IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
PROGRAMA DEL DIPLOMA DEL BI

M05/4/BIOLO/SPM/ENG/TZ1/XX+

22056010

BIOLOGY
STANDARD LEVEL
PAPER 1

Wednesday 11 May 2005 (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.

1. What is an advantage of using an electron microscope?

A. Living cells can be observed

B. Virus particles can be observed

C. Pigments can be observed

D. Whole cells can be observed

2. A photomicrograph of a tissue is accompanied by a scale bar which represents 1 μm. The scale bar is 10 mm long.

What is the magnification of this photomicrograph?

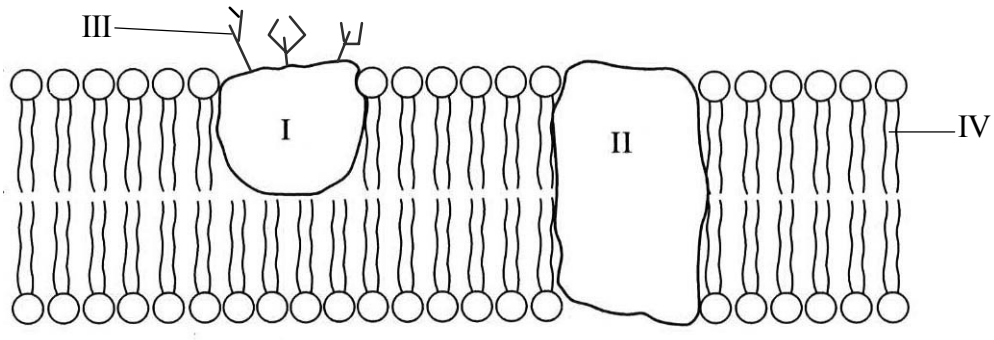
A. × 10

B. × 1 000

C. × 10 000

D. × 1 000 000

3. What part of the plasma membrane is responsible for preventing the free movement of ions into and out of the cell?



A. I

B. II

C. III

D. IV

4. What is facilitated diffusion?

A. The passive movement of a particle through the phospholipid bilayer of the cell membrane.

B. The passive movement of a particle across a cell membrane via a channel protein.

C. The movement of a particle down a concentration gradient helped by active pumping.

D. The movement of a particle up a concentration gradient helped by active pumping.

5. How does mitosis produce two genetically identical nuclei?

A. By separation of homologous pairs of chromosomes

B. By separation of pairs of chromatids

C. By division of the cytoplasm equally in two

D. By division of the centrioles in two

6. A cell has a high density of rough endoplasmic reticulum (ER) in its cytoplasm. Which other organelle can be expected to occur in large numbers in this cell?

A. Chloroplasts

B. Microvilli

C. Golgi apparatus

D. Nuclei

7. How many peptide bonds are in a polypeptide made of 120 amino acids?

A. 119

B. 120

C. 359

D. 360

8. Which of the following will alter the shape of amylase?

I. A temperature above 40°C

II. A temperature of 4°C

III. A pH of 11

IV. A pH of 1

A. I only

B. I and II only

C. I and III only

D. I, III and IV only

9. How does the enzyme pectinase help in fruit juice production?

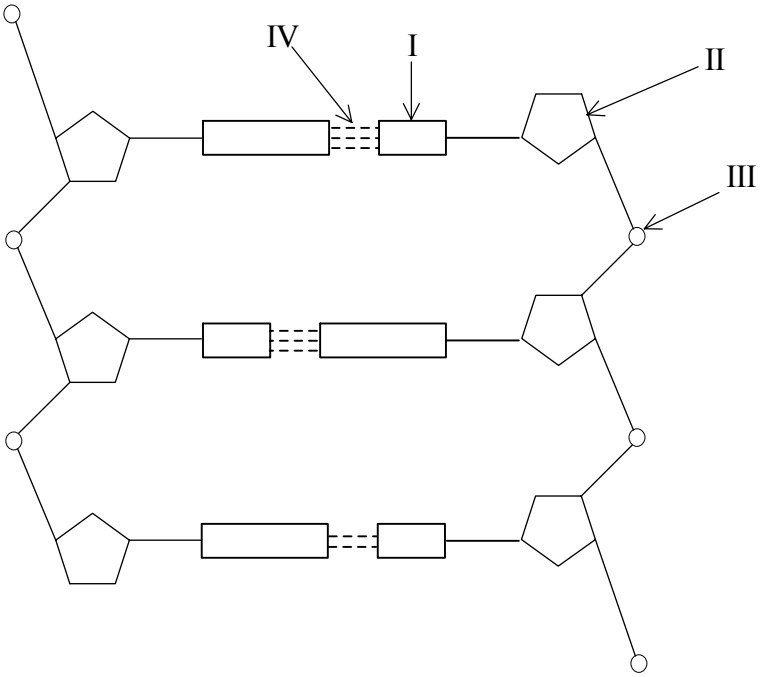
A. Pectinase increases the amount of protein in the juice extracted.

B. Pectinase decreases the lipid content of the juice extracted.

C. Pectinase increases the volume of the juice extracted.

D. Pectinase eliminates toxins from the juice extracted.

10. Which labels on the diagram are parts of a nucleotide?



A. I only

B. I and II only

C. II and IV only

D. I, II and III only

11. Which of the following is a comparison of anaerobic and aerobic respiration in the muscles of a human?

	Anaerobic	**Aerobic**
A.	Lactate produced	CO_2 produced
B.	O_2 consumed	No O_2 consumed
C.	No ATP is produced	High ATP yield
D.	Ethanol produced	Glucose consumed

12. Pigments are extracted from the leaves of a green plant. White light is then passed through the solution of pigments. What effect do the leaf pigments have on the white light?

A. Green wavelengths are absorbed and red and blue wavelengths are transmitted.

B. Red and blue wavelengths are absorbed and green wavelengths are transmitted.

C. Blue wavelengths are absorbed and green and red wavelengths are transmitted.

D. Green and red wavelengths are absorbed and blue wavelengths are transmitted.

13. What are the products of photosynthesis?

I. O_2

II. H_2O

III. ATP

IV. CO_2

A. I only

B. I and II only

C. I and III only

D. I, III and IV only

14. What causes Down's syndrome?

A. Non-disjunction in the formation of sex cells

B. Random alignment of chromosomes in the formation of sex cells

C. Gene mutation in the formation of sex cells

D. Crossing over in the formation of sex cells

15. What is a test cross used for?

A. To determine if two individuals belong to the same species.

B. To identify the presence of dominant alleles.

C. To identify the presence of recessive alleles.

D. To test the viability of offspring.

16. Which combination of parents could produce children with all of the different ABO blood types?

A. $A \times B$

B. $B \times O$

C. $A \times AB$

D. $A \times A$

17. What feature in a family pedigree chart would suggest that a trait is sex-linked?

A. Numbers of offspring affected by the condition increased over several generations.

B. Girls only inherit the trait from their mothers.

C. Equal numbers of males and females show the trait.

D. One gender was more commonly affected than the other.

18. What is the source of carbon for the following organisms?

	Autotrophs	**Heterotrophs**	**Saprotrophs**
A.	Organic	Inorganic	Organic
B.	Inorganic	Organic	Organic
C.	Organic	Organic	Organic
D.	Inorganic	Inorganic	Inorganic

19. What conditions exist when a population is in the plateau phase of population growth?

A. immigration + emigration = natality + mortality

B. natality + immigration = emigration + mortality

C. mortality – immigration = natality – emigration

D. immigration – natality = mortality – emigration

20. Which of the following taxa do *Milvus migrans* and *Milvus milvus* both belong to?

I. Species
II. Order
III. Family
IV. Genus

A. I only

B. IV only

C. I and III only

D. II, III and IV only

21. Which group of organisms, identified by this key, represents the Fungi?

1	Nuclei present	2
	No nuclei present	A
2	Develops from an embryo	3
	Does not develop from an embryo	4
3	Cell wall present	B
	No cell wall	C
4	Cell wall of chitin	D
	Cell wall of cellulose or no cell wall	Protoctista

22. In 1789 Gilbert White, a naturalist, observed eight breeding pairs of swifts (*Apus apus*) in the English village of Selborne. Each pair of swifts produces two offspring on average per year. In 200 years this should have produced 10^{30} swifts in the village of Selborne. A survey carried out in 1983 revealed only 12 breeding pairs in this village.

Which of the following possibilities could have prevented the numbers rising to 10^{30} ?

I. The number of nesting sites remained the same

II. The food supply of the swifts remained constant

III. Predatory birds in the area were exterminated

IV. The climate became colder from 1789 onwards

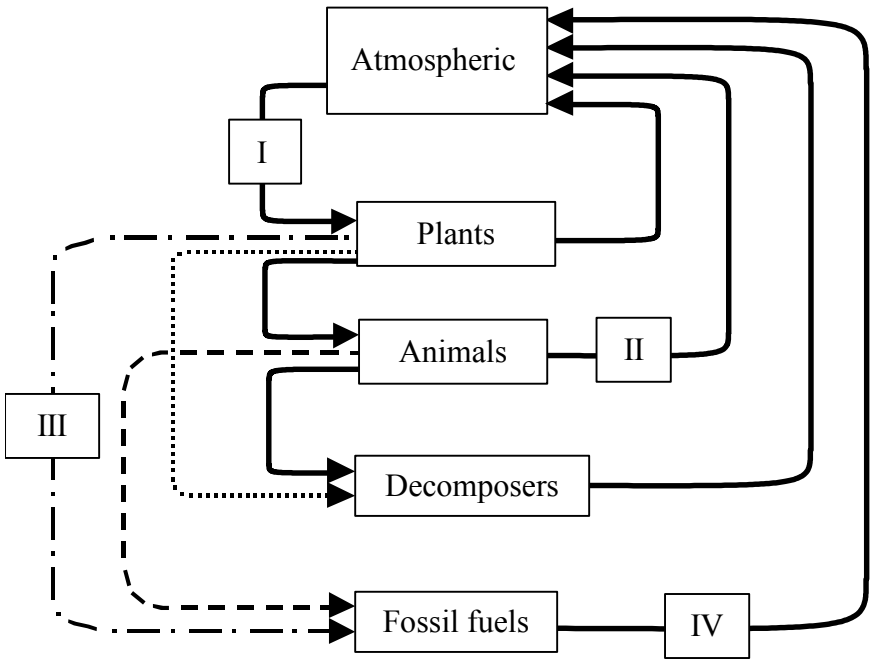
A. I only

B. I and II only

C. I, II and III only

D. I, II and IV only

23. Which processes indicated on the carbon cycle below will contribute towards increased global warming?



A. I and II only

B. II and III only

C. II and IV only

D. II, III and IV only

24. What are functions of the stomach, small intestine and large intestine?

	Stomach	Small intestine	Large intestine
A.	Starts protein digestion	Completes digestion and absorbs organic compounds	Absorbs water, minerals and water-soluble vitamins
B.	Starts carbohydrate digestion	Absorbs water, minerals and water-soluble vitamins	Completes digestion and absorbs organic compounds
C.	Starts protein digestion	Absorbs water, minerals and water-soluble vitamins	Completes digestion and absorbs organic compounds
D.	Starts carbohydrate digestion	Completes digestion and absorbs organic compounds	Absorbs water, minerals and water-soluble vitamins

25. Which is the correct sequence of blood flow in normal human circulation?

A. pulmonary vein → right atrium → aorta → vena cava

B. vena cava → pulmonary vein → aorta → right atrium

C. vena cava → right atrium → pulmonary vein → aorta

D. pulmonary vein → vena cava → aorta → right atrium

26. How can human immunodeficiency virus (HIV) get transmitted from one human to another?

I. By touching the skin of an infected person

II. Through drinking contaminated water

III. Through the exchange of body fluids

IV. From mother to child across the placenta

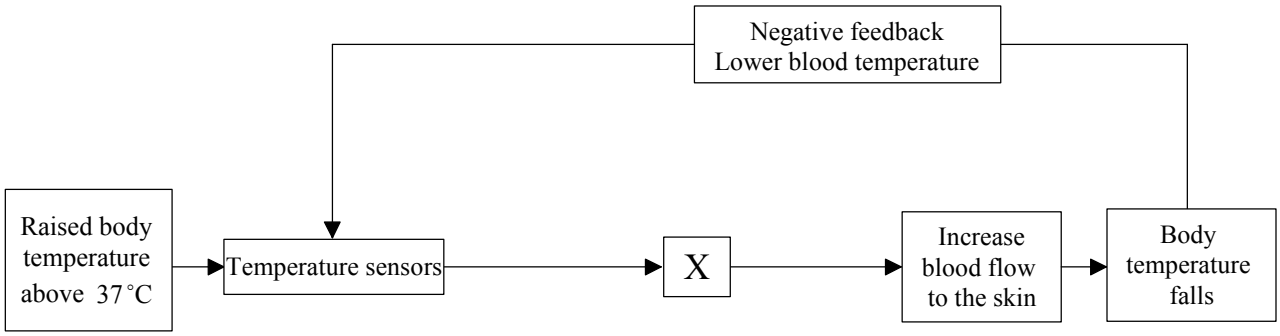
A. I and III only

B. III and IV only

C. I, III and IV only

D. I, II, III and IV

27. What is at point **X** in the following negative feedback loop?



A. Venules

B. Capillaries

C. Arterioles

D. Sweat glands

28. Which cells secrete insulin?

A. *β*-cells of the pancreas

B. Cells of the liver

C. *α*-cells of the pancreas

D. Epithelial cells of the intestine

29. What does oxytocin control?

A. Brain development of the fetus

B. Onset of ovulation

C. Stimulation of uterine contractions

D. Implantation of the blastocyst

30. Which hormone is directly responsible for the development of secondary sexual characteristics?

A. Progesterone

B. Testosterone

C. LH (luteinizing hormone)

D. FSH (follicle stimulating hormone)