

22056013

**BIOLOGY
HIGHER LEVEL
PAPER 1**

Wednesday 11 May 2005 (afternoon)

1 hour

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.

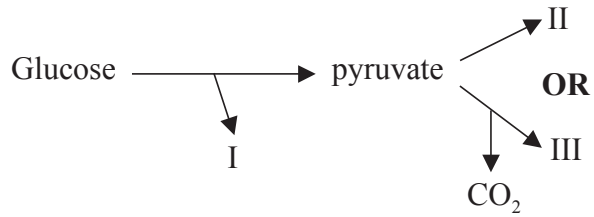
1. Which of the following is a metabolic activity of some prokaryotic cells but **no** eukaryotic cells?
- A. Anaerobic respiration
 - B. Fermentation
 - C. Photosynthesis
 - D. Nitrogen fixation

2. Which of the following are functions of mitosis? √= yes ×= no

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

3. 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
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. In the following generalized diagram of anaerobic respiration, which molecules are represented by I, II and III?



	I	II	III
A.	ATP	Ethanol	Lactate
B.	Ethanol	ATP	Lactate
C.	Lactate	Ethanol	ATP
D.	ATP	Lactate	Ethanol

6. Which of the following could cause denaturation of an enzyme?

- A. Substrate concentration
- B. A competitive inhibitor
- C. High temperature
- D. Low salt concentration

7. Where do transcription and translation occur in eukaryotic cells?

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

8. The codons CCU and CCC both code for the amino acid proline. What property of the genetic code does this illustrate?
- A. It is universal.
 - B. It is degenerate.
 - C. One gene codes for one polypeptide.
 - D. There are overlapping genes.
9. 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 %
10. Which statement explains Mendel's law of segregation?
- A. Alleles separate so that half the gametes receive one allele and the other half of the gametes receive the other allele.
 - B. Homologues randomly align during metaphase.
 - C. Alleles are inherited together.
 - D. Genes segregate independently so that one gamete receives one gene independently of the other gamete receiving the other gene.
11. Which of the following correctly identifies 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

12. If the allele for short hair (L) is completely dominant to the allele for long hair (l), which statement is correct for animals LL and Ll?
- A. They have the same parents.
 - B. They have the same phenotypes.
 - C. They have the same genotypes.
 - D. They have the same alleles.
13. Which statement most accurately 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.
14. Which of the following is a characteristic of evolution?
- A. Evolution is a cumulative change in heritable characteristics in a population.
 - B. Evolution occurred in the past but does not happen today.
 - C. Evolution is dependent on the inheritance of acquired characteristics.
 - D. Evolution is progressive and leads to more advanced organisms.
15. 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 population of a species that can be sustainably supported by a given environment
 - D. The minimum population of a species that can be sustainably supported by a given environment

16. 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

17. Which of the following can produce variation in a species?

- I. Mitosis
- II. Meiosis
- III. Fertilization

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

18. 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.	✓	✓	✓

19. 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

20. Which of the following correctly describes blood entering the pulmonary artery from the heart?

A.	Leaves left ventricle	Oxygenated
B.	Leaves right ventricle	Deoxygenated
C.	Leaves left ventricle	Deoxygenated
D.	Leaves right ventricle	Oxygenated

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

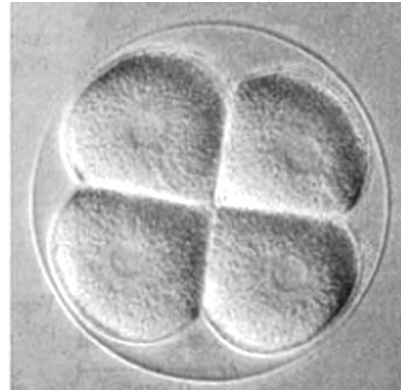
	Stomach	Small intestine	Large intestine
A.	Digests proteins	Absorbs vitamin K	Absorbs water
B.	Absorbs water	Digests carbohydrates	Digests proteins
C.	Digests lipids	Digests proteins	Absorbs water
D.	Digests proteins	Absorbs glucose	Absorbs water

22. Which of the following represents the blastocyst?

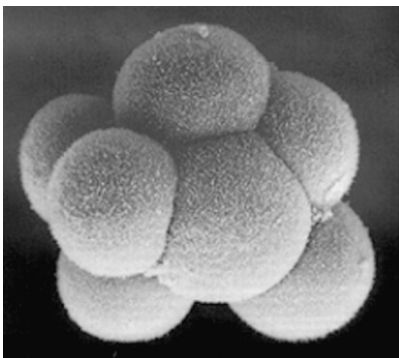
A.



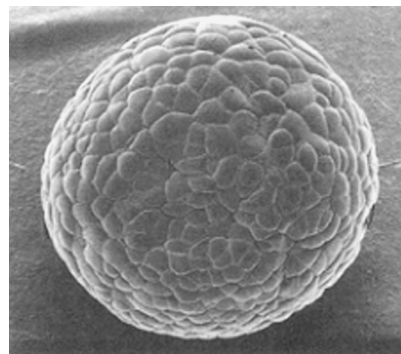
B.



C.



D.



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

23. A biochemist isolated and purified molecules needed for DNA replication. When some DNA was added replication occurred, but the DNA molecules formed were defective. Each consisted of a normal DNA strand paired with segments of DNA a few hundred nucleotides long. Which of the following had been left out of the mixture?

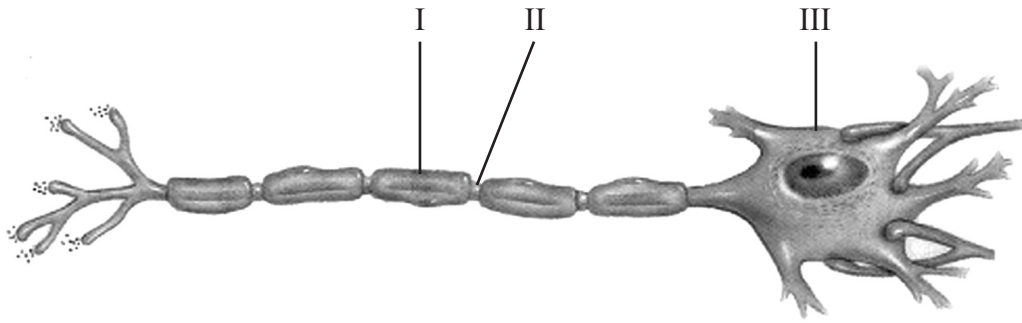
- A. DNA ligase
- B. Helicase
- C. Nucleotides
- D. DNA polymerase

24. How do enzymes speed up biochemical reactions?
- A. By being used up in the reaction
 - B. By increasing activation energy
 - C. By changing the pH of the reaction
 - D. By lowering activation energy
25. What determines the shape of a protein?
- A. The number of peptide linkages
 - B. The sequence of amino acids
 - C. The number of essential amino acids
 - D. The active site
26. Which of the following is produced during glycolysis?
- A. $\text{NADH} + \text{H}^+$
 - B. CO_2
 - C. Glucose
 - D. Glycogen
27. Which of the following produce ATP in mitochondria?
- A. The movement of protons from the matrix to the intermembrane space
 - B. The movement of protons from the intermembrane space to the cytoplasm
 - C. The splitting of water molecules and the movement of electrons to oxygen
 - D. The movement of protons from the intermembrane space to the matrix

28. Which of the following occur(s) during cyclic photophosphorylation?
- I. Reduction of NADP^+
 - II. Production of ATP
 - III. Photoactivation of photosystem I
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II, and III
29. Which of the following controls skin colour in humans?
- A. Polygenic inheritance
 - B. Multiple alleles
 - C. Codominance
 - D. Recessive alleles
30. If red (RR) is crossed with white (rr) and produces a pink flower (Rr), and tall (D) is dominant to dwarf (d), what is the phenotypic ratio from a cross of Rr dd and rr Dd?
- A. 9:3:3:1
 - B. 50 % pink, 50 % white and all tall
 - C. 1:1:1:1, in which 50 % are tall, 50 % dwarf, 50 % pink and 50 % white
 - D. 3:1

31. Where would meiosis occur in humans?
- A. Bone marrow
 - B. Liver cells
 - C. Uterus
 - D. Ovary
32. What is the primary/main role of human chorionic gonadotrophin (HCG) in pregnancy?
- A. Maintains corpus luteum
 - B. Reduces progesterone levels
 - C. Development of the fetus
 - D. Increases estrogen levels
33. Which of the following are attacked by cytotoxic T-cells?
- I. Cancer cells
 - II. Bacteria
 - III. Virus infected cells
- A. I only
 - B. I and III only
 - C. II and III only
 - D. I, II and III

34. The diagram below is of a neuron.



[Source: adapted from S I Fox, *Human Physiology*, (1999), 6, McGraw-Hill, page 168]

Which of the following correctly name the structures labelled I, II and III?

	I	II	III
A.	Nodes of Ranvier	Myelin sheath	Cell body
B.	Myelin sheath	Nodes of Ranvier	Cell body
C.	Myelin sheath	Cell body	Nodes of Ranvier
D.	Nodes of Ranvier	Cell body	Myelin sheath

35. When a motor neuron is at its resting potential, which of the following is correct for the concentration of Na⁺ and K⁺ ions?

	Inside neuron	Outside neuron
A.	K ⁺ high	Na ⁺ low
B.	Na ⁺ low	K ⁺ high
C.	K ⁺ high	Na ⁺ high
D.	Na ⁺ high	K ⁺ low

36. Which nitrogenous waste products are excreted by the following organisms?

	Freshwater fish	Birds	Mammals
A.	Urea	Urea	Uric acid
B.	Ammonia	Uric acid	Ammonia
C.	Ammonia	Uric acid	Urea
D.	Uric acid	Ammonia	Urea

37. In diabetes mellitus, which compound is found in excess in the urine?

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

38. Which of the following help(s) in supporting a terrestrial woody plant?

- I. Xylem tissue
 - II. Turgor pressure
 - III. Phloem tissue
- A. I only
 - B. I and II only
 - C. II and III only
 - D. I, II and III

- 39.** Which of the following would be an adaptation made by a xerophytic plant?
- A. Reduced root surface area
 - B. Increased air space
 - C. Increased number of stomata
 - D. A thicker cuticle
- 40.** Which of the following explains why some people place clear plastic bags over their houseplants when they will be left unattended for two weeks?
- A. Transpiration will be slowed and more water will remain in the soil.
 - B. Carbon dioxide will build up in the bag and increase photosynthesis.
 - C. Heat will build up in the bag and keep the plant from freezing.
 - D. Light intensity will be increased and increase photosynthesis.
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