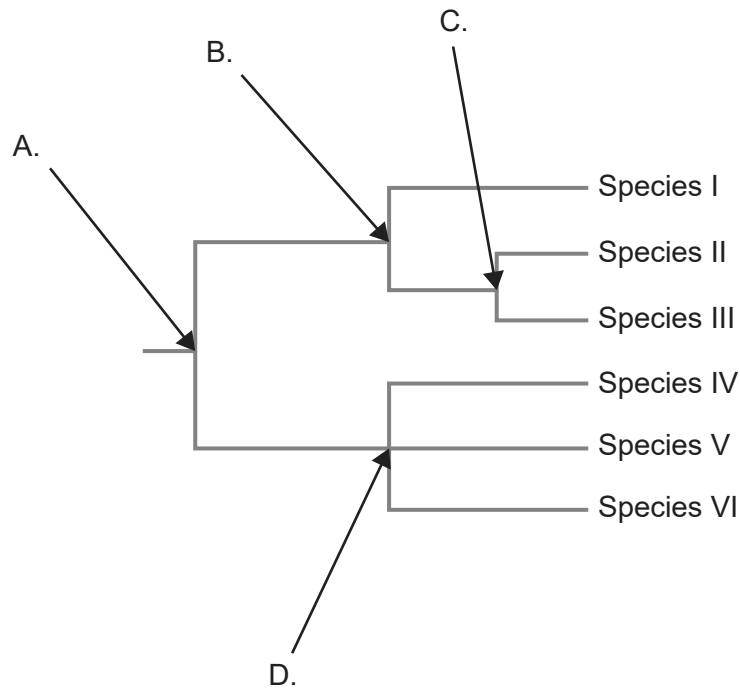
- A. Variation in each lizard population allowed adaptation to occur.
 - B. Lizards migrated to areas where they were better adapted.
 - C. Lizards on the islands diverged due to lack of interbreeding with the mainland population.
 - D. Homologous structures have prevented separate species from evolving.
21. What explains the presence in living humans of DNA sections which are identical to DNA found in Neanderthals who lived 40 000 years ago?
- A. Genetic mutation
 - B. Inheritance
 - C. Adaptation
 - D. Speciation

Turn over

22. Which phylum shows radial symmetry?

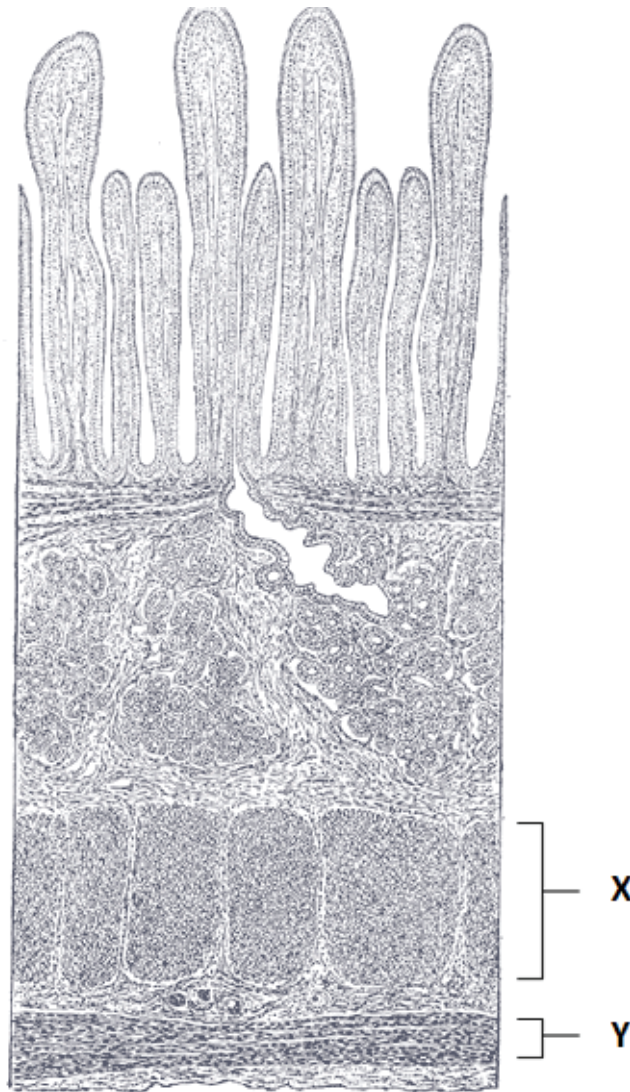
- A. Annelida
- B. Cnidaria
- C. Platyhelmintha
- D. Porifera

23. The cladogram was constructed using DNA base sequences from six species. Which node indicates the greatest difference in base sequences?



[Source: © International Baccalaureate Organization 2018]

24. The photomicrograph drawing shows a longitudinal section of the small intestine.



[Source: Henry Gray (1918) *Anatomy of the Human Body*]

What is the function of the tissue layers labelled X and Y?

- A. Secretion of digestive enzymes
- B. Absorption of digested food
- C. Transport of absorbed foods
- D. Movement of food in the intestine

Turn over

25. Which vessel carries deoxygenated blood away from the heart?
- A. Aorta
 - B. Pulmonary artery
 - C. Vena cava
 - D. Pulmonary vein
26. A combination of antibiotics and bioengineered antibodies to bacterial antigens is now being used in hospitals to treat bacterial infections. What makes this method more effective than just using antibiotics alone?
- A. Increases selective pressure on bacteria to evolve antibiotic resistance
 - B. Bacteria become noticeable to phagocytes
 - C. Antibodies can be cloned by the immune system
 - D. Blocks metabolic pathways in bacteria
27. After 8 hours of sleep and before eating, which hormone will be secreted and what cells secrete it?

	Hormone	Cells in the pancreas
A.	Insulin	α cells
B.	Glucagon	α cells
C.	Insulin	β cells
D.	Glucagon	β cells

28. How are the insides of alveoli prevented from sticking together?

	Method of prevention	Produced by
A.	Surfactant	Type I pneumocytes
B.	Surfactant	Type II pneumocytes
C.	Pressure	Mixture of O ₂ and CO ₂ within alveoli
D.	Pressure	CO ₂ concentration gradient inside capillaries

- 29.** Neural pathways in living brains can now be mapped by tracking the movement of water molecules inside axons. What keeps water molecules inside axons?
- A. Plasma membrane
 - B. Hydrogen bonding
 - C. Pump proteins
 - D. Synapse
- 30.** What hormone controls the metabolic rate of body cells?
- A. Insulin
 - B. Leptin
 - C. Melatonin
 - D. Thyroxin
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