IB Questionbank Biology

**Year 12 Practice Questions**

74 min

59 marks

**1.** A cell has cytoplasm, a cell wall, naked DNA and ribosomes. Based on this information, what type of cell could this be?

A. A cell from a pine tree

B. A grasshopper cell

C. A human red blood cell

D. A bacterium

(Total 1 mark)

**2.** The diagram below shows part of a DNA molecule that is being replicated.



Where would DNA polymerase link the next nucleotide during replication?

A. I

B. II

C. III

D. IV

(Total 1 mark)

**3.** What is the function of the structure labelled X?



[From: www.medical-look.com/human\_anatomy/organs/Lungs.html]

A. Gas exchange

B. Ventilation

C. Respiration

D. Inspiration

(Total 1 mark)

**4.** Why are antibiotics effective against bacteria but not viruses?

A. Viruses can hide inside host cells.

B. Bacteria are recognized as pathogens but viruses are not.

C. The enzymes of bacteria can be inhibited by antibiotics.

D. Viruses are resistant to antibiotics.

(Total 1 mark)

**5.** A parent organism of unknown genotype is mated in a test cross. Half of the offspring have the same phenotype as the parent. What can be concluded from this result?

A. The parent is homozygous dominant for the trait.

B. The trait being inherited is polygenic.

C. The parent is heterozygous for the trait.

D. The parent is homozygous recessive for the trait.

(Total 1 mark)

**6.** The table below shows the codons that determine different amino acids in protein translation.

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| --- | --- | --- | --- | --- | --- |
| **First base** | **Second base in codon** | | | | **Third base** |
| **in codon** | **U** | **C** | **A** | **G** | **in codon** |
| U | Phe | Ser | Tyr | Cys | U |
|  | Phe | Ser | Tyr | Cys | C |
|  | Leu | Ser | — | — | A |
|  | Leu | Ser | — | Trp | G |
| C | Leu | Pro | His | Arg | U |
|  | Leu | Pro | His | Arg | C |
|  | Leu | Pro | Gln | Arg | A |
|  | Leu | Pro | Gln | Arg | G |
| A | Ile | Thr | Asn | Ser | U |
|  | Ile | Thr | Asn | Ser | C |
|  | Ile | Thr | Lys | Arg | A |
|  | Met | Thr | Lys | Arg | G |
| G | Val | Ala | Asp | Gly | U |
|  | Val | Ala | Asp | Gly | C |
|  | Val | Ala | Glu | Gly | A |
|  | Val | Ala | Glu | Gly | G |

What is the sequence of the amino acids that is being translated from the following mRNA sequence?

5´ AUGGGUGCUUAUUGGUAA 3´

A. Met-Pro-Arg-Ile-Thr

B. Met-Cys-Ser-Tyr-Trp

C. Met-Gly-Ala-Tyr-Trp

D. Met-Gly-Tyr-Ala-Thr

(Total 1 mark)

**7.** If a mitochondrion has a length of 5 µm and a student’s drawing of the mitochondrion is 10 mm, what is the magnification of the drawing?

A. ×0.0005

B. ×0.5

C. ×200

D. ×2000

(Total 1 mark)

**8.** (a) Body mass index (BMI) can be calculated from the mass (in kg) and height (in m) of an individual. The status of an individual can then be determined from a scale such as the one shown below.

|  |  |
| --- | --- |
| **BMI / kg m–2** | **Status** |
| < 18.5 | Underweight |
| 18.5–24.9 | Normal weight |
| 25.0–29.9 | Overweight |
| ≥ 30.0 | Obese |

(i) Calculate the BMI for an individual whose mass is 74.0 kg and who has a height of 1.80 m.

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(1)

(ii) On the basis of the BMI calculated in (a)(i), identify the status of this individual.

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(1)

(b) Outline factors that can lead to an individual becoming obese.

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(3)

(Total 5 marks)

**9.** The term *fitness* can be defined as “the physical condition of the body that allows it to perform exercise of a particular type”. Becoming fit requires training a range of muscles and improving the performance of the cardiovascular and pulmonary systems.

(a) State **two** changes in the performance of the cardiovascular system that could occur after a training programme.

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(2)

(b) Intense exercise during training can lead to a condition called oxygen debt. Outline how oxygen debt is repaid.

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(2)

(c) Warming up and down routines are often used by athletes as a way of avoiding injuries during training. Outline the importance of warm-up exercises for avoiding injuries.

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(2)

(Total 6 marks)

**10.** The electron micrograph below shows an *E. coli* cell.



[Source: www.microbiology.umaryland.edu/images/bact\_em.jpg]

(a) Identify the structures labelled A and B in the electron micrograph above and state **one** function of each.

A: Name .......................................................................................................

Function .......................................................................................................

B: Name .......................................................................................................

Function .......................................................................................................

(2)

(b) Compare prokaryotic and eukaryotic cells.

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(3)

(Total 5 marks)

**11.** The diagram below shows two nucleotides linked together to form a dinucleotide.



(a) (i) Identify the chemical group labelled I.

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(1)

(ii) State the type of bond labelled II.

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(1)

(b) Distinguish between the sense and antisense strands of DNA during transcription.

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(1)

(c) Compare the DNA found in prokaryotic cells and eukaryotic cells.

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(2)

(Total 5 marks)

**12.** (a) State **two** functions of proteins, giving a **named** example of each.

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(2)

(b) Explain the significance of polar and non-polar amino acids.

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(3)

(Total 5 marks)

**13.** Explain how and why ventilation rate varies with exercise.

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(Total 6 marks)

**14.** *Up to two additional marks are available for the construction of your answers.*

**(2)**

(a) Outline the cause and transmission of AIDS.

(5)

(b) Describe how phagocytic leucocytes may act as a defence against disease.

(4)

(c) Explain the principle of homeostasis with reference to the control of body temperature.

(9)

(Total 20 marks)