The circulatory system

Question Paper 6

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Transport in mammals
Sub Topic	The circulatory system
Booklet	Theory
Paper Type	Question Paper 6

Time Allowed : **40 minutes**

Score : **/ 33**

Percentage : **/100**

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 Malaria is an infectious disease that is considered by the World Health Organization to be a disease of worldwide importance.

(a) Explain what is meant by the term *infectious*.

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(b) Name **one** species of organism that causes malaria.

..... [1]

(c) Explain the significance of the following statements in the control of malaria.

(i) The female *Anopheles* mosquito has been more closely studied with regard to malaria than the male *Anopheles* mosquito.

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..... [1]

(ii) The infective stages of the malarial organism are present in anti-coagulant produced by the mosquito.

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(iii) After circulating in the blood for a short time, the pathogen enters liver cells of the newly infected person and then enters red blood cells.

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(d) Discuss the factors that determine the distribution of malaria worldwide.

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[Total: 11]

2 Fig. 6.1 is a section through lung tissue showing an alveolus and its blood supply.

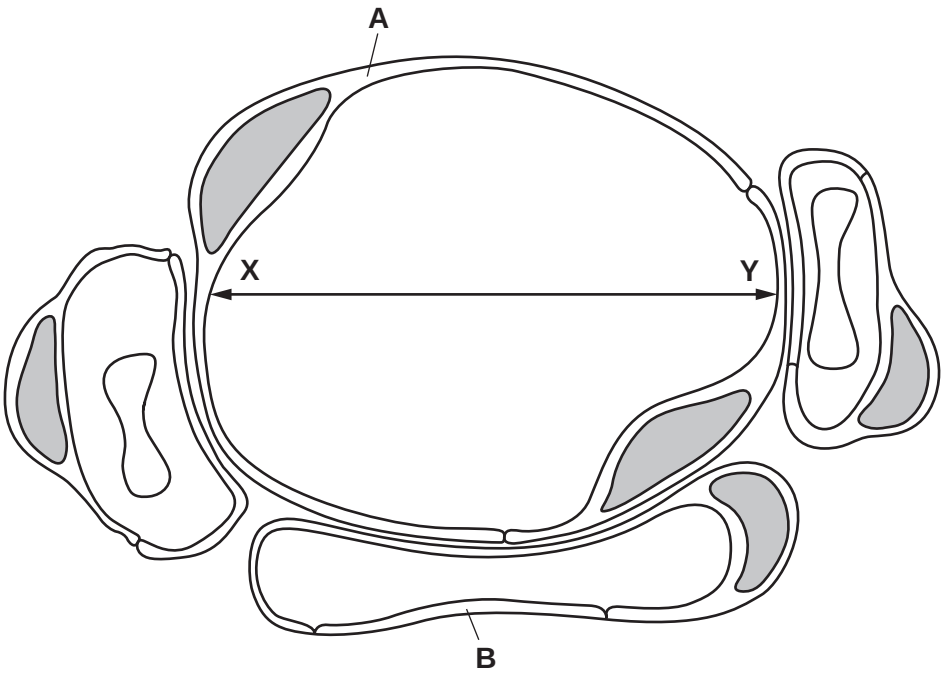

Fig. 6.1

(a) **(i)** Name the type of epithelial cell shown by label lines **A** and **B**.

..... [1]

(ii) Describe how the elastic fibres of the alveoli contribute to the healthy functioning of the lungs.

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(b) The actual diameter of the alveolus along the line **X**–**Y** is 220 micrometres (µm). Calculate the magnification of Fig. 6.1.

Show your working and give your answer to the nearest whole number.

answer × ..... [2]

(c) Outline two features of a gas exchange surface **that are shown on Fig. 6.1**.

1. .....

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2. .....

..... [2]

(d) Fig. 6.2 is a simplified diagram of the circulatory system of a human, showing gas exchange in the lungs and in respiring tissue. The partial pressures of oxygen (pO_2) and carbon dioxide (pCO_2) at four locations are also shown.

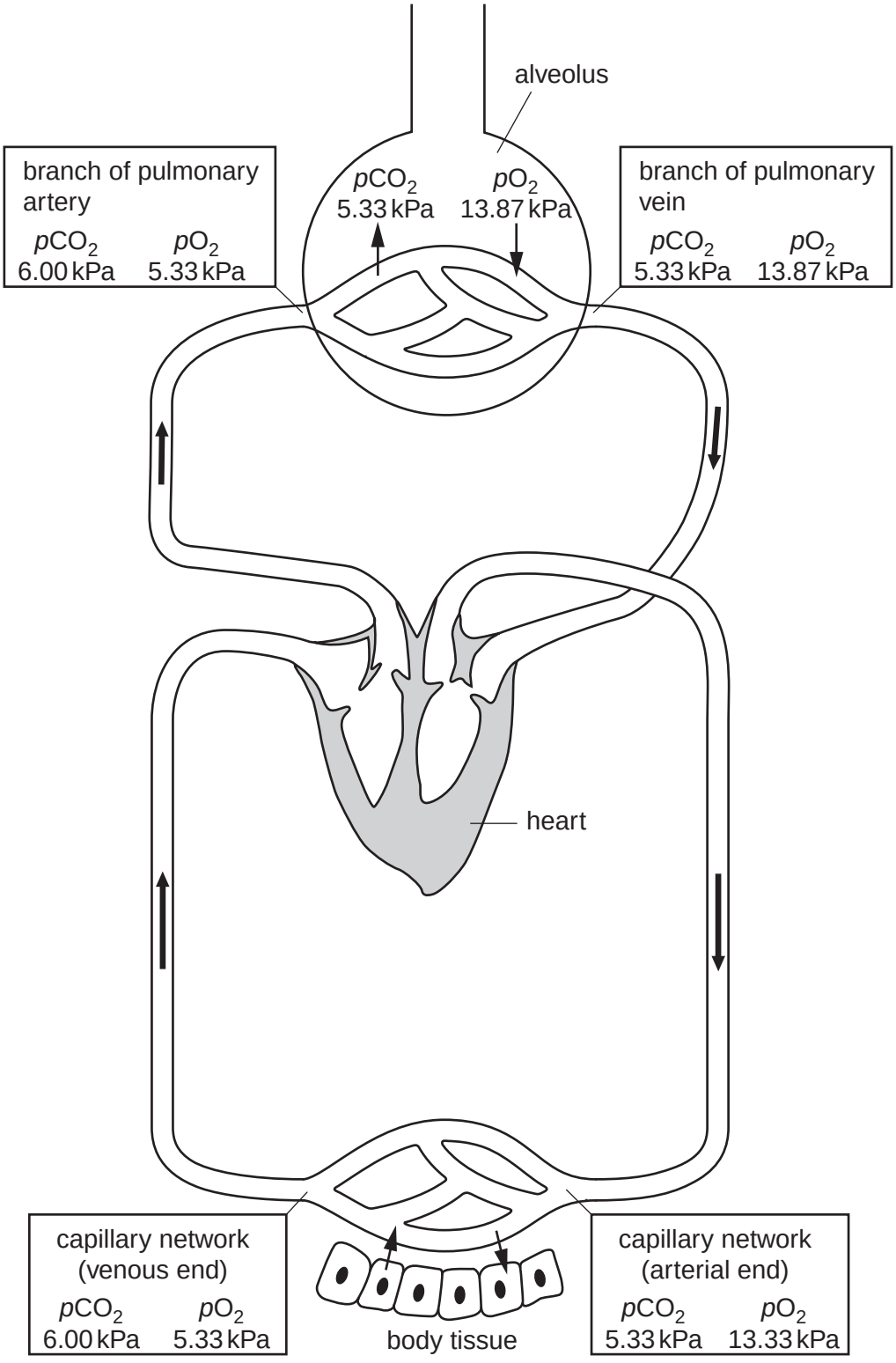

Fig. 6.2

With reference to Fig. 6.2, explain how the differences in *p*O2 and *p*CO_2 in the alveolus and in blood enable gas exchange in the lungs **and** respiring tissue.

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[Total: 11]

3 The mammalian liver is made up of lobules that consist of liver cells (hepatocytes) arranged in plates.
Between these plates of cells are enlarged leaky capillaries called sinusoids.
Blood from both the hepatic portal vein and the hepatic artery flows through these sinusoids to the central vein and eventually into the hepatic vein.
Inside the sinusoids are Kupffer cells.
Fig. 3.1 shows a section of a liver lobule and its associated blood vessels.

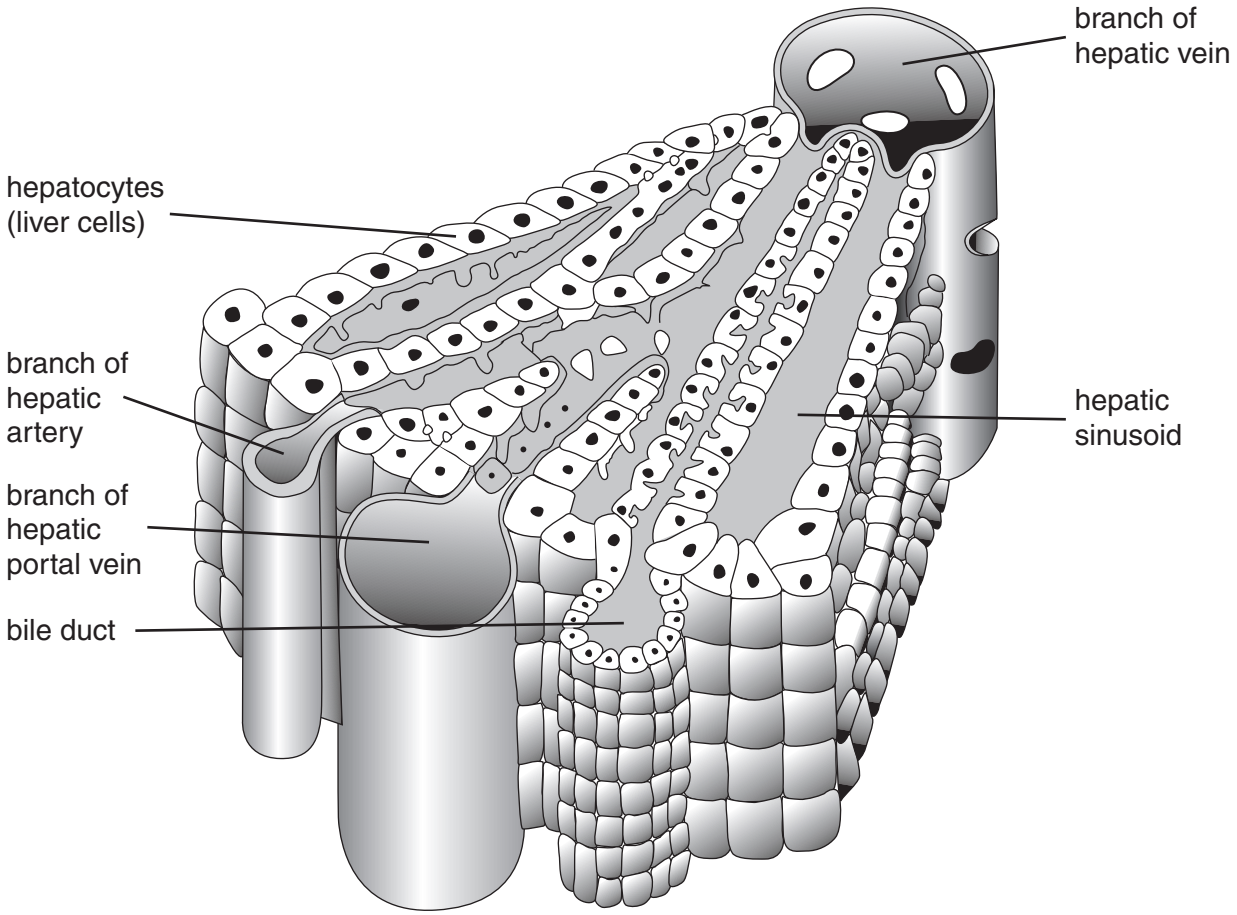

Fig. 3.1

(a) Describe the role of the Kupffer cells in the homeostatic function of the liver.

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(b) State how liver cells are involved in fat metabolism.

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(c) Explain how urea produced by liver cells from the deamination of excess amino acids is transported to the kidney for excretion.

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(d) State how blood in the hepatic vein will differ after a heavy meal from blood in

(i) the hepatic portal vein;

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.....[1]

(ii) the hepatic artery.

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.....[1]

[Total : 11]