

1. During protein synthesis mRNA is produced by the process of 'transcription'.

Where is mRNA produced?

- A nucleus
- B nucleolus
- C ribosome
- D rough endoplasmic reticulum

Your answer

[1]

2. Fig. 24.1 shows the structure of an ATP molecule.

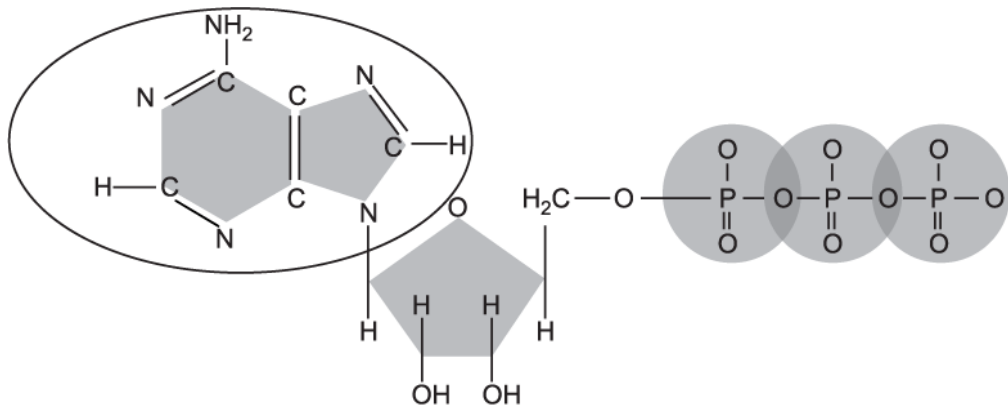


Fig. 24.1

Which part of the ATP molecule is circled?

- A adenine
- B adenosine
- C ribose
- D deoxyribose

Your answer

[1]

3. A length of template DNA has the following sequence: GATACTCCTAG.

Which of the options, A to D, is the mRNA sequence that would be transcribed from this length of DNA?

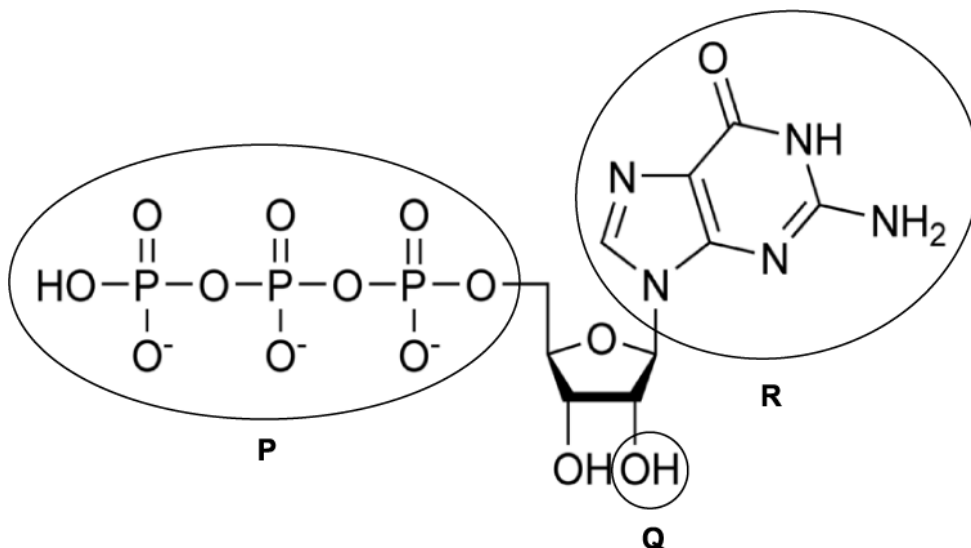
- A CTAGGAGTATC
- B CUAGGAGUAUC
- C CTATGAGGATC
- D CUAUGAGGAUC

Your answer

[1]

4. The structure of a guanosine triphosphate (GTP) molecule is shown below.

Three regions of the molecule have been circled and labelled P, Q and R.



Which of the options, A to D, gives the regions that are structurally different to an adenosine monophosphate (AMP) molecule?

- A P, Q and R
- B P and Q
- C P and R
- D Q and R

Your answer

[1]

5. A DNA sequence is composed of 30 percent guanine.

Which of the options, A to D, is the percentage of the sequence that is composed of adenine?

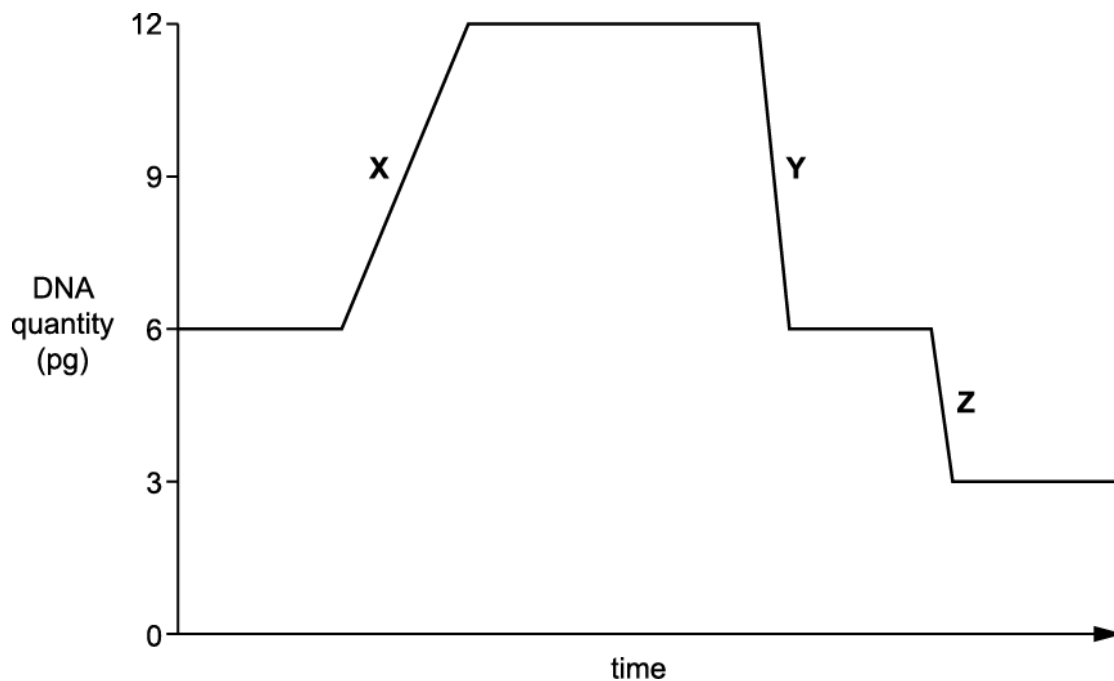
- A 20
- B 30
- C 60
- D 70

Your answer

[1]

6. The quantity of DNA in a cell changes throughout the cell cycle. The graph below shows these changes in a primary spermatocyte.

Three points on the graph are labelled X, Y and Z.



Which of the following statements is/are correct?

- 1 X represents the semi-conservative replication of DNA.
- 2 Z would result in the formation of a spermatid.
- 3 Y and Z represent telophase.

- A 1, 2 and 3 are correct
- B Only 1 and 2 are correct
- C Only 2 and 3 are correct
- D Only 1 is correct

Your answer

[1]

7. A gene mutation causes part of a DNA sequence to change from TAC to TAA.

TAA is a stop codon.

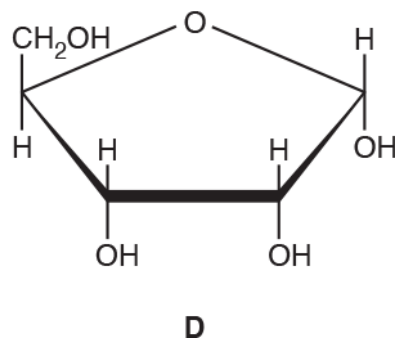
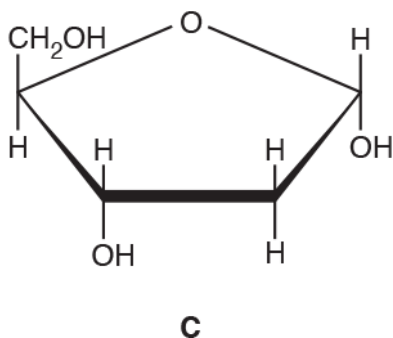
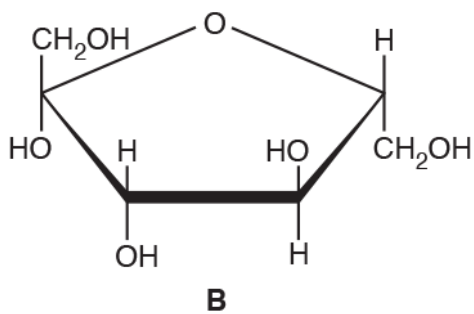
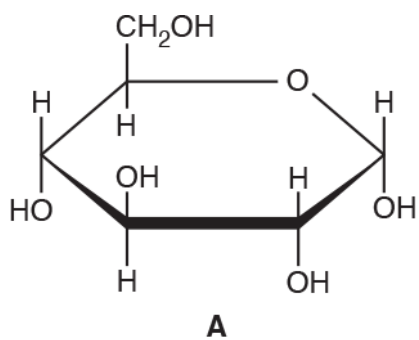
Which of the statements, A to D, is a correct explanation of why the stop codon may not affect translation of the mRNA sequence?

- A TAA also codes for an amino acid
- B TAA stops transcription, not translation
- C the mutation in the mRNA sequence may be repaired
- D the stop codon may not be present in the mature mRNA sequence

Your answer

[1]

8. Which of the molecules, A to D, can be described as a pentose monosaccharide with a general formula of $C_x(H_2O)_y$?



Your answer

[1]

9. During the semi-conservative replication of DNA, which of the enzymes, A to D, is required to break hydrogen bonds between the nitrogen-containing bases?

- A DNA polymerase
- B DNA primase
- C DNA ligase
- D DNA helicase

Your answer

[1]

10. A student is purifying DNA from a bacterial culture.

Which of the molecules, A to D, is required for the precipitation of DNA during the purification process?

A ethanol

B glucose

C lysozyme

D water

Your answer

[1]

END OF QUESTION PAPER

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
1			A	1	
			Total	1	
2			A	1	
			Total	1	
3			D	1	
			Total	1	
4			C	1	
			Total	1	
5			A ✓	1	
			Total	1	
6			B ✓	1	
			Total	1	
7			D ✓	1	<p>Examiner's Comments This question was assessing whether candidates understood that not all the DNA sequence is transcribed into mature mRNA. The most common incorrect response was that repair of the mRNA took place.</p>
			Total	1	
8			D	1	<p>Examiner's Comments This biochemistry-based question proved challenging. Candidates were required to use their knowledge of pentose and hexose structures to choose the correct diagram for a given molecular formula. The only pentose i.e. C5 monosaccharides were found in options C and D. Counting the atoms within the molecules would have given candidates the only possible option for the ratio of hydrogen to oxygen as option D.</p>
			Total	1	
9			D	1	
			Total	1	

Mark Scheme

Question			Answer/Indicative content	Marks	Guidance
10			A	1	
			Total	1	