

## SECTION B

### Question 1 (5 marks)

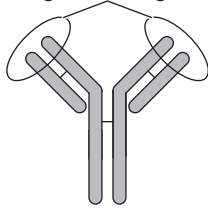
a. C – rough endoplasmic reticulum OR ribosome 1 mark

b. C, D and E 1 mark

*Note: All three in order are required for the mark.*

c. i. antibody 1 mark

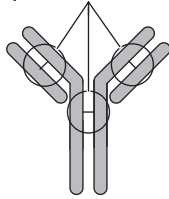
ii. antigen-binding site



1 mark

*Note: Both sites are required for the mark.*

iii. disulfide bonds holding four polypeptide chains together



1 mark

*Note: All three bonds are required for the mark.*

### Question 2 (6 marks)

a. i. The function of the transcription factor is to bind to the RNA polymerase that then changes shape, enabling it to bind to the operator region of the gene. 1 mark

ii. Having the appropriate ‘body form’ that HOX genes are involved in regulating is a distinct survival advantage. Any change/mutation in these genes is likely to be removed from the gene pool. 1 mark

b. i. HOX genes A, C and D (the white colour of the arms and legs illustrates that gene 1 is most active) 1 mark

ii. genes 5 and 7 (the shading means HOX A, B and D are active, and two of these HOX genes suppress structural genes 5 and 7) 1 mark

c. The effects are different due to different combinations and repressions of a different combination of structural genes (HOX A activates 1, 2, 3, 4, 6 and 8, and suppresses 5 and 7, while HOX B activates 1, 2, 3, 4, 5 and 6, and suppresses 7 and 8). 1 mark

The transcription factor has a different shape, leading to a different combination of activation and repression of structural genes. 1 mark