N13/4/BIOLO/SPM/ENG/TZ0/XX

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BIOLOGY
STANDARD LEVEL
PAPER 1

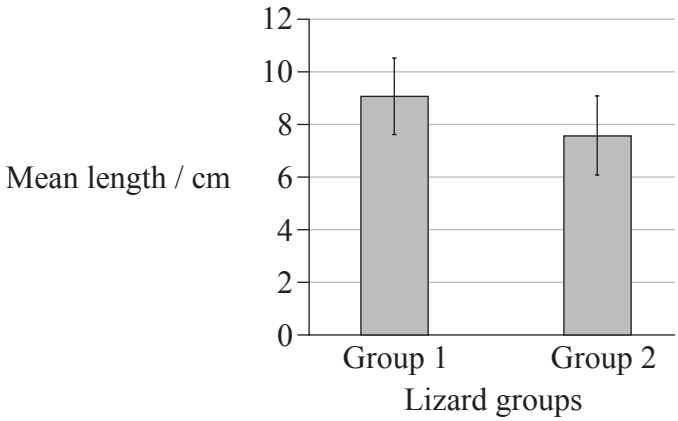
Wednesday 13 November 2013 (afternoon)

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. The bar chart shows the mean length (in cm) of two lizard species. The error bars represent the standard deviation. What can be understood from the bar chart?



A. Group 1 lizards are longer than all group 2 lizards.

B. Group 2 lizards are longer than all group 1 lizards.

C. Group 2 has same mean as group 1.

D. Group 2 lizards can be longer than group 1 lizards.

2. What identifies the structure and function of flagella and pili?

	Flagella		**Pili**	
	Structure	**Function**	**Structure**	**Function**
A.	corkscrew shape	can pull cells together	hair like shape	used for locomotion
B.	hair like shape	can pull cells together	corkscrew shape	used for locomotion
C.	corkscrew shape	used for locomotion	hair like shape	can pull cells together
D.	hair like shape	used for locomotion	corkscrew shape	can pull cells together

3. Which property of cells is evidence for the cell theory?

A. Cells have proteins.

B. Cells can divide.

C. Cells have nucleic acids.

D. Cells can move around.

4. What identifies plant cells and animal cells?

	Plant cell	Animal cell
A.	cell wall and plasma membrane; may contain starch	no cell wall only plasma membrane; may contain glycogen
B.	no cell wall only plasma membrane; may contain starch	cell wall and plasma membrane; may contain glycogen
C.	cell wall and plasma membrane; may contain glycogen	no cell wall only plasma membrane; may contain starch
D.	no cell wall only plasma membrane; may contain glycogen	cell wall and plasma membrane; may contain starch

5. Which is the sequence of events in mitosis?

A. metaphase, anaphase, telophase, prophase

B. anaphase, prophase, telophase, metaphase

C. telophase, prophase, metaphase, anaphase

D. prophase, metaphase, anaphase, telophase

6. Which are functions of membrane proteins?

A. Hormone binding sites and DNA replication

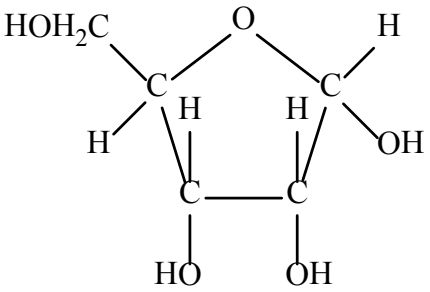
B. Cell adhesion and translation

C. Cell to cell communication and protein pumps

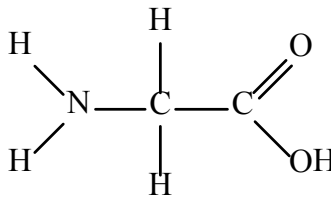
D. Passive transport and glycolysis

7. Which types of molecule are shown in the diagrams?

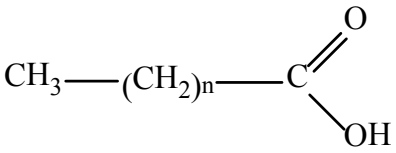
Molecule I



Molecule II



Molecule III



	Molecule I	Molecule II	Molecule III
A.	amino acid	fatty acid	ribose
B.	glucose	amino acid	fatty acid
C.	ribose	amino acid	fatty acid
D.	fatty acid	glucose	amino acid

8. Which are functions of lipids?

A. Hydrophilic solvent and energy storage

B. Hydrophobic solvent and membrane potential

C. Thermal insulation and energy storage

D. Thermal insulation and hydrophilic solvent

9. In enzyme experiments, the rate of enzyme activity often gradually decreases. What is most likely to cause this decrease?

A. The temperature decreasing

B. The enzyme concentration decreasing

C. The pH decreasing

D. The substrate concentration decreasing

10. What is light energy used for in photolysis?

A. Formation of hydrogen and oxygen

B. Formation of carbon dioxide only

C. Formation of ATP and glucose

D. Formation of oxygen only

11. What is the composition of eukaryotic chromosomes?

A. DNA only

B. DNA and ribose

C. DNA and RNA

D. DNA and proteins

12. What is the difference between dominant, recessive and codominant alleles?

	Dominant allele	Recessive allele	Codominant allele
A.	only affecting the phenotype when in a homozygous state	always affecting the phenotype	both alleles affect the phenotype
B.	always affecting the phenotype	both alleles affect the phenotype	only affecting the phenotype when in a homozygous state
C.	always affecting the phenotype	only affecting the phenotype when in a homozygous state	both alleles affect the phenotype
D.	both alleles affect the phenotype	only affecting the phenotype when in a heterozygous state	always affecting the phenotype when in a heterozygous state

13. Which genotypes are possible when a male with blood group AB and a female with blood group O have offspring?

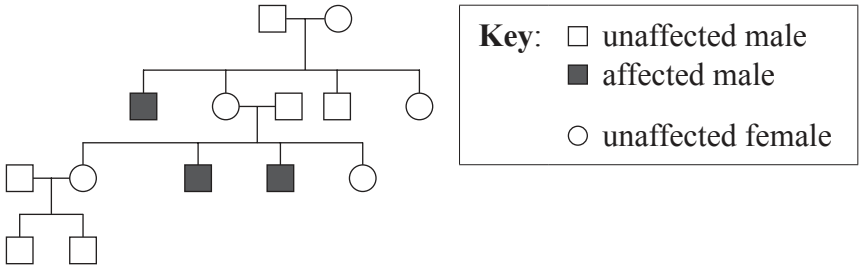
A. I^Ai only

B. I^Ai and I^Bi

C. I^Ai and ii

D. I^Ai, I^Bi and ii

14. The following shows a pedigree chart.



What type of inheritance is shown in this pedigree chart?

A. X-linked recessive

B. Y-linked dominant

C. X-linked dominant

D. Y-linked recessive

15. What happens to DNA fragments in electrophoresis?

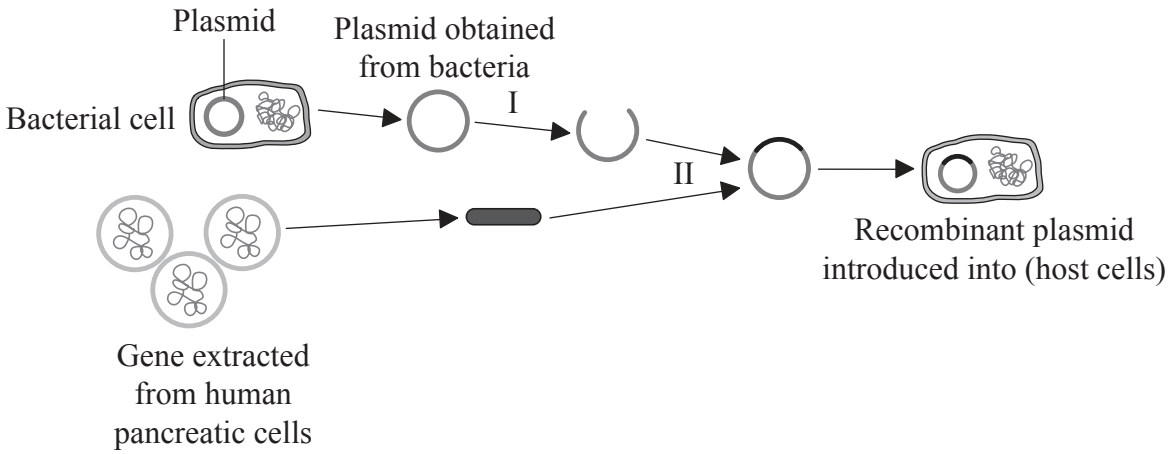
A. They move in a magnetic field and are separated according to their size.

B. They move in an electric field and are separated according to their size.

C. They move in a magnetic field and are separated according to their bases.

D. They move in an electric field and are separated according to their bases.

16. The flow chart summarizes methods of gene transfer.



[Source: © International Baccalaureate Organization 2014]

Which enzymes are used in steps I and II?

	I	II
A.	DNA ligase	restriction enzyme
B.	restriction enzyme	DNA ligase
C.	DNA polymerase	DNA ligase
D.	restriction enzyme	DNA polymerase

17. What is a population?

A. Organisms of the same genus living in an ecosystem

B. Organisms living together and interacting in the same habitat

C. Organisms of a species living together in the same area

D. Organisms that can breed together

18. Which pair of statements is correct?

	Autotroph	Heterotroph
A.	obtains organic molecules from other organisms	synthesizes organic molecules from inorganic molecules
B.	synthesizes organic molecules from inorganic molecules	obtains organic molecules from other organisms
C.	synthesizes inorganic molecules from organic molecules	synthesizes organic molecules from inorganic molecules
D.	obtains inorganic molecules from other organisms	obtains inorganic molecules from other organisms

19. What are examples of greenhouse gases?

A. Ethane and ozone

B. Methane and nitrogen

C. Methane and carbon dioxide

D. Ethane and oxygen

20. What causes heritable variation in a species?

I. Muscle development through exercise

II. Increased rainfall in the ecosystem

III. Changes in the genome of the species

A. I and III only

B. II only

C. III only

D. I, II and III

21. Which phylum includes plants with rhizoids, spores that are produced in a capsule and a height below 0.5 metres?

A. Angiospermophyta

B. Bryophyta

C. Coniferophyta

D. Filicinophyta

22. What indicates overall population change?

A. (natality + immigration) - (mortality + emigration)

B. (mortality + immigration) - (natality + emigration)

C. (natality - immigration) + (mortality + emigration)

D. (mortality + emigration) + (natality - emigration)

23. What are features of the enzyme amylase?

	Substrate	Source	Optimum pH
A.	starch	salivary glands	7
B.	lignin	pancreas	1.5
C.	cellulose	liver	4
D.	glycogen	kidney	9

24. Why are antibiotics effective against pathogenic bacteria?

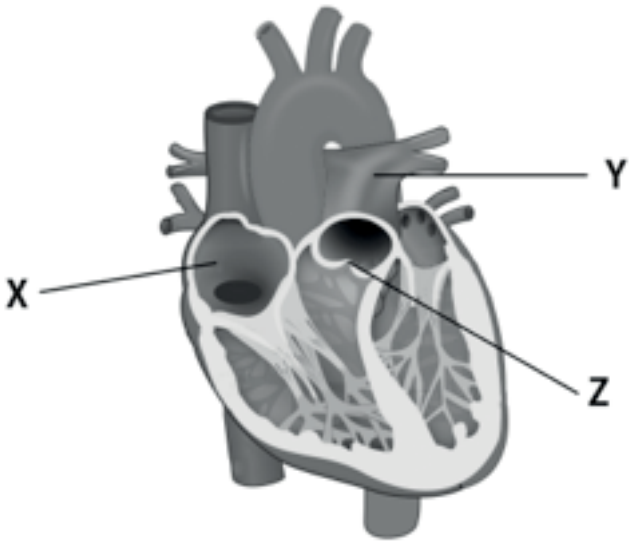
A. Bacteria have a high rate of mutation

B. Bacterial cell processes are blocked

C. Bacteria have a slow metabolism

D. Bacteria assimilate antibiotics

25. The diagram below shows the human heart.



[Source: International Baccalaureate Organization 2014]

What structures are indicated by the labels X, Y and Z?

	X	Y	Z
A.	semilunar valve	pulmonary artery	right atrium
B.	right atrium	semilunar valve	pulmonary artery
C.	right atrium	pulmonary artery	semilunar valve
D.	pulmonary artery	right atrium	semilunar valve

26. What is dissolved in blood plasma?

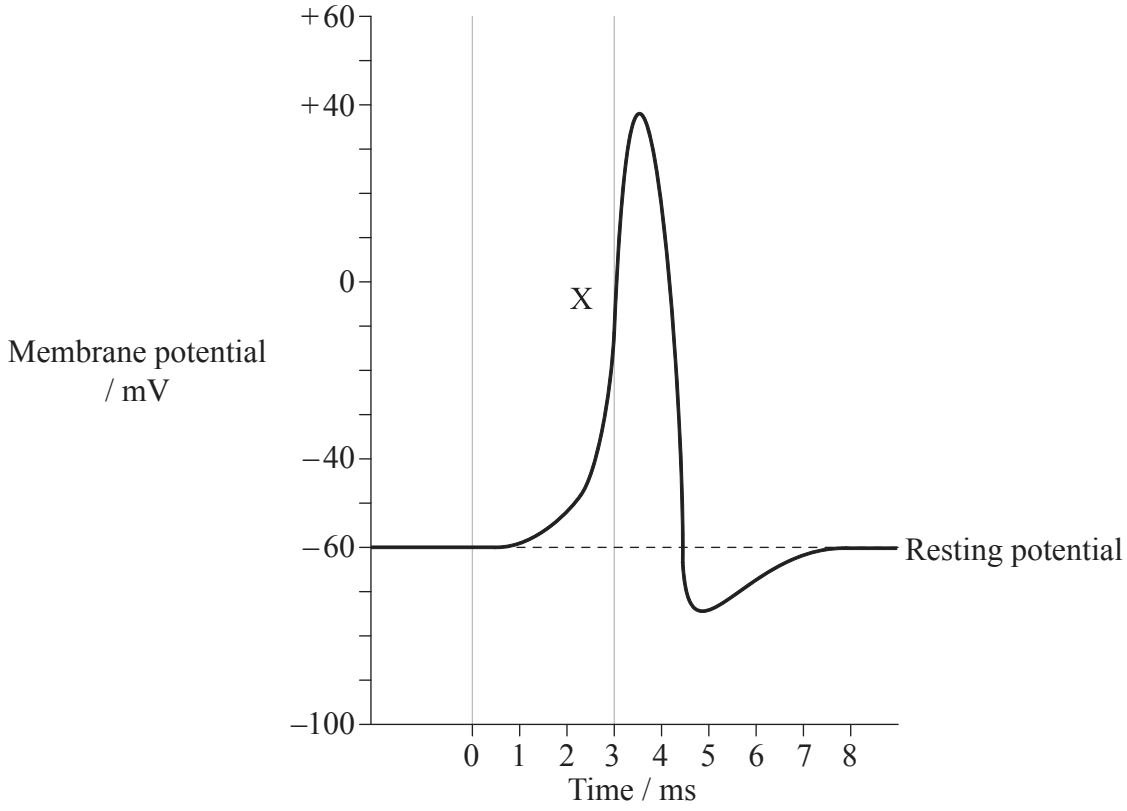
A. carbon dioxide, erythrocytes and platelets

B. amino acids, glucose and urea

C. carbon dioxide, oxygen and heat

D. glycogen, antibodies and urea

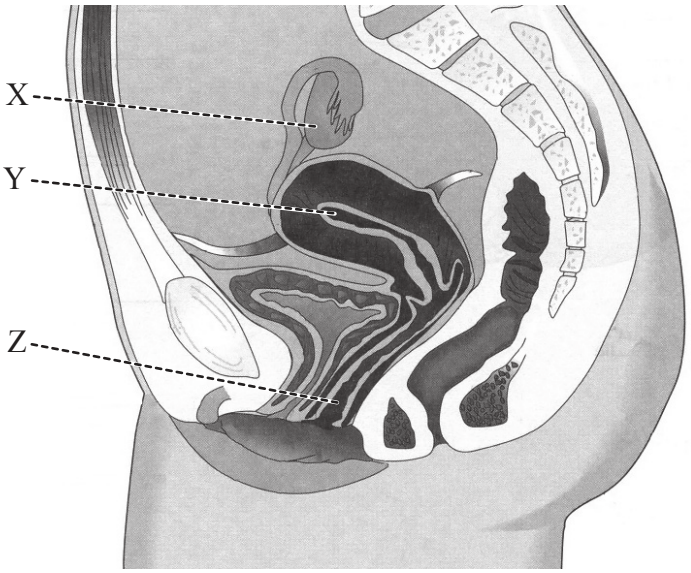
27. The diagram below shows the changes in membrane potential during an action potential.



What best describes events indicated by the label X?

A.	sodium ions diffuse out of the neuron	the inside of the neuron becomes more negative
B.	potassium ions diffuse out of the neuron	the inside of the neuron becomes more negative
C.	potassium ions diffuse into the neuron	the inside of the neuron becomes more positive
D.	sodium ions diffuse into the neuron	the inside of the neuron becomes more positive

28. The diagram below shows the female reproductive system.



[Source: © International Baccalaureate Organization 2014]

What are the structures indicated by X, Y and Z?

	X	Y	Z
A.	oviduct	cervix	vagina
B.	ovary	uterus	vagina
C.	oviduct	bladder	cervix
D.	ovary	uterus	cervix

29. What is the body's response to low blood glucose levels?

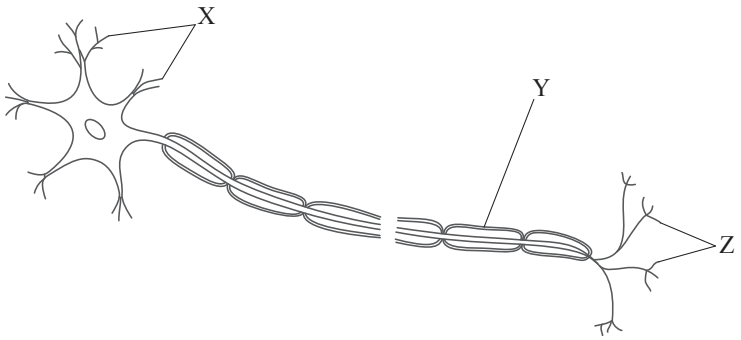
A. Alpha cells in the pancreas secrete glucagon

B. Beta cells in the pancreas secrete insulin

C. Alpha cells in the pancreas secrete insulin

D. Beta cells in the pancreas secrete glucagon

30. The diagram below shows a motor neuron.



[Source: International Baccalaureate Organization 2014]

What are the structures indicated by X, Y and Z?

	X	Y	Z
A.	motor end plates	myelin sheath	dendrites
B.	dendrites	cell body	motor end plates
C.	dendrites	myelin sheath	motor end plates
D.	motor end plates	cell body	dendrites