SMART EXAM RESOURCES

TOPIC QUESTIONS: NUCLEIC ACID AND PROTEIN SYNTHESIS

SUB-TOPIC: POLYPEPTIDE -PROTEIN-FORMATION

SET-2-QP-MS

1 As a result of transcription and translation, a polypeptide chain is produced. Proteins with quaternary structure contain two or more polypeptide chains.

An antibody molecule and a haemoglobin molecule both show quaternary structure.

(a) Table 6.1 shows some features of an antibody molecule and a haemoglobin molecule.

Complete Table 6.1 to produce a summary of the features of the two molecules.

Table 6.1

feature	antibody	haemoglobin
fibrous or globular		
number and names of polypeptide chains	two heavy and two light chains	
type of bond holding polypeptide chains together		ionic

[3]

(b) The base sequence shown in Fig. 6.1 is a short section of a longer length of DNA that is transcribed to produce mRNA. When translated, this short section produces the amino acid sequence threonine (Thr), proline (Pro), cysteine (Cys).

Fill in the two **unshaded** boxes in Fig. 6.1 to show:

- the mRNA codon for Cys
- the tRNA anticodon for Thr.

You do **not** need to give the codon and anticodon sequences in the shaded boxes.

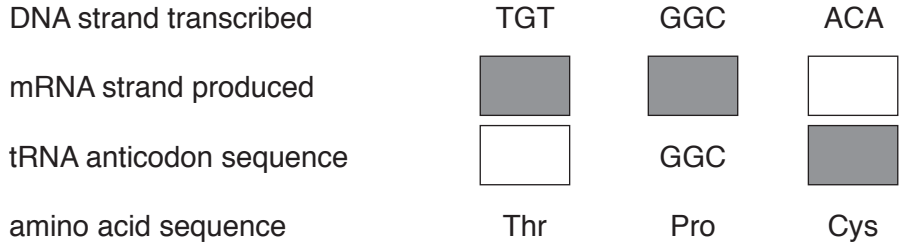

Fig. 6.1

[2]

[Total: 5]

MARK SCHEME:

(a)	*row 1* globular + globular ; *row 2* 2, alpha / α, globin, and 2, beta / β, globin (chains) ; **A** 2 alpha and 2 beta chains *row 3* disulfide (bridges / bonds) ; covalent is neutral	**3**
(b)	*mRNA strand produced* UGU ; *tRNA anticodon sequence* UGU ;	**2**
	Total:	**5**

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.

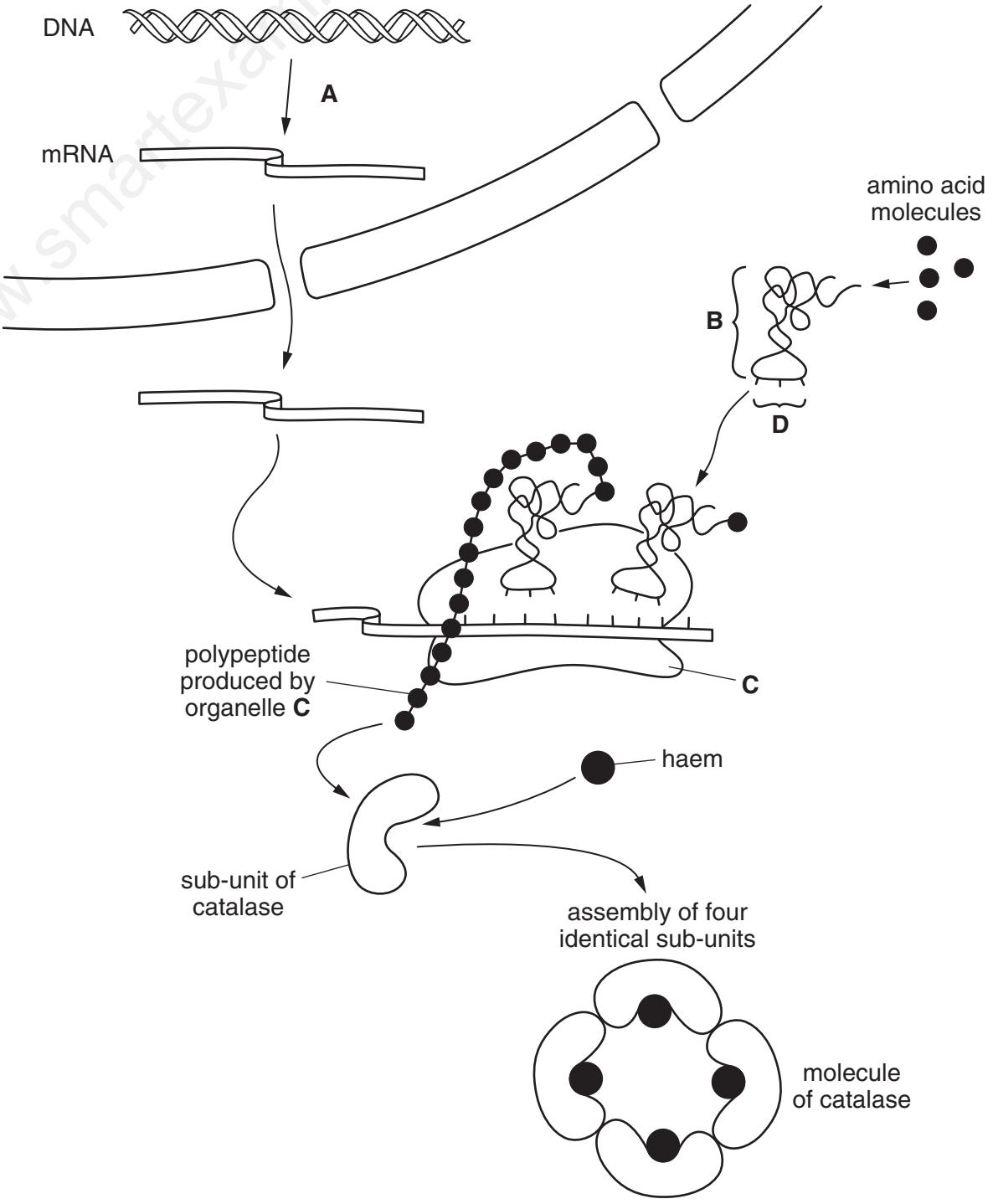

Fig. 4.1

(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]