

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. Which of the following is a metabolic activity of some prokaryotic cells but **no** eukaryotic cells?
- A. Anaerobic respiration
 - B. Fermentation
 - C. Photosynthesis
 - D. Nitrogen fixation

2. Which of the following is required for osmosis to occur?
- A. An enzyme
 - B. A fully permeable membrane
 - C. ATP
 - D. A solute concentration gradient

3. Which of the following are functions of mitosis? ✓ = yes × = no

	Reduction in chromosome number	Tissue repair
A.	×	×
B.	✓	×
C.	×	✓
D.	✓	✓

4. The tendency of water to resist changes in temperature is due to which of the following properties?
- A. Ability to dissolve solutes
 - B. Low density
 - C. Specific heat capacity
 - D. Transparency

5. Which of the following is produced during glycolysis?
- A. $\text{NADH} + \text{H}^+$
 - B. CO_2
 - C. Glucose
 - D. Glycogen
6. In what form is excess glucose stored in human muscles?
- A. Glycogen
 - B. Starch
 - C. Triglycerides
 - D. Cholesterol
7. Which enzyme separates the strands of DNA during replication?
- A. DNA polymerase
 - B. RNA polymerase
 - C. Reverse transcriptase
 - D. Helicase
8. Where do transcription and translation occur in eukaryotic cells?

	Transcription	Translation
A.	Cytoplasm	Cytoplasm
B.	Cytoplasm	Mitochondria
C.	Nucleus	Cytoplasm
D.	Nucleus	Nucleus

9. Which of the following is a product of aerobic respiration?
- A. Ethanol
 - B. Water
 - C. Oxygen
 - D. Lactic Acid
10. Which of the following describe the function(s) of lipids?
- I. Energy storage
 - II. Insulation
 - III. Enzyme activity
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II, and III
11. Which of the following molecules do plants need to carry out photosynthesis?
- I. H_2O
 - II. CO_2
 - III. $\text{C}_6\text{H}_{12}\text{O}_6$
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II, and III

12. Which of the following terms best describes the failure of chromosomes to separate during meiosis?
- A. Codominance
 - B. Trisomy
 - C. Crossing over
 - D. Non-disjunction
13. A woman of blood group AB marries a man of blood group A, whose father was blood group O. What is the probability that their child will have blood group B?
- A. 0 %
 - B. 25 %
 - C. 50 %
 - D. 100 %
14. In addition to blood typing, which of the methods below could be used to determine paternity?
- A. PCR
 - B. DNA profiling
 - C. Cloning
 - D. Karyotyping
15. Which of the following correctly identify the most common end products of mitosis and meiosis?

	Mitosis	Meiosis
A.	Two diploid cells	Four haploid cells
B.	Four diploid cells	Four haploid cells
C.	Four haploid cells	Two diploid cells
D.	Two diploid cells	Two haploid cells

16. What are chromosomes with the same size, banding pattern, centromere location but with different alleles called?
- A. Sister chromatids
 - B. Homologous chromosomes
 - C. Autosomes
 - D. Daughter chromosomes
17. Which statement explains Mendel’s law of segregation?
- A. Genes segregate independently so that one gamete receives one gene independently of the other gamete receiving the other gene.
 - B. Homologues randomly align during metaphase.
 - C. Alleles are inherited together.
 - D. Alleles separate so that half the gametes receive one allele and the other half of the gametes receive the other allele.
18. Which of the following statements correctly describes the carrying capacity of an environment?
- A. The maximum rate of population growth for a species
 - B. The area of land that can support a defined population of a species
 - C. The maximum number of a species that can be sustainably supported by a given environment
 - D. The minimum number of a species that can be sustainably supported by a given environment
19. Which of the following is a greenhouse gas?
- A. Oxygen
 - B. Methane
 - C. Nitrogen
 - D. Sulfur Dioxide

20. Assume that an energy pyramid has four levels (producer level plus three consumer levels) and that the energy of the producer level is set at 100 %. What percentage of the energy from the producer level will be obtained by the tertiary consumers?
- A. 100 %
 - B. 10 %
 - C. 1 %
 - D. 0.1 %
21. Which statement correctly describes the plants *Clarkia cylindrica*, *Clarkia deflexa*, and *Clarkia similis*?
- A. All three belong to the same species.
 - B. Each belongs to a different group.
 - C. All three belong to the same family.
 - D. Each belongs to a different family.
22. Which of the following may correctly identify the role(s) of some bacteria in an ecosystem?
- A. Autotroph only
 - B. Autotroph and decomposer
 - C. Decomposer and heterotroph
 - D. Autotroph, decomposer and heterotroph
23. Which of the following is **not** a kingdom?
- A. Plantae
 - B. Protocista
 - C. Chordata
 - D. Fungi

24. Which of the following is closely associated with lowering of high body temperature?

- A. Constriction of blood vessels in the skin
- B. Vasodilation of blood vessels in the skin
- C. Increased shivering
- D. Decreased sweat production

25. Which of the following correctly explains the functions of parts of the digestive system?

	Stomach	Small intestine	Large intestine
A.	Digests proteins	Absorbs vitamin K	Absorbs water
B.	Absorbs water	Digests carbohydrates	Digests proteins
C.	Digests lipids	Digests proteins	Absorbs water
D.	Digests proteins	Absorbs glucose	Absorbs water

26. Which of the following is correct for a pathogen? √= yes ×= no

	Can be a virus	Can cause antibody response	Is antigenic
A.	√	×	×
B.	√	√	×
C.	×	√	√
D.	√	√	√

27. Which of the following features is essential for alveoli to function?
- A. A dense muscle layer
 - B. A high surface area to volume ratio
 - C. Walls made up of multi-layer of cells
 - D. A dry lining

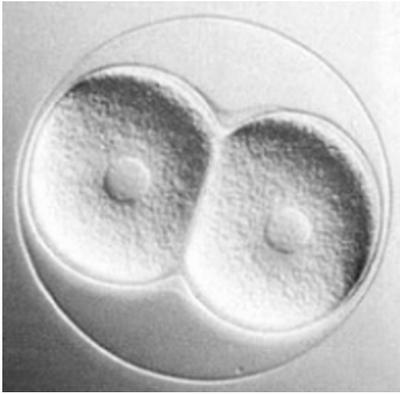
28. Which of the following correctly describe the events during the process of birth?

	Progesterone	Oxytocin	Uterine contractions
A.	Increases	Decreases	Increases
B.	Decreases	Decreases	Decreases
C.	Increases	Increases	Increases
D.	Decreases	Increases	Increases

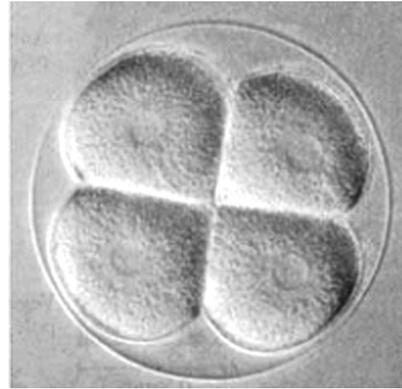
29. The human kidney helps to maintain water balance by removing which of the following substances?
- A. Proteins
 - B. Antigens
 - C. Urea
 - D. Glucose

30. Which of the following represents a blastocyst?

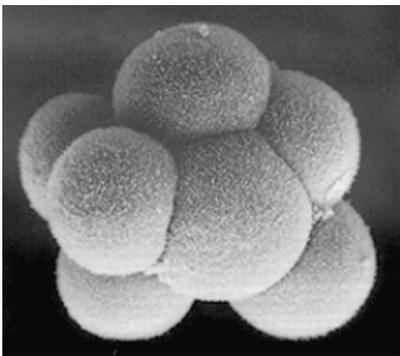
A.



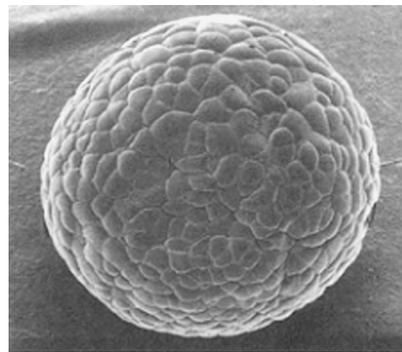
B.



C.



D.



[Source: Campbell and Reece, *Biology*, (2002), 6th edition, Benjamin Cummings, pages 1003–1004]