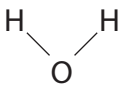
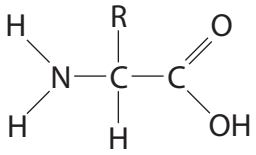
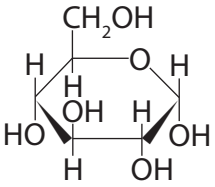
1 The diagram below shows four molecules, P, Q, R and S, found in living organisms.



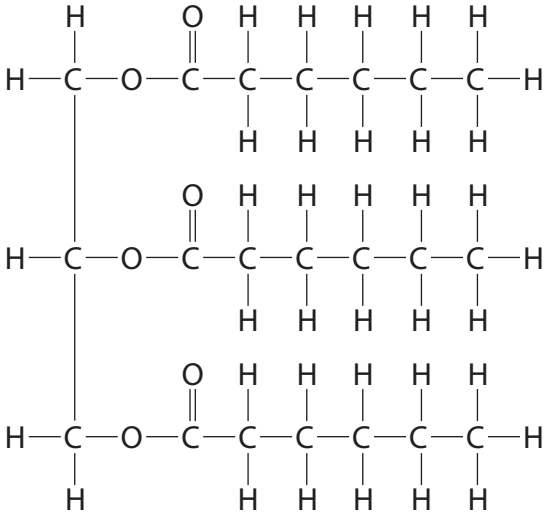
P



Q



R



S

(a) Place a cross ☒ in the box to complete each of the following statements.

(i) Two molecules of **P** can be joined together by

(1)

☒ **A** a hydrogen bond

☒ **B** a hydrophobic interaction

☒ **C** an ionic bond

☒ **D** a peptide bond

(ii) A condensation reaction between two molecules of **Q** forms

(1)

☒ **A** an ester bond

☒ **B** a glycosidic bond

☒ **C** a hydrogen bond

☒ **D** a peptide bond

(iii) Molecule **R** is

(1)

- ☒ **A** a fatty acid
- ☒ **B** an amino acid
- ☒ **C** deoxyribose
- ☒ **D** glucose

(iv) One of the products of the hydrolysis of molecule **S** is

(1)

- ☒ **A** a triglyceride
- ☒ **B** an amino acid
- ☒ **C** glycerol
- ☒ **D** water

(b) Name **one** element found in all molecules of **Q** that would not be found in carbohydrates.

(1)

.....

(c) Draw a diagram to show the molecules produced when **two** molecules of **R** join together during a condensation reaction.

(3)

(d) Explain how the dipolar nature of water is essential for living organisms.

(2)

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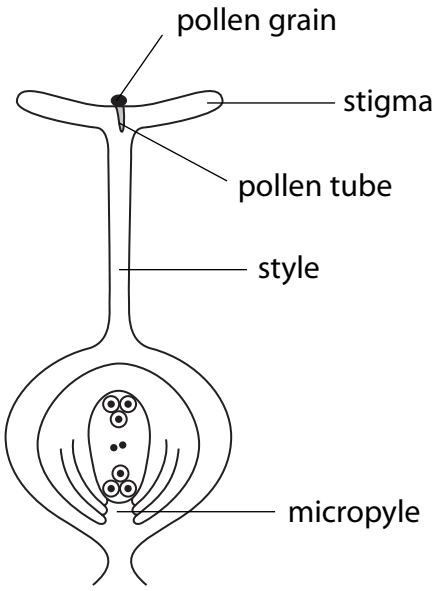
(Total for Question 1 = 10 marks)

2 Water is important for many different processes in plants including successful pollen tube growth.

(a) The diagram below shows a pollen grain growing on the stigma of a flower.



(i) The pollen tube grows from the pollen grain to the micropyle. Suggest **one** stimulus, other than water, that causes the pollen tube to grow towards the micropyle.

(1)

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(ii) The tip of the growing pollen tube releases digestive enzymes into the style. Suggest the role of these digestive enzymes in the growth of the pollen tube.

(3)

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(b) Give **three** roles of water in a plant other than for pollen tube growth.

(3)

1 .....

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2 .....

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3 .....

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(Total for Question 2 = 7 marks)