**54.** The diagram below represents an enzyme and a number of other molecules.



(a) Label on the diagram the active site of the enzyme.

[1]

(b) Write the letter of the molecule that is most likely to be the substrate for this enzyme.

........................................................................................................................[1]

(c) Use the information in the diagram to explain **enzyme specificity**.

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(d) One hypothesis of the mechanism of enzyme action is the ‘lock and key’ hypothesis. Another hypothesis, the ‘induced fit’ hypothesis, involves the enzyme changing shape slightly to allow the substrate to fit perfectly. The substrate also changes shape slightly.

Suggest how the **substrate** changing shape slightly will assist enzyme action.

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[1]

[Total 6 marks]

**54.** (a) active site correctly labelled; 1

(b) **C**; 1

(c) shape of active site;complementary;correct shape / correct molecule / correct substrate / **C**, will,fit /  
form ESC;any other shape / any other molecule / any other substrate /  
**A** / **B** / **D** / **E**, will not;*award 2 marks if candidate writes ‘only correct …..’*) 3 max

(d) *look for points relating to the substrate changing shape  
ignore refs to enzyme changing shape*

puts strain on the bonds in the substrate / bonds break more easily; **A** weakens bonds

lowers activation energy;AVP;e.g. referring to anabolic reaction 1 max

[6]