



EXAM PAPERS PRACTICE

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Level: SL IB in Biology
Subject: Biology
Topic: IB SL Biology
Type: Topic Question

2002



1583

All International Baccalaureate IB Topic Questions SL Biology

BIOLOGY

SL - IB

Key skills

Mark Scheme

Answer 1

The correct answer is C because even though Crick and Watson hypothesised about semi-conservative replication, which made sense after their discovery of DNA's structure, Meselson and Stahl were the first scientists to provide unequivocal proof of the hypothesis.

Statement I is incorrect because DNA polymerase always works in the 5' to 3' direction (the opposite direction to statement I).

Statement II is incorrect because helicase works first to unwind and unzip the DNA before DNA polymerase can start synthesising a new strand.

Answer 2

The correct answer is D because there are no glycosidic bonds within DNA's structure. Glycosidic bonds tend to be found mainly within carbohydrate molecules (disaccharides and polysaccharides).

A takes place when helicase unzips the original DNA prior to replication.

B occurs when DNA polymerase 'captures' a free nucleotide and holds it briefly in position to be attached to the growing strand.

C takes place as new covalent bonds between sugars and phosphates form, linking nucleotides together in the growing strand.

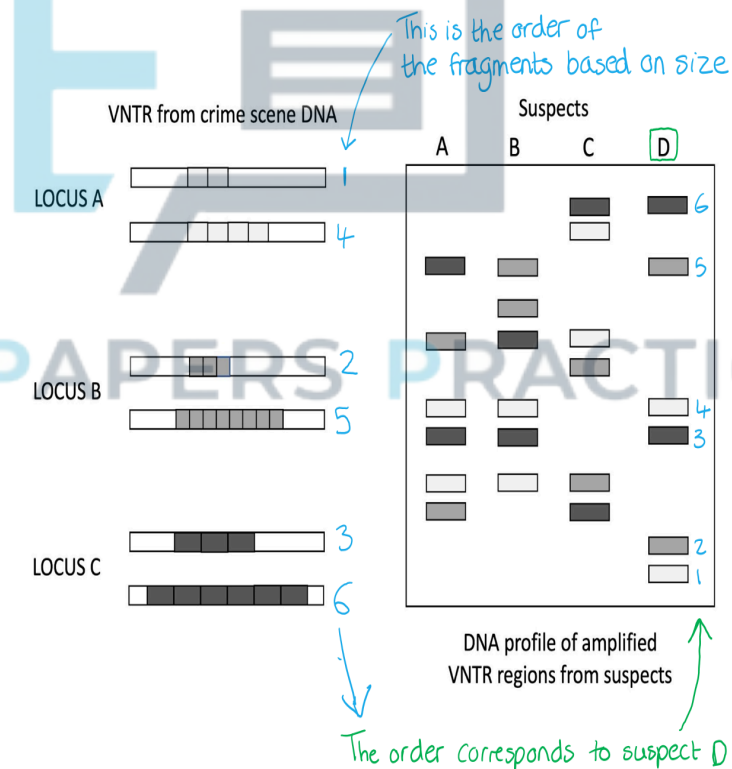
Answer 3

The correct answer is B.

The only incorrect statement is Statement I. The enzyme that has to be used is Taq polymerase from the thermophilic bacterium *Thermus aquaticus*. This is because human DNA polymerase would denature at the high temperatures used in the thermal cyclers during the PCR process.

Answer 4

The correct answer is D because the separation of fragments corresponds to the length/size of the



VNTR regions at each loci.



Answer 5

The correct answer is B because the anode is the positively charged electrode so negative molecules, in this case proteins, will be attracted towards the anode leading to separation. Note that this also applies when separating DNA molecules.

A is incorrect because it doesn't explain the separation of the fragments.

C is incorrect because DNA is negatively charged.

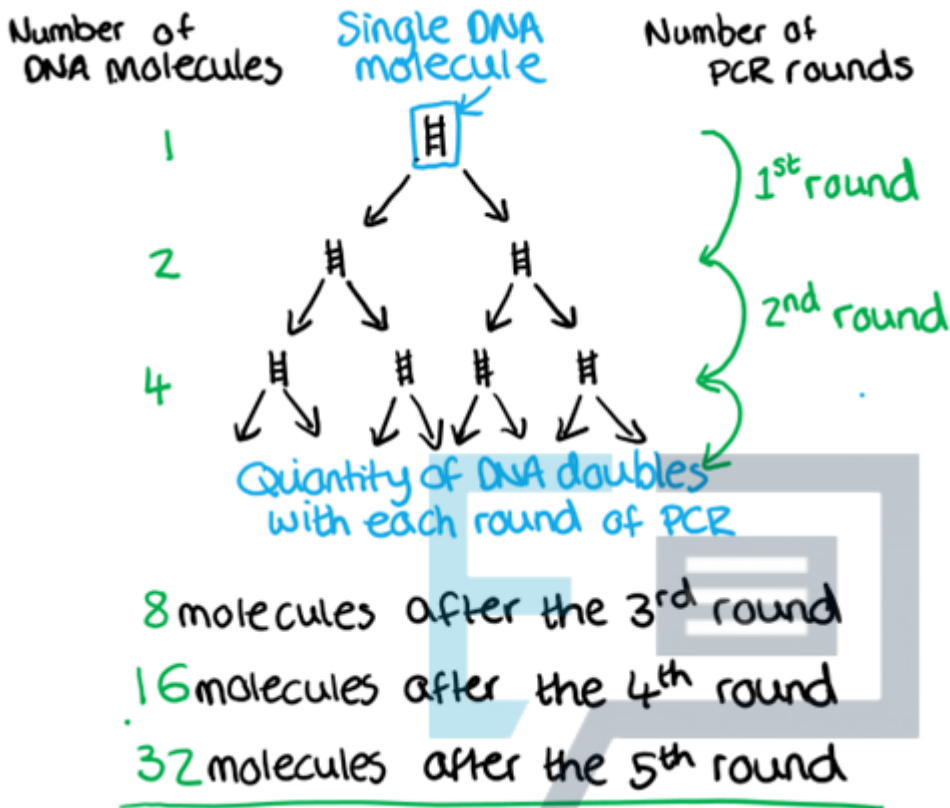
D is incorrect because smaller molecules travel further through the gel.

Answer 6

The correct answer is B because DNA strands are broken apart in denaturation, primers are annealed and then the strand elongates using the primers as a starting point.

Answer 7

The correct answer is C



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Answer 8

The correct answer is B; the same bases coding for the same amino acids across all organisms mean that the code can be transcribed and translated by different species in the same way.

Having 2 strands, as described in A, makes it possible to create exact copies of a template using complementary base pairing. While this may assist with making copies of genes ready for transfer, it does not specifically aid gene transfer between species.

Degeneracy in C refers to the fact that there is more than one triplet of bases that code for each amino acid.

PCR in D is a process that can be used to produce the fragment of DNA required for gene transfer, but it is not a key feature of the genetic code.

Answer 9

The correct answer is B. The profiles show that parents 1 and 2 are the parents of both child 3 and 5, but there is not enough information to indicate that the children are twins.

A can be concluded because none of the bands match up with each other.

C can be concluded because some of the bands on child 4 match up with parent 1 but the remaining bands do not match up with parent 2.

D can be concluded because child 6 has no bands that match up with anyone else in the profile and therefore we can conclude that they are unrelated.



Answer 10

The correct answer is **C**. Helicase is responsible for unwinding the double helix by breaking the hydrogen bonds between the complementary bases in the DNA strands, allowing replication to occur.

A is incorrect because helicase does not form new strands of DNA; that is the role of DNA polymerase.

B is incorrect because joining Okazaki fragments is the role of DNA ligase.

D is incorrect because proofreading is performed by DNA polymerase, not helicase.

Answer 11

The correct answer is **C**. DNA polymerase adds nucleotides to the growing DNA strand by matching complementary bases to the template strand during DNA replication.

A is incorrect because DNA ligase is responsible for joining Okazaki fragments.

B is incorrect because RNA primase synthesizes a short RNA primer, not the nucleotides of the DNA strand.

D is incorrect because topoisomerase relieves tension in the DNA strands by cutting and rejoining them, not adding nucleotides.