A.1.2. Nucleic acids [13 marks]

1. [Maximum mark: 1]
Which property of DNA explains how genetic information can be replicated accurately?

A. Complementary base pairing

B. The double helical shape

C. 5′ – 3′ bonding in the sugar-phosphate backbone

D. The ability of DNA to bind to histones [1]

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2. [Maximum mark: 1]
Which of the following complementary base pairs is/are found in a DNA double helix?

I. Cytosine – guanine

II. Thymine – adenine

III. Adenine – uracil

A. I only

B. I and II only

C. II and III only

D. I, II and III [1]

3. [Maximum mark: 1]

Which codon would be found in RNA but not in DNA?

A. GTU

B. UCA

C. ATC

D. CGC [1]

4. [Maximum mark: 1]

What are components of DNA and RNA?

	DNA	RNA	Both DNA and RNA
A.	ribose	deoxyribose	uracil
B.	ribose	deoxyribose	adenine
C.	deoxyribose	ribose	uracil
D.	deoxyribose	ribose	adenine

[1]

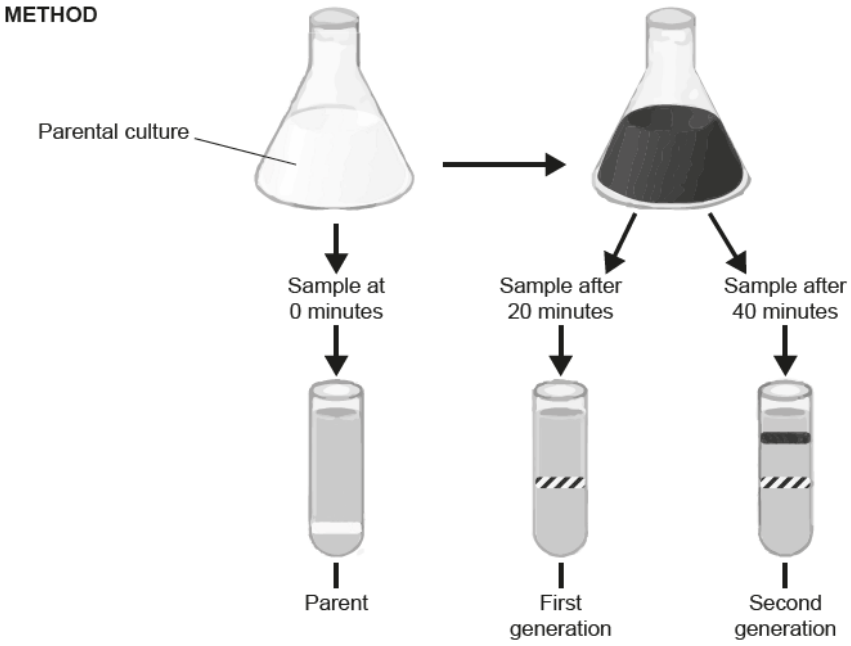
5. [Maximum mark: 6]

(a) Draw a labelled diagram showing the structure of a DNA nucleotide.

[3]

(b) Meselson and Stahl grew bacteria in a medium with ^{15}N (heavy nitrogen) so that all bacteria in the parental culture contain heavy DNA. They then transferred some of the bacteria to a medium with ^{14}N (light nitrogen).

Samples were taken at 0, 20 and 40 minutes and centrifuged with the results as shown.



(b.i) Explain the results of the first and second generation. [2]

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(b.ii) State the conclusion Meselson and Stahl drew from their experiment. [1]

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6. [Maximum mark: 1]
Which subunits would be connected by hydrogen bonds in a DNA molecule?

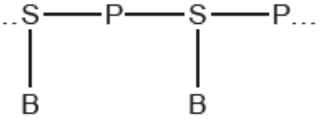
A. Phosphate to deoxyribose sugar

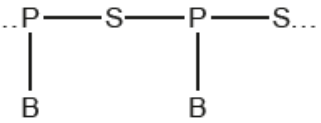
B. Thymine to deoxyribose sugar

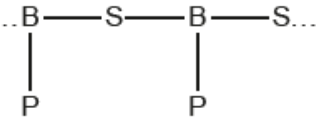
C. Adenine to uracil

D. Cytosine to guanine [1]

7. [Maximum mark: 1]
What is the arrangement of the components of nucleotides in a single DNA strand?

A. 

B. 

C. 

D. 

Key:
S – sugar
P – phosphate group
B – organic base

[1]

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8. [Maximum mark: 1]
What is the arrangement of subunits in a DNA nucleotide?

A. sugar – base – phosphate

B. sugar – phosphate – base

C. phosphate – sugar – base

D. sugar – phosphate – base – base – phosphate – sugar [1]

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