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BIOLOGY
STANDARD LEVEL
PAPER 1

Wednesday 14 May 2008 (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. Human sperm and eggs both consist of single cells. What is a difference between them?
 - A. Sperm have more chromosomes than eggs.
 - B. Eggs have more chromosomes than sperm.
 - C. Sperm have a larger surface area to volume ratio than eggs.
 - D. Eggs have a larger surface area to volume ratio than sperm.

2. A student observes and draws an Amoeba, using the high power lens of a microscope. The diameter of the drawing is 100 mm. The actual diameter of the Amoeba is 100 μm . What is the magnification of the drawing?
 - A. 0.001
 - B. 100
 - C. 400
 - D. 1000

3. Which types of metabolic activity are found in prokaryotes?
 - I. Fermentation
 - II. Nitrogen fixation
 - III. Photosynthesis
 - A. None
 - B. I only
 - C. I and II only
 - D. I, II and III

4. What is a difference between plant and animal cells?
- A. Animal cells burst when they take in excess water by osmosis whereas plant cells do not.
 - B. Plant cells store cellulose whereas animal cells store starch.
 - C. Animal cells have ribosomes whereas plant cells do not.
 - D. Plant cells have a cell wall whereas animal cells have a cell membrane.
5. What ensures that mitosis produces two genetically identical nuclei?
- A. One of each of the twenty-three types of chromosome is pulled to each pole of the cell by spindle microtubules.
 - B. Half of the chromosomes are pulled to each centriole by mesosomes.
 - C. Identical chromatids are pulled to opposite poles by spindle microtubules.
 - D. DNA molecules are moved to the equator of the cell where they are replicated.
6. What causes water to have a relatively high boiling point?
- A. Hydrogen bonds between water molecules
 - B. Hydrogen bonds between hydrogen and oxygen within water molecules
 - C. Cohesion between water molecules and the container in which the water is boiled
 - D. Covalent bonds between hydrogen and oxygen within water molecules

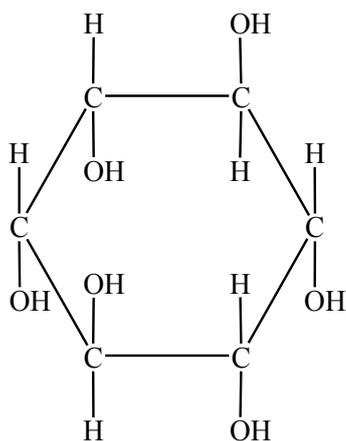
7. Which of the following substances are organic?

- I. Lipids
- II. Water
- III. Carbon dioxide

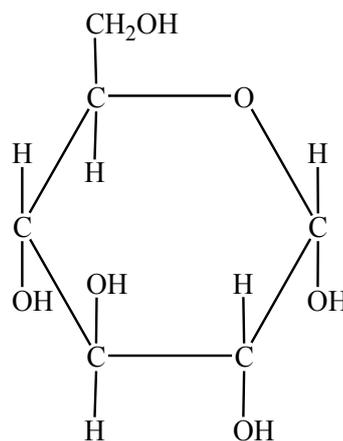
- A. I only
- B. II and III only
- C. I and II only
- D. I, II and III

8. Which of the following molecules is a ribose?

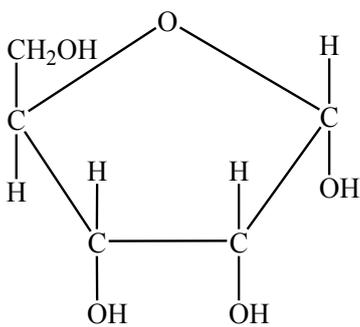
A.



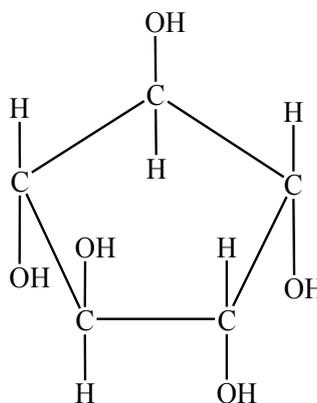
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C.

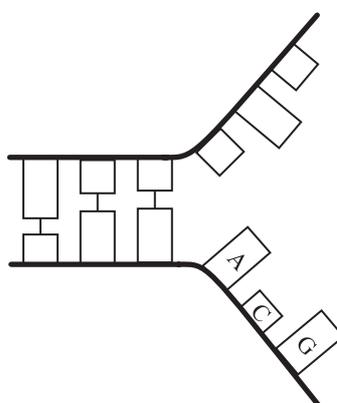


D.



9. When substrate concentration increases, in a reaction catalysed by an enzyme, why does the rate of reaction increase?
- A. The substrate molecules collide more frequently with the active site.
 - B. There are more active sites to catalyse the reaction.
 - C. The substrate molecules are moving faster.
 - D. There are more substrate molecules to catalyse the reaction.

10. The diagram below represents DNA replication. Some of the bases are indicated.



In which direction is the replication fork moving and which bases would be needed to replicate the section of DNA shown?

	Direction of movement of replication fork	Bases needed
A.	Left to right	U, G and C
B.	Right to left	U, G and C
C.	Left to right	T, G and C
D.	Right to left	T, G and C

11. If a polypeptide consists of 240 amino acids, what is the minimum number of nucleotides needed on the sense strand of a gene to code for it?
- A. 80
 - B. 240
 - C. 720
 - D. 1440
12. Where in eukaryotic cells is glucose broken into pyruvate, to release energy for use in the cell?
- A. Chloroplast
 - B. Cytoplasm
 - C. Mitochondrion
 - D. Nucleus
13. In what way are eukaryotic chromosomes different from prokaryotic chromosomes?

	Eukaryotic chromosomes	Prokaryotic chromosomes
A.	Protein is present	Protein is absent
B.	DNA is present	DNA is absent
C.	RNA is present	RNA is absent
D.	RNA is absent	RNA is present

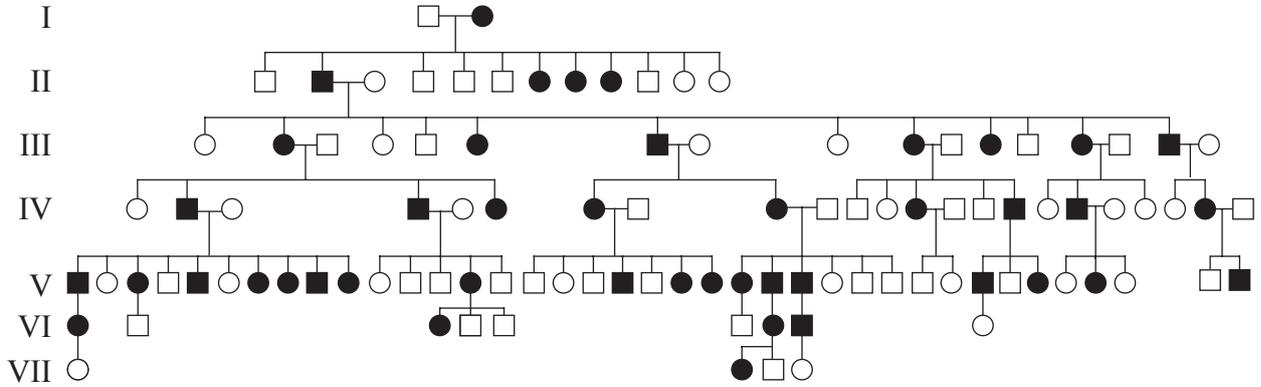
14. What are the final products when a diploid onion cell, containing 16 chromosomes undergoes meiosis?
- A. 4 cells, each with 8 chromosomes
 - B. 2 cells, each with 8 chromosomes
 - C. 4 cells, each with 4 chromosomes
 - D. 2 cells, each with 16 chromosomes
15. Which processes result in the greatest amount of genetic variation in a population?
- A. Natural selection and meiosis
 - B. Meiosis and mutation
 - C. Mutation and mitosis
 - D. Mitosis and natural selection
16. Hemophilia is sex-linked and is caused by a recessive allele. A woman's father has hemophilia, but her husband does not.

What is the probability of the women and her husband having a child with hemophilia?

	Probability of a son having hemophilia	Probability of a daughter having hemophilia
A.	50%	0%
B.	0%	0%
C.	100%	0%
D.	0%	50%

17. Brachydactyly, abnormal shortness of the fingers, was the first human genetic disorder found to be caused by a dominant allele.

The pedigree below shows a family with affected males ■, unaffected males □, affected females ● and unaffected females ○.



What are the genotypes of the father and mother in the first generation, using the symbol B for the dominant alleles and symbol b for recessive allele?

- A. bb and BB
 - B. bb and Bb
 - C. Bb and BB
 - D. BB or Bb and bb
18. There are many different views on the ethics of reproductive cloning in humans. Which is a valid argument **against** cloning in humans?
- A. It involves the use of donor sperm which is unethical.
 - B. It happens naturally when identical twins are conceived.
 - C. Only females can be cloned.
 - D. The life expectancy of children produced by cloning might be lower than normal.

19. What components are needed to make an ecosystem?
- A. A community and its abiotic environment
 - B. A community and its source of energy and nutrients
 - C. Producers and consumers only
 - D. Producers, consumers and decomposers only
20. What is the ecological role of saprotrophic bacteria?
- A. To recycle energy in dead organic matter
 - B. To digest dead organic matter and release nutrients from it
 - C. To ingest dead organic matter and prevent it from accumulating
 - D. To produce dead organic matter by killing organisms
21. Which equation should be used to calculate the mean of a set of values?
- A. $\text{lowest value} + \frac{(\text{highest value} - \text{lowest value})}{2}$
 - B. $\frac{(\text{highest value} - \text{lowest value})}{2} \pm 68\%$
 - C. $\frac{\text{total of all values}}{\text{number of values}}$
 - D. $\frac{\text{number of values}}{\text{total of all values}} \times 100\%$

22. According to Darwin’s theory of evolution, what causes the struggle for survival in populations?
- A. Overproduction of offspring
 - B. Favourable heritable variations
 - C. Natural selection
 - D. Competition between the fittest individuals in the population

23. What is a factor that increases the greenhouse effect and what is a consequence of it?

	Factor contributing to increases in the greenhouse effect	Consequence of the increased greenhouse effect
A.	Increasing global temperatures	Rising sea levels
B.	Rising sea levels	Increasing global temperatures
C.	Increasing global temperatures	Burning fossil fuels to run air conditioning
D.	Increases in air travel	Increasing global temperatures

24. Where is the gall bladder located?
- A. Surrounded by the liver
 - B. Surrounded by the pancreas
 - C. Behind the intestines in the abdomen
 - D. Below the stomach in the abdomen

25. What is the sequence of structures through which oxygenated blood travels?
- A. pulmonary artery → heart → aorta
 - B. pulmonary vein → heart → aorta
 - C. pulmonary artery → heart → pulmonary vein
 - D. pulmonary vein → heart → pulmonary artery
26. Why are antibiotics ineffective against viruses?
- A. Viruses do not have metabolic pathways for the antibiotic to target.
 - B. Viruses have developed resistance to antibiotics.
 - C. Viruses destroy T-lymphocytes before the antibiotic can work.
 - D. Viruses mutate quickly when challenged by an antibiotic.
27. What are antigens?
- A. Substances that stimulate the production of antibodies.
 - B. Harmful bacteria that are contained in vaccines.
 - C. Substances that attack any foreign material when it enters the body.
 - D. Harmful bacteria that are found in some foods.

28. What changes would occur if a person moved from a cold swimming pool to a very warm changing room?

	Transfer of heat in blood to the skin	Temperature of the skin	Rate of blood flow in skin arterioles
A.	Decreases	Increases	Increases
B.	Increases	Decreases	Increases
C.	Increases	Increases	Decreases
D.	Increases	Increases	Increases

29. What substance is released into the blood by the pancreas when blood glucose levels are low?

- A. Glucose
- B. Glucagon
- C. Glycogen
- D. Insulin

30. Do the levels of progesterone and FSH increase or remain low during the first few days of the menstrual cycle?

- A. Progesterone and FSH both remain low.
 - B. Progesterone remains low but FSH increases.
 - C. Progesterone increases but FSH remains low.
 - D. Progesterone and FSH both increase.
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