

ADVANCED SUBSIDIARY GCE
HUMAN BIOLOGY
Molecules, Blood and Gas Exchange

F221

Candidates answer on the question paper.

OCR supplied materials:

None

Other materials required:

- Electronic calculator
- Ruler (cm/mm)

Tuesday 11 January 2011
Morning

Duration: 1 hour




Candidate forename		Candidate surname	
-----------------------	--	----------------------	--

Centre number						Candidate number				
---------------	--	--	--	--	--	------------------	--	--	--	--

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Write your answer to each question in the space provided. If additional space is required, you should use the lined pages at the end of this booklet. The question number(s) must be clearly shown.
- Answer **all** the questions.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
-  Where you see this icon you will be awarded marks for the quality of written communication in your answer.
- You may use an electronic calculator.
- You are advised to show all the steps in any calculations.
- This document consists of **20** pages. Any blank pages are indicated.

Answer **all** the questions.

- 1 Many proteins, such as haemoglobin found in erythrocytes (red blood cells), have complex structures.

Fig. 1.1 shows two common types of secondary structure found in proteins.

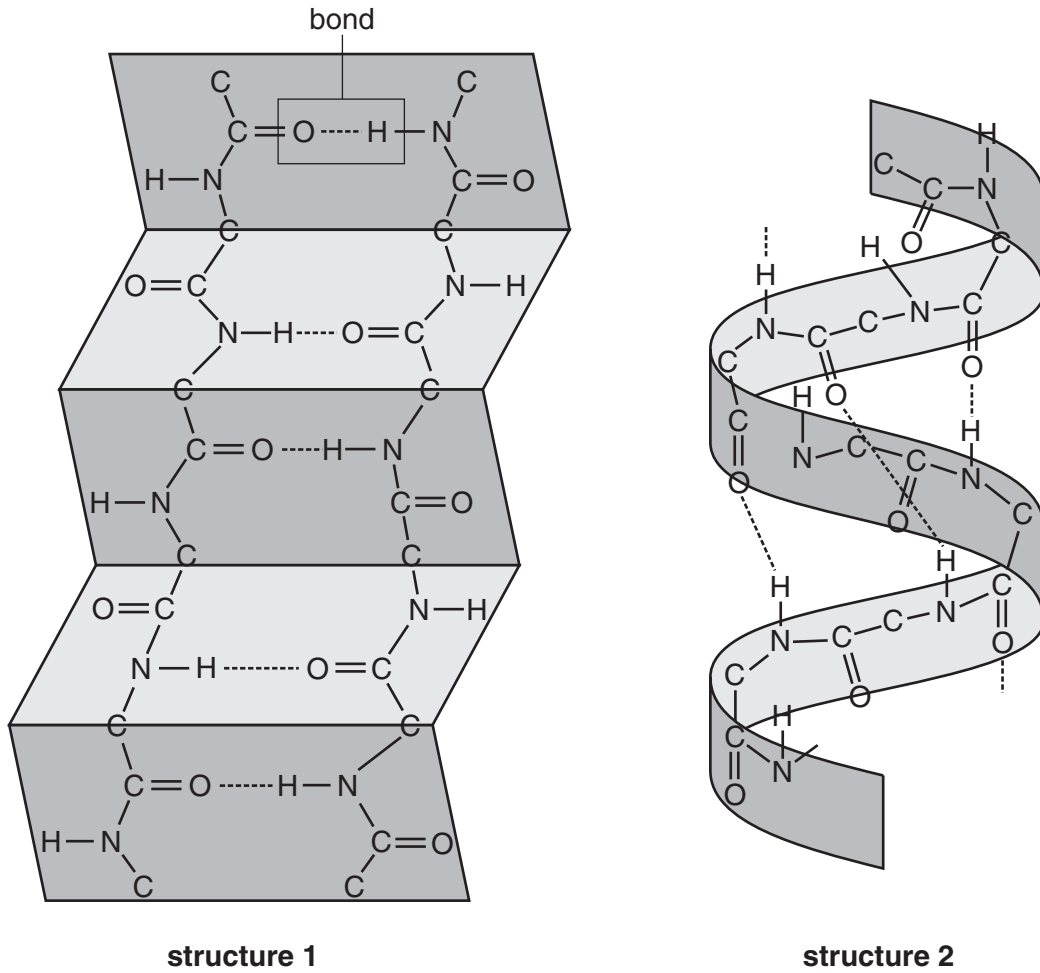


Fig. 1.1

- (a) Name the two types of secondary structure shown in Fig. 1.1 above.

structure 1

structure 2 [1]

- (c) Secondary structures can be further folded to form complex proteins. A student constructed a flow diagram to help with their revision of protein structure and function.

Fig. 1.2 shows part of this flow diagram. Complete the flow diagram by writing the most suitable words in the boxes.

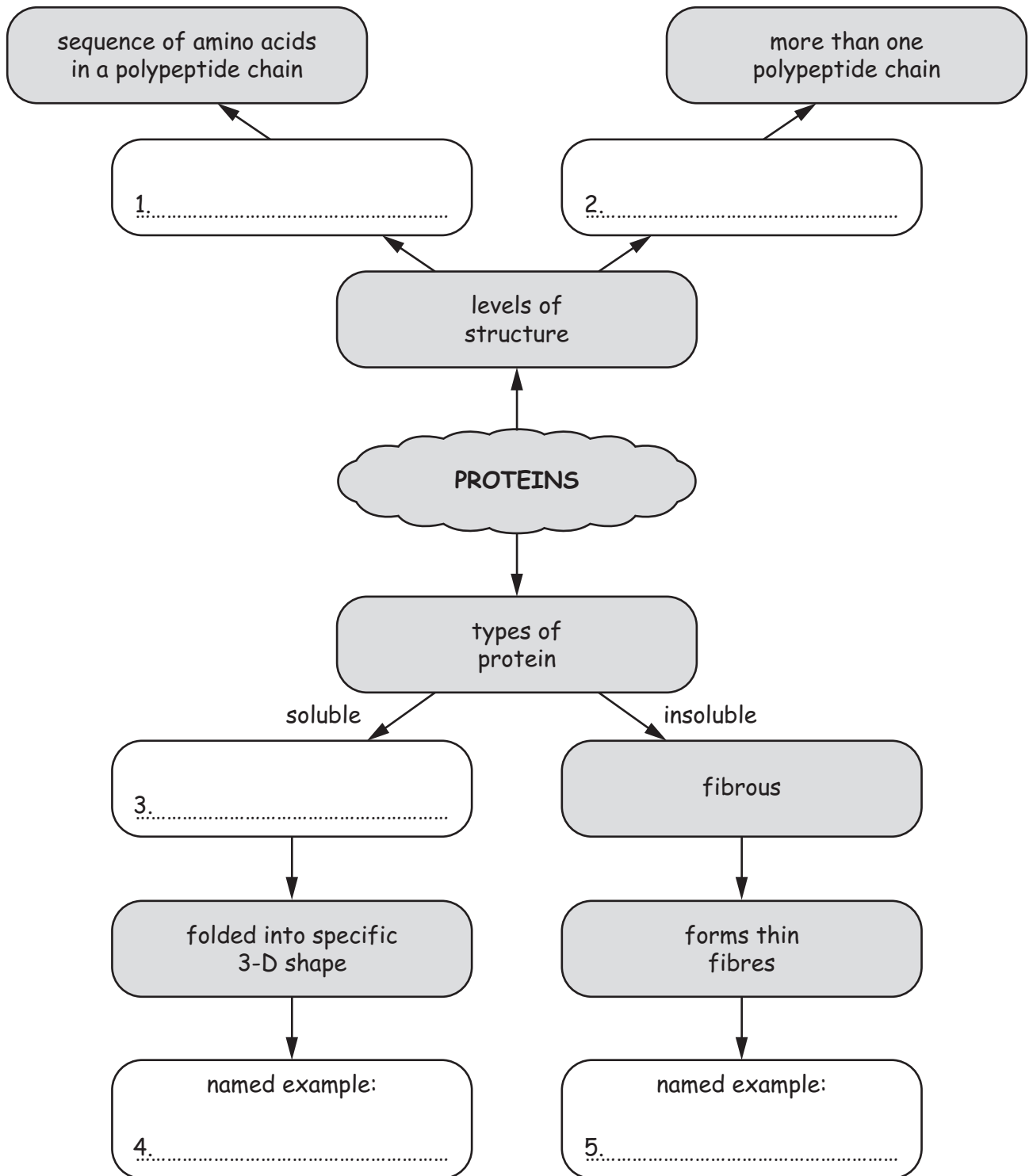


Fig. 1.2

[5]

(d) Antibodies are a type of complex protein. Some leucocytes (white blood cells) produce antibodies in response to the presence of bacteria in the body.

State precisely **where** in the leucocyte:

(i) the antibody protein is made;

..... [1]

(ii) the protein is modified and packaged to form the final antibody molecule.

..... [1]

[Total: 11]

- 2 Plasma is the liquid part of the blood. It consists mainly of water in which many other components are found, either dissolved or suspended.

(a) Name **two** substances **dissolved** in blood plasma.

.....
 [2]

(b) Other body fluids, such as tissue fluid and lymph, are produced from blood plasma.

Fig. 2.1 shows the relationship between these three body fluids. The arrows on the diagram represent the direction of movement of these body fluids.

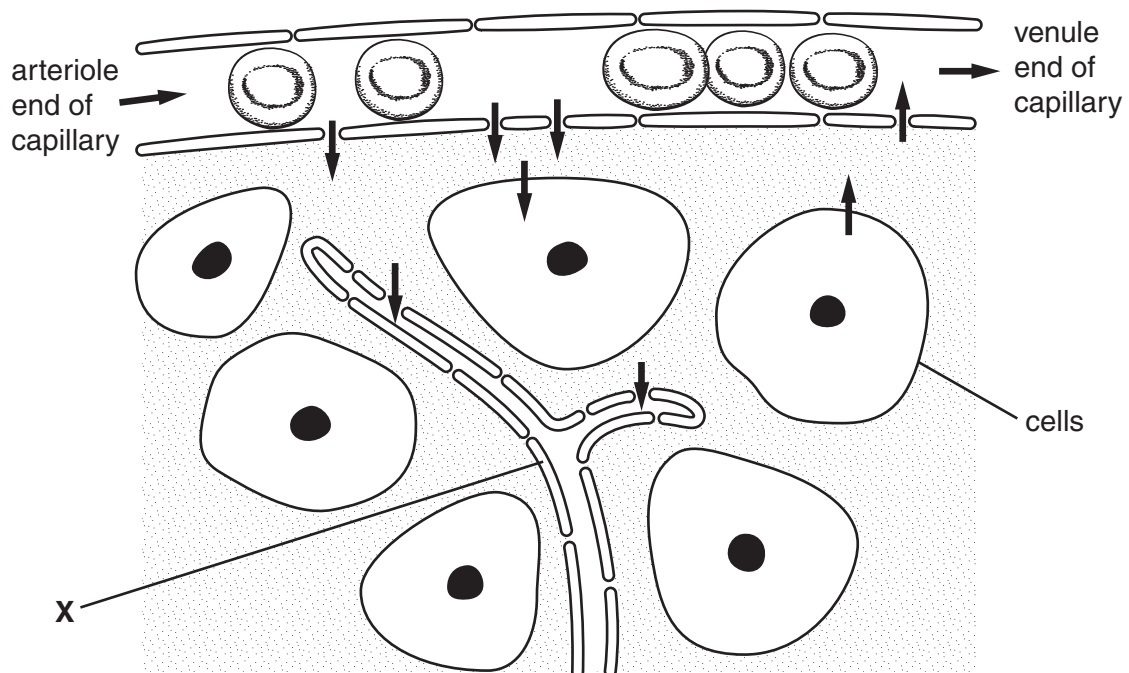


Fig. 2.1

(i) Name vessel X.

..... [1]

(ii) Complete the table below to compare the composition of blood plasma and tissue fluid.

Place a tick (✓) to show whether the component is present, or a cross (X) to show whether the component is absent.

component	blood plasma	tissue fluid
erythrocytes		
sodium ions		
fibrinogen		
glucose		

[4]

(c) Donated whole blood can be treated to produce:

- blood plasma, which can be frozen and stored for future use;
- serum, which is the liquid collected after blood has been clotted.

(i) What must be done to **whole blood** to obtain plasma for storage?

.....

 [1]

(ii) Suggest how serum differs from **stored** blood plasma.

.....

 [1]

[Total: 9]

3 Fig. 3.1 shows a diagram of the cell surface membrane of an erythrocyte (red blood cell).

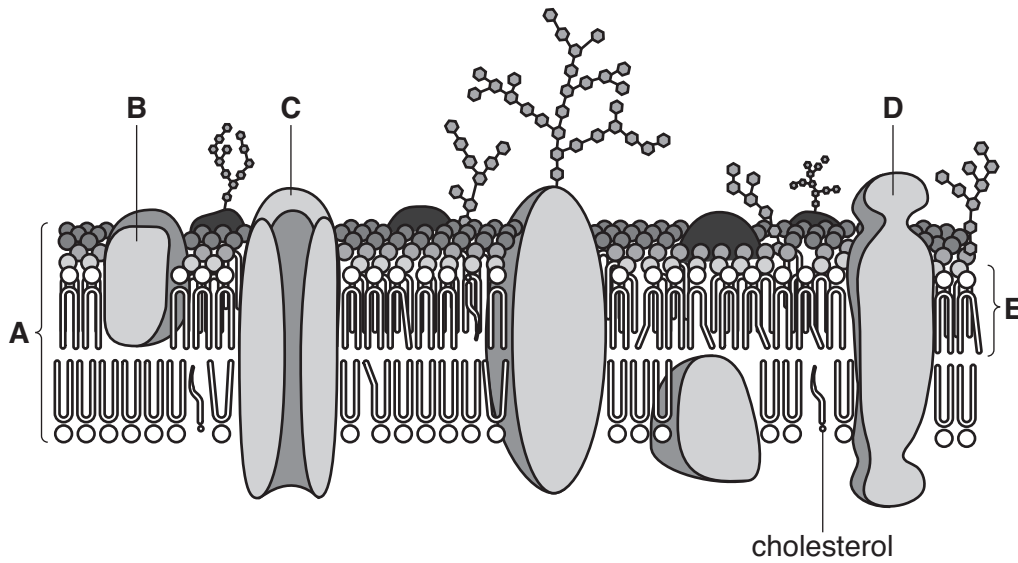


Fig. 3.1

(a) State which of the labelled structures **A** to **E** shows the part most likely for:

(i) oxygen molecules to pass through by passive diffusion;

..... [1]

(ii) glucose molecules to pass through by facilitated diffusion.

..... [1]

(b) Explain why glucose molecules have to pass through the membrane by facilitated diffusion.

.....

.....

.....

.....

..... [2]

(b) State **two** roles of fatty acids in the body.

.....
.....
.....
..... [2]

(c) Terms used to describe fatty acids include saturated, unsaturated, monounsaturated and polyunsaturated.

(i) Describe the differences between a **saturated** fatty acid and an **unsaturated** fatty acid.

.....
.....
.....
.....
.....
..... [2]

(ii) Suggest a difference between a **monounsaturated** fatty acid and a **polyunsaturated** fatty acid.

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

[Total: 9]

(c) Severe asthma can cause respiratory arrest.

(i) Name **two** other causes of respiratory arrest.

.....
..... [2]

(ii) Describe how expired air resuscitation (EAR) is used to help an **adult** in respiratory arrest.

.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
.....
..... [3]

[Total: 14]

15
BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

QUESTION 6 STARTS ON PAGE 16

6 In humans, blood is carried inside blood vessels and materials in the blood are transported by mass transport.

(a) (i) State the term used to describe a circulatory system in which blood is only carried inside vessels.

..... [1]

(ii) Define the term *mass transport*.

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

(b) Fig. 6.1 shows the structure of an artery and vein.

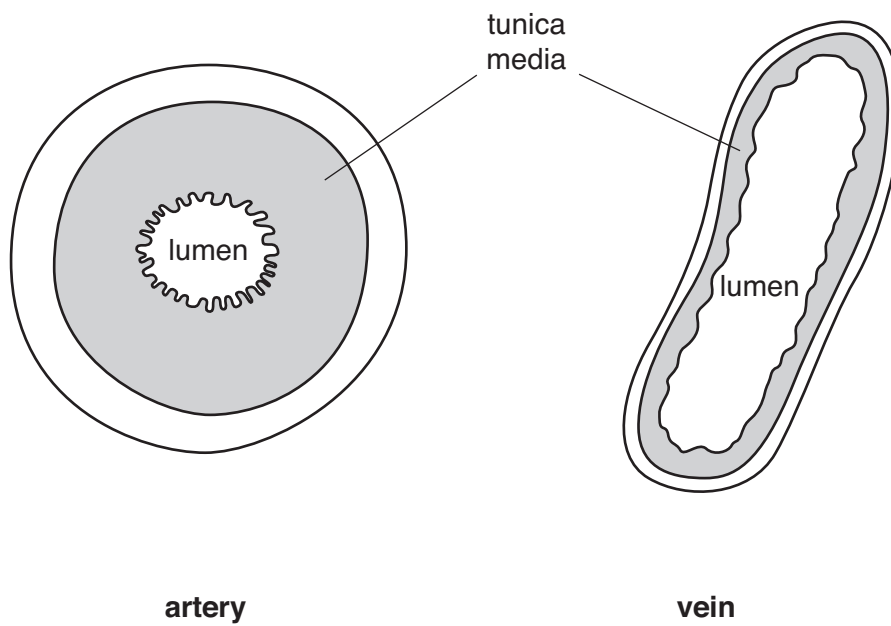


Fig. 6.1

