

7.1 DNA Structure & Replication

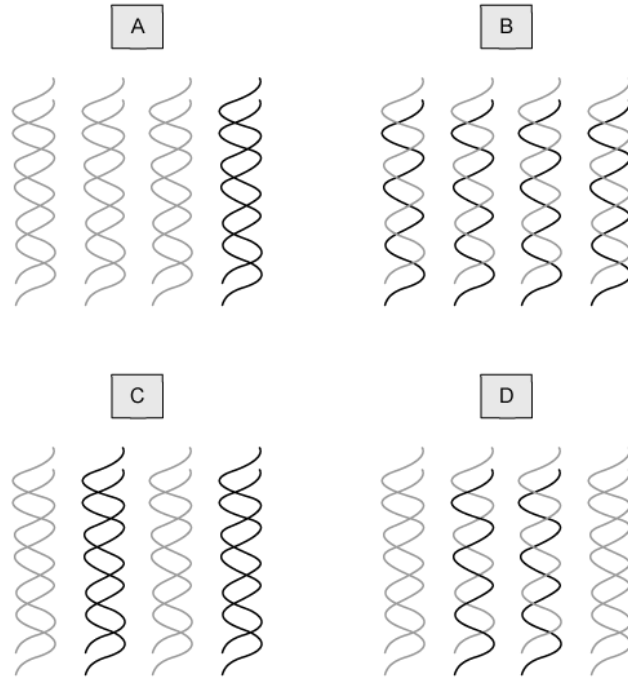
Question Paper

Course	DP IB Biology
Section	7. Nucleic Acids (HL Only)
Topic	7.1 DNA Structure & Replication
Difficulty	Hard

Time allowed: 10
Score: /5
Percentage: /100

Question 1

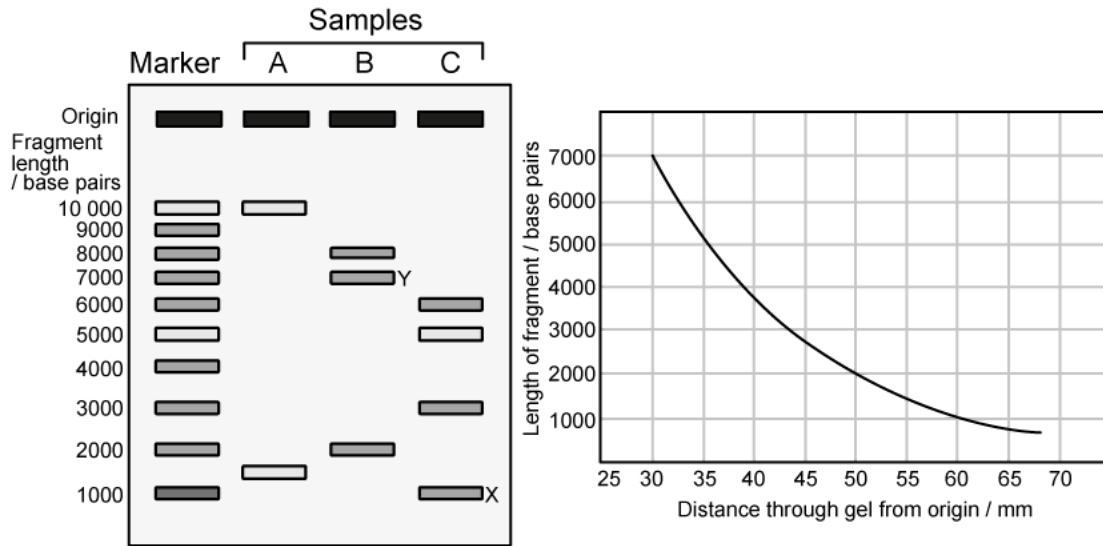
Which of the following shows the appearance of the DNA strands that would result after **two** rounds of DNA replication? Note that the black strands represent DNA present in the original DNA molecule. The grey strands represent newly-synthesised DNA.



[1 mark]

Question 2

A DNA profile was created for two genes in three individuals (A, B, and C).



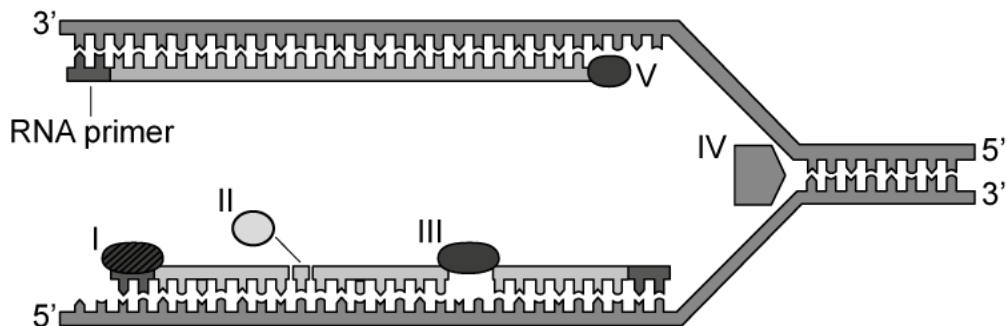
Which of the following statements, relating to the images provided, are correct?

- I. The relationship between DNA fragment length and distance moved through the gel is linear.
 - II. Fragment length is determined by the number of VNTRs.
 - III. There is a percentage increase of 50 % between the distance moved by fragment Y and that moved by fragment X.
 - IV. Individual A is homozygous for both of the genes tested.
- A. I, II, and III only.
 B. I, II, III, and IV.
 C. II and IV only.
 D. III and IV only.

[1 mark]

Question 3

Which row correctly identifies the enzymes in a replication fork?



	I	II	III	IV	V
A.	DNA primase	DNA ligase	DNA polymerase I	Helicase	DNA polymerase III
B.	DNA polymerase III	DNA ligase	DNA polymerase I	Helicase	DNA primase
C.	DNA primase	DNA ligase	DNA primase	DNA polymerase III	DNA polymerase I
D.	DNA polymerase I	DNA polymerase III	DNA ligase	DNA gyrase	DNA helicase

[1 mark]

Question 4

Which of the following statements about DNA sequencing are correct?

- I.
Fragments of different length can be separated using gel electrophoresis.
- II.
PCR requires the use of primers, deoxyribonucleotides, RNA polymerase, and labelled dideoxynucleotides.
- III.
The terminator nucleotide indicates the base present at each position in the sequence.
- IV.
Dideoxynucleotides are incorporated at specific points in the DNA sequence.

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

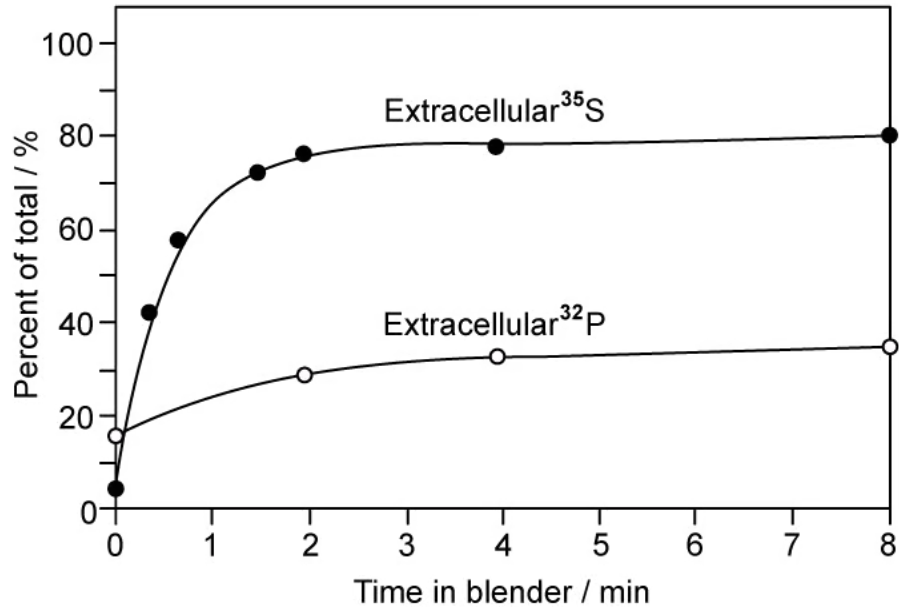
[1 mark]

Question 5

Hershey and Chase carried out an experiment to determine whether the molecule of heredity was protein or DNA; their results after centrifugation are shown below.

Note the following:

- Extracellular material is found in the supernatant.
- The y-axis shows the percentage of each radioactive element present in the supernatant; the remainder of each element ends up in the pellet.



Which of the following can be concluded from the results shown?

- A. No viral protein enters the infected bacterial cells.
- B. DNA has a greater mass than protein.
- C. Around 80 % of the viral DNA enters the infected bacterial cells.
- D. Most proteins are separated from the bacterial cells by the blending process.

[1 mark]