

**INTERNATIONAL BACCALAUREATE****BIOLOGY**

Subsidiary Level

Monday 13 May 1996 (afternoon)

Paper 1

45 minutes

This examination paper consists of 30 questions.

Each question offers four suggested answers.

The maximum mark for this paper is 30.

This examination paper consists of ten pages.

INSTRUCTIONS TO CANDIDATES

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.

EXAMINATION MATERIALS**Required/Essential:**

Optically Mark Read (OMR) answer sheet

Electronic calculator (neither programmable nor graphic display calculators are allowed)

Allowed/Optional:

A simple translating dictionary for candidates not working in their own language

1. In which of the following cell structures is cellulose found?
 - A. Nucleolus
 - B. Chloroplast
 - C. Cell wall
 - D. Cell membrane

2. An element present in proteins but not in carbohydrates is
 - A. carbon.
 - B. hydrogen.
 - C. oxygen.
 - D. nitrogen.

3. A substrate binds to its enzyme at the enzyme's
 - A. peptide bonds.
 - B. active site.
 - C. last amino acid.
 - D. inner molecular loops.

4. During an experiment, a cell is placed into a solution containing a dye. After a few hours the concentration of the dye inside the cell is higher than the external solution. The same experiment is performed in the presence of a substance that inhibits ATP utilisation. In this case the dye did not enter the cell.

The most probable mechanism by which the dye entered the cell in the first experiment is

- A. active transport.
- B. diffusion.
- C. osmosis.
- D. pinocytosis.

5. Which of the following answers contains two cell organelles each of which uses and produces ATP?

- A. Cell membrane and ribosome
- B. Endoplasmic reticulum and mitochondrion
- C. Chloroplast and nucleolus
- D. Chloroplast and mitochondrion

In photosynthesis the carbon dioxide acceptor is

- A. NADPH + H⁺
- B. chlorophyll.
- C. ribulose bisphosphate (ribulose diphosphate).
- D. glucose bisphosphate.

7. Messenger RNA differs from DNA in that mRNA

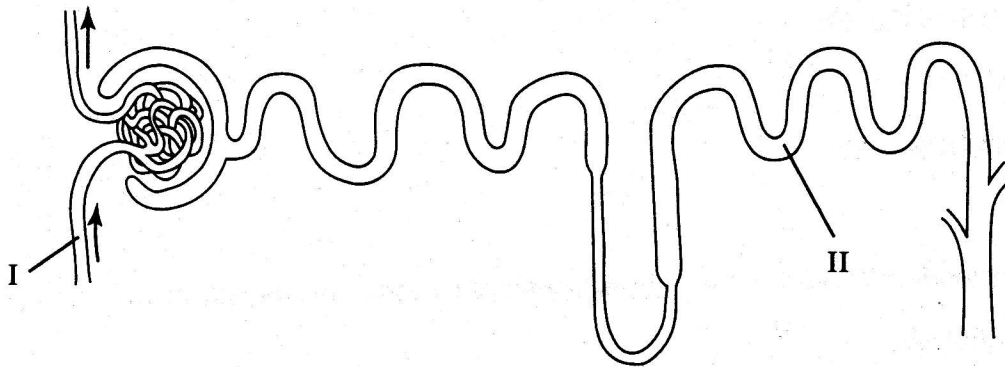
- A. contains half as many of the same nucleotides.
- B. is a one strand molecular chain that contains uracil instead of thymine and ribose in place of deoxyribose.
- C. is a one strand molecular chain that contains uracil instead of thymine and deoxyribose in place of ribose.
- D. is a similar double stranded molecule but contains uracil instead of thymine and ribose in place of deoxyribose.

8. A major function of vitamin B₁₂ is to

- A. maintain the correct absorption and metabolism of calcium.
- B. contribute to blood clotting.
- C. act as a coenzyme in cell respiration.
- D. contribute to the normal formation of red blood cells.

9. Carbon dioxide diffuses from the capillaries into the alveoli because
- A. there is a difference in atmospheric pressure.
 - B. there is a difference in carbon dioxide concentration between the two sides of the alveolus wall.
 - C. carbonic anhydrase pumps carbon dioxide out.
 - D. the alveolus lining (membrane) has pores with active pumps.
10. The rate of heart beat is
- A. increased by impulses from the parasympathetic nervous system.
 - B. increased by impulses from the sympathetic nervous system.
 - C. decreased by impulses from the sympathetic nervous system.
 - D. decreased by the presence of adrenalin in the blood.
11. After exercise on a hot day the urine in humans becomes more concentrated. The hormone responsible for this change is
- A. FSH.
 - B. thyroxin.
 - C. ADH.
 - D. adrenalin.

The diagram below refers to question 12.



2. A substance normally present in I but not in II is
- A. glucose.
 - B. urea.
 - C. bile pigment.
 - D. uric acid.

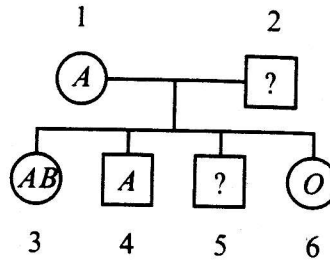
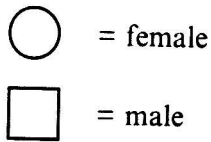
13. Which of the following parts of the eye does not allow light to pass through it?
- A. Cornea
 - B. Choroid
 - C. Pupil
 - D. Aqueous humour

14. Immediately after fertilisation the zygote undergoes
- A. cleavage.
 - B. gastrulation.
 - C. implantation.
 - D. differentiation.

15. Which of the following is **not** produced during the light-**dependent** reactions of photosynthesis?
- A. Oxygen
 - B. Carbon dioxide
 - C. ATP
 - D. NADPH + H⁺
16. The enzymes required for the light-**independent** reactions of photosynthesis are located in the
- A. cytoplasm.
 - B. thylakoids and grana.
 - C. chloroplast stroma (matrix).
 - D. chloroplast external membrane.
17. One characteristic of insect-pollinated flowers is that they possess
- A. long, feathery and sticky stigmas.
 - B. many, small pollen grains.
 - C. large and sticky pollen grains.
 - D. many, long and smooth stamens.
18. The rate of water loss from a plant will be **lowest** if it is exposed to conditions that are
- A. windy with a high humidity.
 - B. windy with a low humidity.
 - C. calm with a low humidity.
 - D. calm with a high humidity.

19. Food stored in the roots of some plants is
- A. transported there by the phloem.
 - B. transported there by the xylem.
 - C. produced by the root cells.
 - D. absorbed from the soil.
20. In mammals, brown hair is dominant to albinism (no colour in the hair). A homozygous brown-haired animal mates with one that is an albino. What proportion of all the individuals is likely to be albino?
- A. 0
 - B. $\frac{1}{4}$
 - C. $\frac{1}{2}$
 - D. all
21. Any recessive sex-linked trait that occurs in mammals is expected to appear
- A. only in males.
 - B. only in females.
 - C. more frequently in females than in males.
 - D. more frequently in males than in females.

The genetic pedigree below shows the blood groups of some of its members. It refers to question 22.

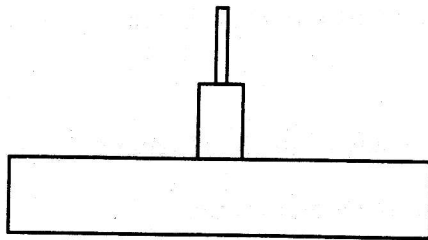


22. The blood group of person 5 could be
- A only.
 - B only.
 - A, AB or B only.
 - A, AB, B or O.
23. The effects of the genetic disorder known as phenylketonuria in a person
- can be avoided if the person is not exposed to the sun's rays.
 - can be corrected if the person is treated with specific drugs.
 - can be avoided if the person keeps to a certain diet.
 - cannot be avoided because it is due to a gene mutation.
24. In dogs a black coat is dominant to white coat. Short hair is also dominant to long hair. The genes responsible are unlinked. A black, short-haired dog, heterozygous for both characters mates with a white, long-haired bitch (female dog). What proportion of the offspring would be expected to have both white coats and long hair?
- 0
 - $\frac{1}{4}$
 - $\frac{1}{2}$
 - $\frac{3}{4}$

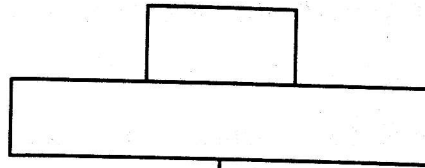
25. Which of the following statements concerning evolution is **true**?
- A. Darwin identified the genetic causes of evolution.
 - B. Variations occur due to gene mutations only.
 - C. Genes responsible for successful adaptations usually increase in frequency.
 - D. Gene frequencies vary independently from other evolutionary factors.
26. If it is assumed that evolution has **not** occurred, a study of the fossil record should show
- A. the presence of fossils of 'simple' organisms in the oldest layers.
 - B. no fossils at all.
 - C. the presence of more 'complex' organisms in the oldest layers.
 - D. the same fossil forms in all layers.
27. The great variety of finches found in the Galapagos Islands is an example of
- A. adaptive radiation.
 - B. genetic engineering.
 - C. convergent evolution.
 - D. selective breeding.
28. Which of the following organisms are **both** essential components of an ecosystem?
- A. Producers and herbivores
 - B. Producers and decomposers
 - C. Producers and carnivores
 - D. Consumers and decomposers

Questions 29 and 30 refer to the following illustrations. They show four trophic (food) diagrams relating to the food chain:

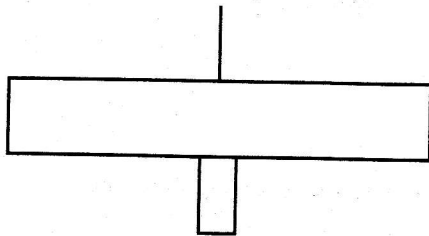
oak trees → *insect larvae* → *woodpeckers*



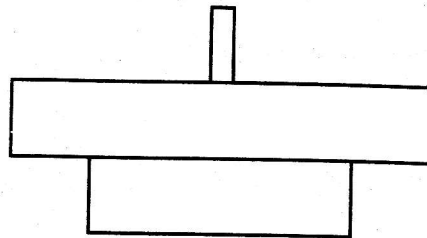
I



II



III



IV

29. Which of the diagrams best represents the pyramid of **numbers** for this food chain?

- A. I
- B. II
- C. III
- D. IV

30. Which of the diagrams best represents the pyramid of **biomass** for this food chain?

- A. I
- B. II
- C. III
- D. IV