Infectious disease

Question Paper 4

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Infectious disease
Sub Topic	Infectious disease
Booklet	Theory
Paper Type	Question Paper 4

Time Allowed : **32 minutes**

Score : **/ 26**

Percentage : **/100**

Grade Boundaries:

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

1 **(a)** Cartilage is present in some parts of the gas exchange system to prevent collapse due to pressure changes during inhalation.

State the parts of the gas exchange system in which cartilage is located.

.....[1]

(b) Fig. 3.1 shows the changes that occur in atmospheric pressure and oxygen partial pressure as altitude changes. The highest altitude at which people live permanently is 5100 m.

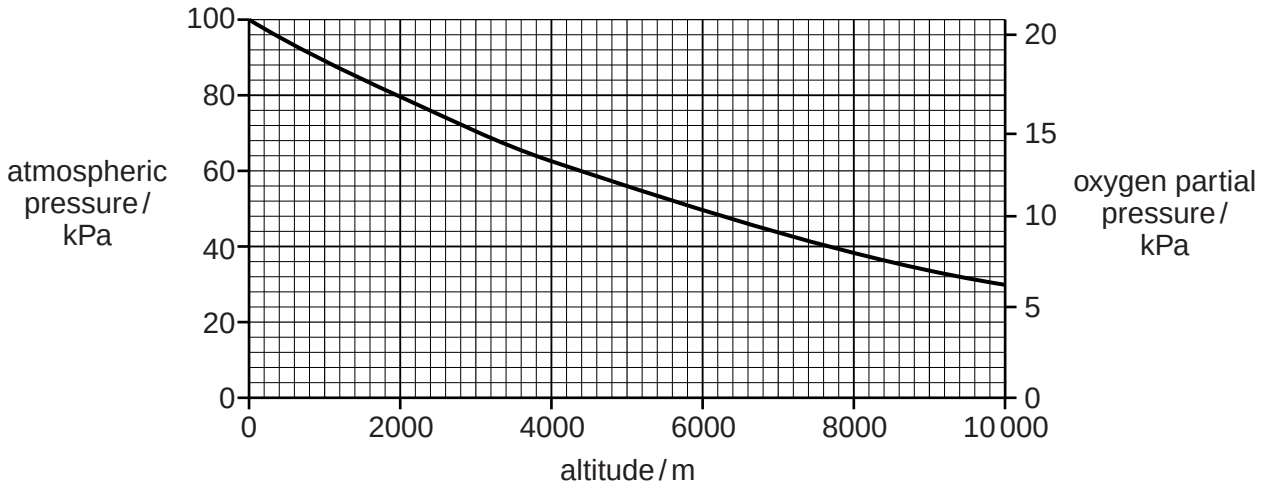

Fig 3.1

With reference to Fig. 3.1:

(i) describe the effect of increasing altitude on both atmospheric pressure and the partial pressure of oxygen

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.....[2]

(ii) calculate the change in the atmospheric pressure when a person travels from sea level to an altitude of 3500 m.

Show your working.

answer .....[2]

(c) When a person travels from 0 m (sea level) to a high altitude, gas exchange in the lungs is affected. A condition known as hypoxia results, where the body tissues do not receive an adequate oxygen supply.

Explain how hypoxia occurs when a person ascends from sea level to a high altitude.

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(d) At high altitudes, short-term responses by the body to hypoxia include:

- a decrease in the volume of plasma in the blood
- a decrease in the volume of blood pumped out of the heart per heart beat
- an increase in the heart rate
- an increase in the breathing rate.

(i) Suggest why a decrease in the volume of plasma in the blood may reduce the effects of hypoxia.

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(ii) Explain why an increase in the heart rate occurs in response to hypoxia.

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(e) People with sickle cell anaemia have a form of haemoglobin that is unable to bind to oxygen efficiently. The cause of the condition is a mutation in the gene coding for the β-globin polypeptide of haemoglobin.

Outline how this mutation can lead to an altered amino acid sequence of the β-globin polypeptide.

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[Total: 15]

2 Vaccination can protect against the infectious disease tuberculosis (TB).

(a) Define the terms:

(i) *vaccination*

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(ii) *infectious disease.*

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(b) TB is an important disease worldwide. Table 2.1 shows recent information about TB cases reported during one year in six different countries.

Table 2.1

country	**region**	**number of cases**	**number of cases per 100 000 population**
Germany	Europe	4000	5
India	Asia	2 300 000	185
Japan	Asia	27 000	21
South Africa	Africa	490 000	981
Swaziland	Africa	15 000	1287
United Kingdom	Europe	7900	13

With reference to Table 2.1, explain the advantage of calculating the number of cases of TB per 100 000 population rather than stating the number of cases alone.

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(c) Describe how a person may become infected with TB.

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(d) Suggest why TB is more likely to be fatal in people who have HIV/AIDS than in those who do not have HIV/AIDS.

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[Total: 11]