

SMART EXAM RESOURCES
TOPIC QUESTIONS: NUCLEIC ACID AND PROTEIN
SYNTHESIS
SUB-TOPIC: DIAGRAM BASED QUESTIONS
SET-2-QP-MS

1

(a) Fig. 4.1 shows part of a DNA molecule.

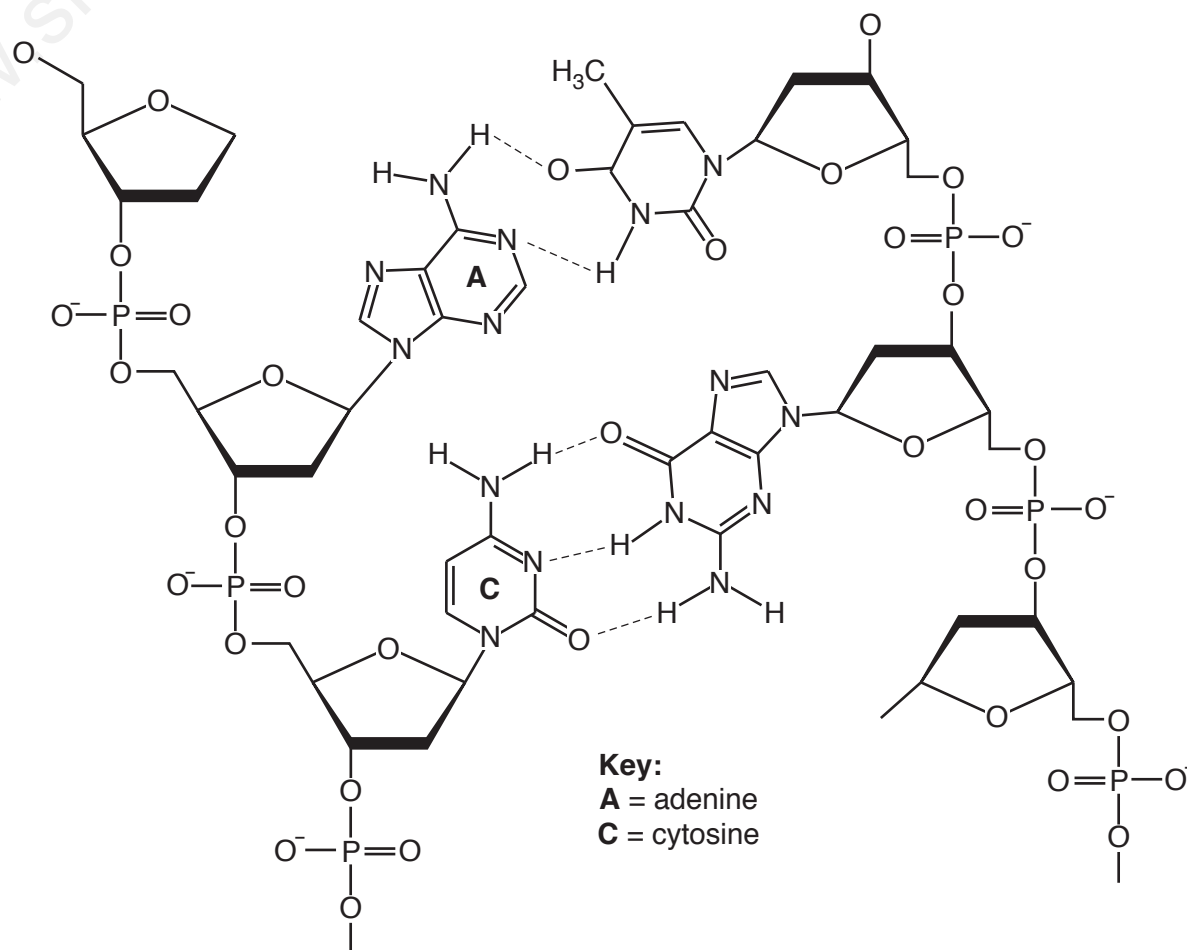


Fig. 4.1

Use Fig. 4.1 to explain how the structure of mRNA differs from the structure of DNA.

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.....

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.....[4]

MARK SCHEME:

<i>mRNA</i>	max 4
1 single-stranded ;	
2 no hydrogen bonding / only DNA has hydrogen bonding ;	
3 no base pairs / only DNA has base pairs ;	
4 uracil and not thymine / DNA has thymine instead of uracil ; <i>treat as neutral T and U, look for complete term</i>	
5 ribose not deoxyribose ;	
6 detail, e.g. -H and not -OH on C2 ;	
7 short(er) / DNA is longer ; A smaller / bigger	
8 not a helix ;	

2

Catalase is an enzyme with a molecular structure composed of four identical sub-units.

Fig. 4.1 is a diagram that shows how catalase is produced in cells.

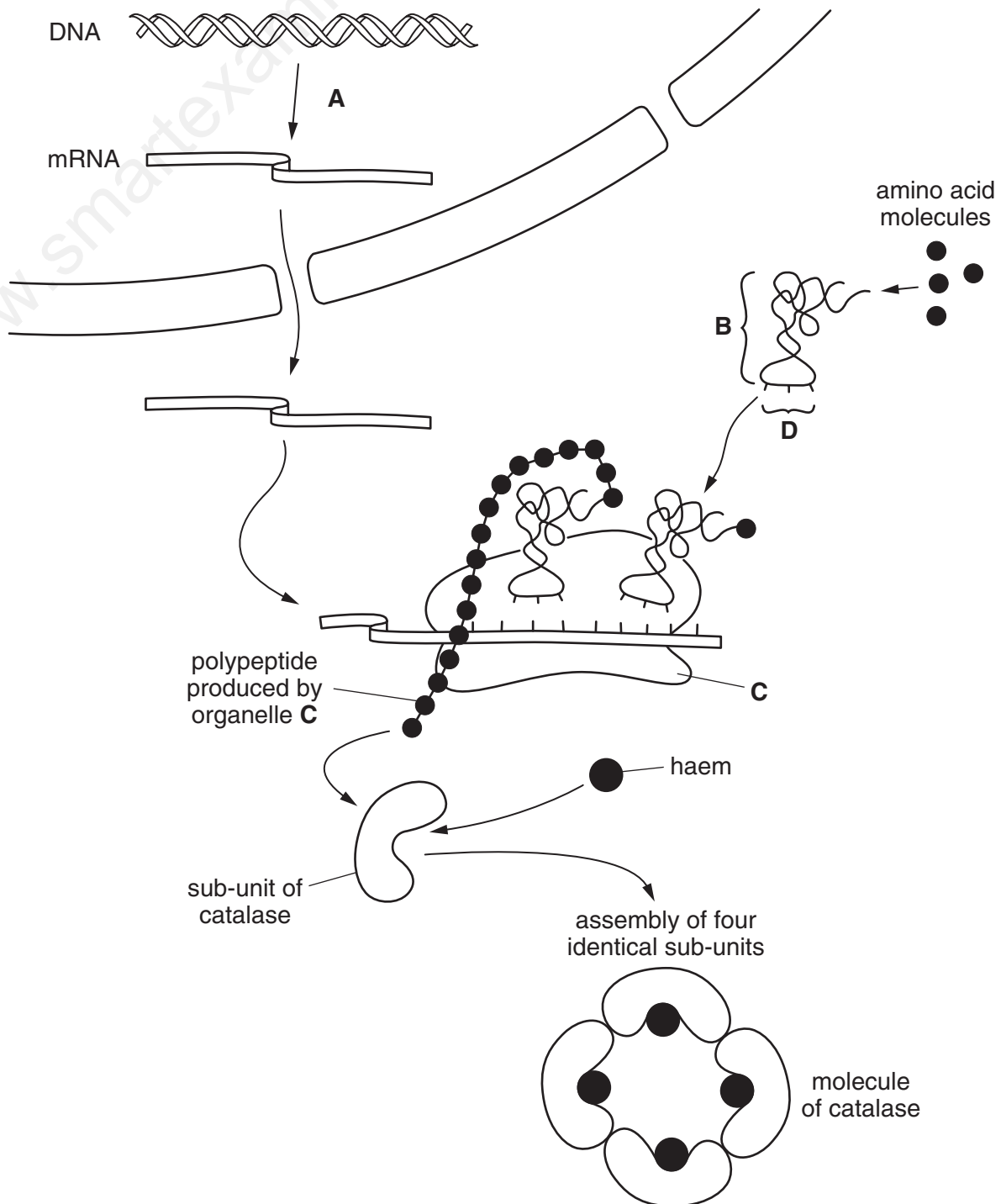


Fig. 4.1

(a) With reference to Fig. 4.1,

(i) name

process **A**

molecule **B**

structure **C**

sequence of bases **D** [4]

MARK SCHEME:

- (a) (i) A transcription ;
B tRNA / transfer RNA ;
C ribosome ; A subunit of ribosome / ribosomal subunit
treat 70S / 80S or small / large as neutral
D anticodon ; [4]**

3

Protein synthesis requires ribosomes, mRNA, tRNA, amino acids and enzymes.

Fig. 4.1 is a diagram of a molecule of tRNA.

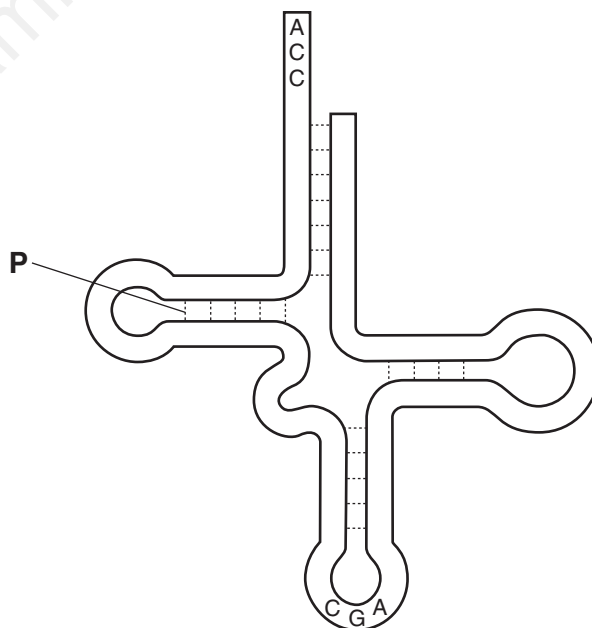


Fig. 4.1

(a) Name the bond labelled P.

.....[1]

(b) Use Fig. 4.1 to describe the role of tRNA in protein synthesis.

You may annotate Fig. 4.1 to help your answer.

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.....
.....
.....
.....
.....
.....
.....[3]

MARK SCHEME:

(a) hydrogen (bond) ;

[1]

(b) *three from*

- 1 tRNA carries an amino acid to ribosomes ;
- 2 (each type of) tRNA carries a specific amino acid ;
- 3 anticodon (on tRNA) binds to codon on mRNA ; *anticodon may be labelled on Fig. 4.1*
- 4 tRNA molecules hold amino acids, in place / in P and A sites (of ribosome), for peptide bond formation ;
- 5 tRNA molecules, reused / described ; **I** tRNA leaves ribosome unqualified
- 6 AVP ; e.g. amino acid is attached to ACC region **I** examples of complementary base pairing between codon and anticodon

[max 3]