Questions are for both separate science and combined science students

Q1.

Cystic fibrosis (CF) is an inherited disorder caused by a faulty gene.

(a) Where in a cell would the CF gene be found?

_____

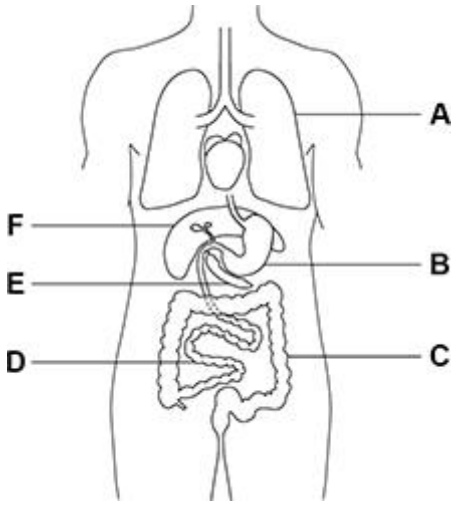
(1)

CF affects many organs in the body.

The main organs affected are:

- the lungs
- the pancreas
- the small intestine.

(b) The figure below shows organs of the human body.



Which letters in the figure above show the lungs, the pancreas and the small intestine?

Tick (✓) **one** box.

A, **D** and **E** ☐

A, **E** and **F** ☐

B, **C** and **D** ☐

B, **C** and **F** ☐

(1)

(c) The pancreas produces several digestive enzymes.

CF reduces the amount of each enzyme that reaches the small intestine.

Explain why a person with CF has:

- difficulty digesting food
- difficulty gaining body mass.

(6)

(d) Gas exchange happens in the alveoli in the lungs.

Describe **three** features of the alveoli that help maximise gas exchange.

1 _____

_____

2 _____

_____

3 _____

_____

(3)

(e) CF reduces the amount of oxygen that can enter the blood from the alveoli.

Explain how a reduced amount of oxygen entering the blood will affect the human body.

_____

_____

_____

_____

_____

_____

(3)

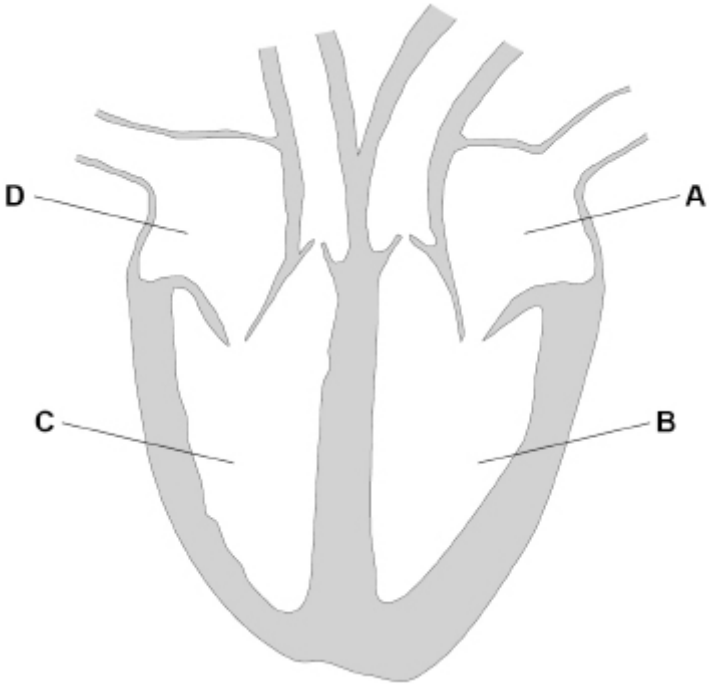
(Total 14 marks)

Q2.

This question is about the circulatory system.

Figure 1 shows the human heart.

Figure 1



(a) Which part of the heart receives oxygenated blood from the lungs?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(b) Which part of the heart pumps deoxygenated blood to the lungs?

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

(1)

(c) A group of cells called the pacemaker controls the resting heart rate.

Where in the heart is the pacemaker found?

Tick (✓) **one** box.

Left atrium ☐

Left ventricle ☐

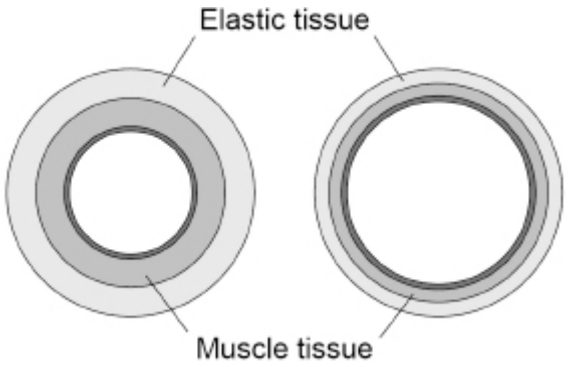
Right atrium ☐

Right ventricle ☐

(1)

(d) **Figure 2** shows a cross section of an artery and of a vein.

Figure 2



Describe **two** ways that the structure of an artery is different from the structure of a vein.

1 _____

_____

2 _____

_____

(2)

(e) In coronary heart disease, the coronary arteries become narrower.

A build-up of fatty material can cause a blockage in a coronary artery.

The table below shows how a blockage in a coronary artery affects blood flow.

Percentage (%) of coronary artery that is blocked	**Blood flow in cm^3/minute**
0	100
10	64
20	42
50	8
80	2

Describe the trend shown in the table.

_____

_____

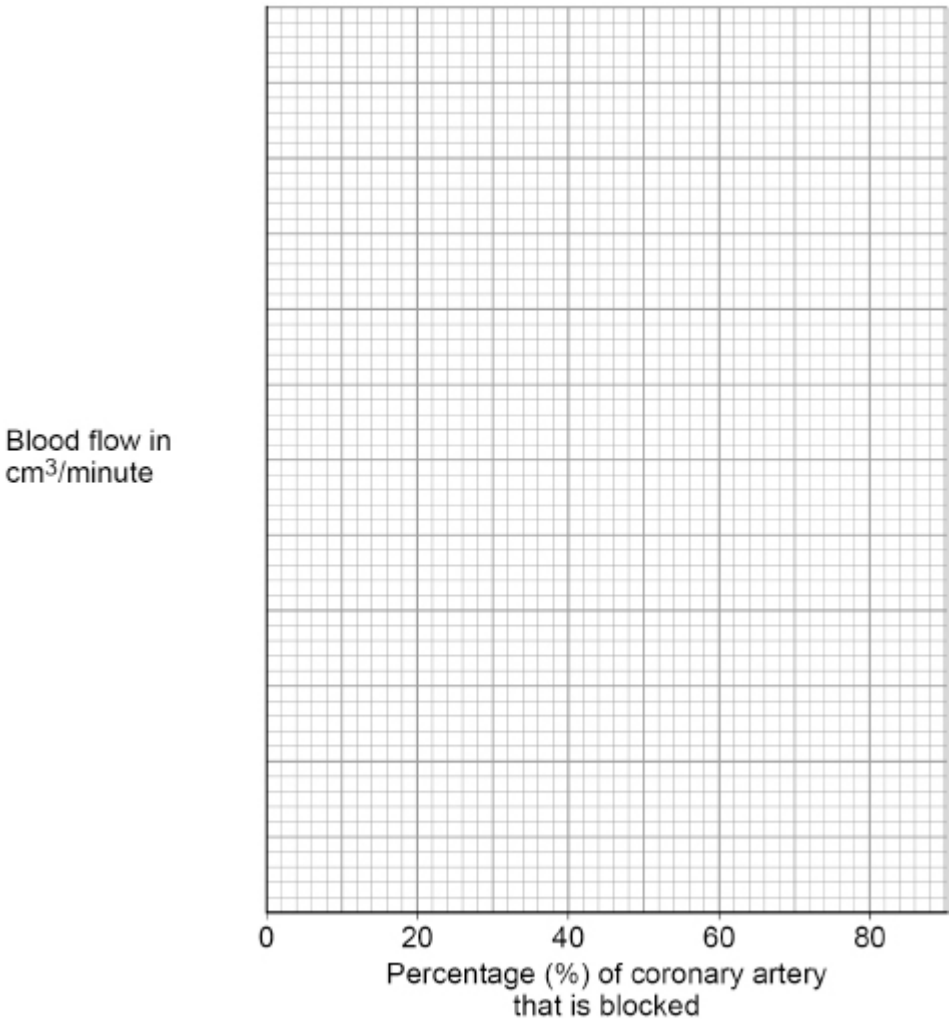
(1)

(f) Complete **Figure 3**.

You should:

- use a suitable scale for the y-axis
- plot the data from the table above
- draw a line of best fit.

Figure 3



(4)

(g) Predict the blood flow in a coronary artery with a 35% blockage.

Use **Figure 3**.

Blood flow = _____ cm^3/minute

(1)

(h) Explain the effect of a partly blocked coronary artery on the human body.

(6)

(i) There are different treatments for a blockage in a coronary artery.

Explain how **one** treatment for a blockage in a coronary artery works.

(2)

(Total 19 marks)