Diseases and Immunity

Question Paper 1

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Diseases and Immunity
Paper Type	(Extended) Theory Paper
Booklet	Question Paper 1

Time Allowed: **62 minutes**

Score: **/51**

Percentage: **/100**

1 Fig. 4.1 is an electron micrograph of some red blood cells and lymphocytes.

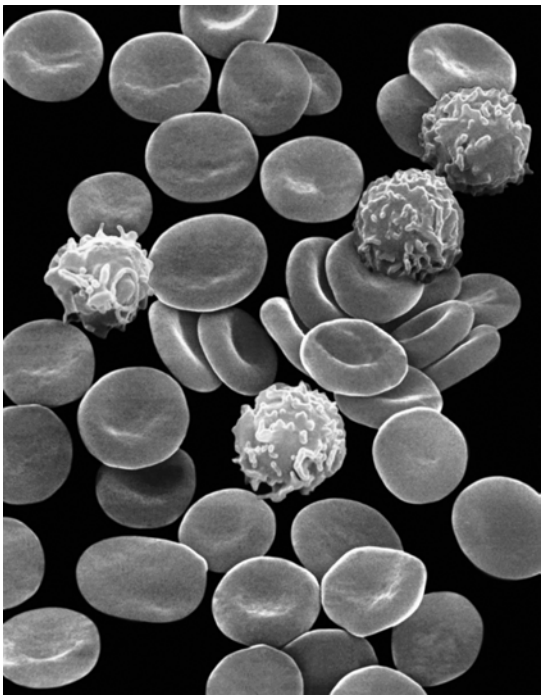

Fig. 4.1

(a) Lymphocytes respond to infection by making and releasing special protein molecules called antibodies.

Describe how antibodies provide protection from diseases caused by viruses and bacteria.

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..... [3]

Red blood cells have special molecules on their cell membranes. These are known as antigens and they stimulate the production of antibodies. These antigens also determine a person's blood group.

Before carrying out kidney transplants, it is important to check that the blood group of the donor matches the blood group of the recipient. This is called blood typing. It is necessary because blood group antigens are present on the inner lining of blood vessels in the kidney.

(b) Explain what would happen if a kidney from a person with blood group A was transferred into the body of a person with blood group O.

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..... [2]

Tissue typing is carried out before transplanting a kidney. This makes sure that there is a close match between the donated kidney and the recipient. However, it is possible to carry out transplants of the cornea without blood typing or tissue typing.

(c) Suggest why it is possible to transplant corneas successfully without carrying out any tissue typing or blood typing.

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..... [1]

The gene for the ABO blood group has three alleles, I^A, I^B and I^o.

(d) A person with blood group O has parents who have blood groups A and B. Complete the genetic diagram to show how this is possible.

Use the symbols, I^A, I^B and I^o, for the blood group alleles.

parental phenotypes	blood group A	×	blood group B
parental genotypes	.....	×	.....
gametes	....	+	....

offspring genotype	.....
offspring phenotype	blood group O

[3]

(e) Use your answer to **(d)** to give examples of the following. The first one has been completed for you.

term	exa
a dominant allele	I^A
heterozygous genotype	……..
codominant alleles	……..
phenotype	……..

[3]

[Total: 12]

2 When bacteria are spread onto agar in a Petri dish they form colonies. Each colony forms from one bacterium. Fig. 4.1 shows an investigation into antibiotic resistance in a species of bacterium that causes disease.

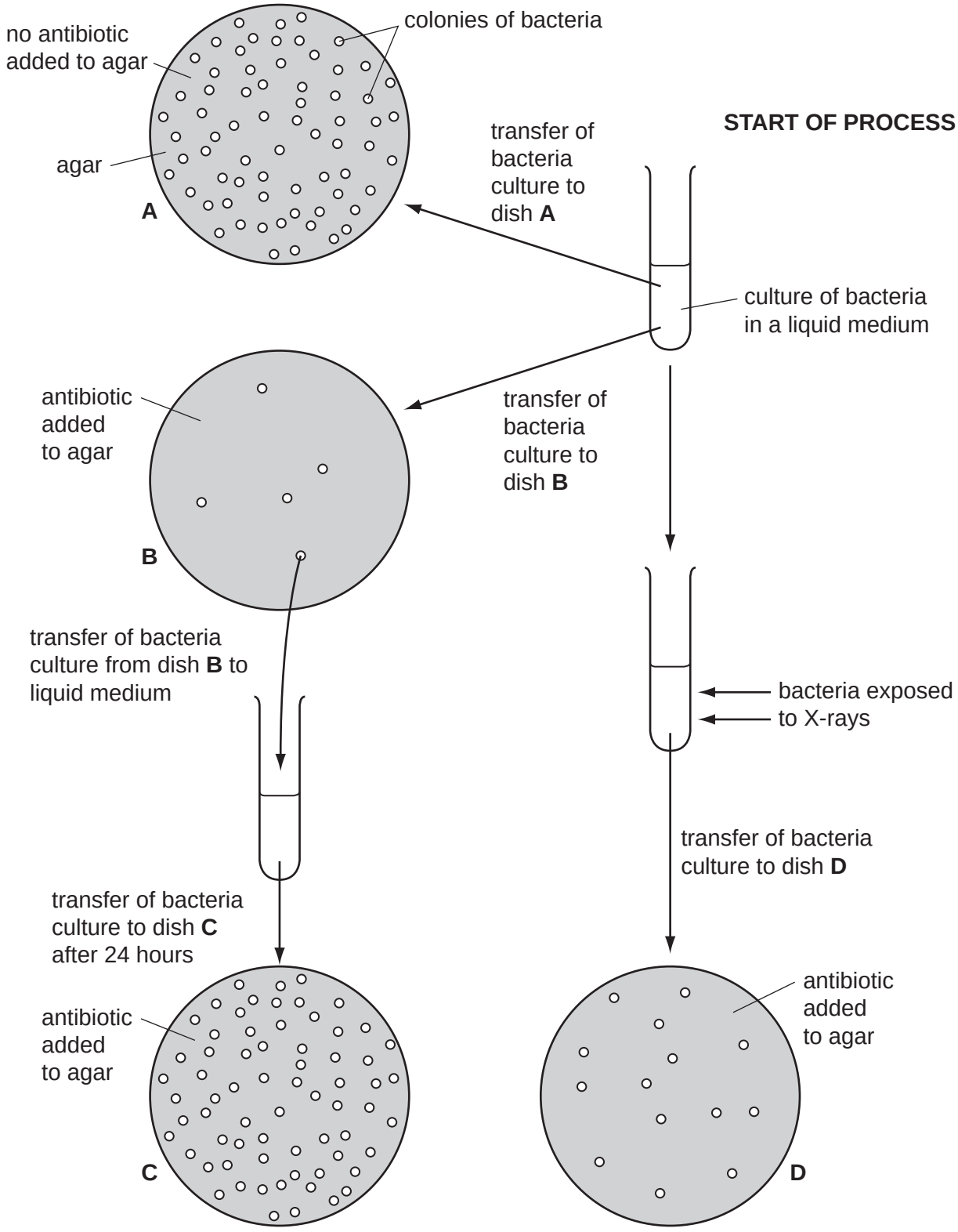

Fig. 4.1

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

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..... [2]

(b) Explain why

(i) only a few bacteria grew in dish **B** compared with dish **A**,

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..... [1]

(ii) more bacteria grew in **C** than in **B**.

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..... [1]

(c) Fig. 4.1 shows the effect of an antibiotic on a species of disease-causing bacterium.

Suggest why antibiotics should not be used too often.

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..... [2]

(d) Explain the possible effect of the X-rays on the bacteria.

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..... [3]

(e) State two ways in which the **structure** of a bacterium differs from the **structure** of a virus.

1. .....

2. ..... [2]

(f) Human Immunodeficiency Virus (HIV) infects cells of the immune system.

Describe the effects of HIV on the immune system.

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..... [4]

[Total: 15]

3 **(a** Annelids and nematodes are both worm-like animals.

State two features that distinguish annelids from nematodes.

1. .....

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2. .....

..... [2]

(b) Fungi are a difficult group to classify because they have features found in both animals and plants.

State one 'animal feature' and one 'plant feature' that fungi possess.

'animal feature' .....

.....

'plant feature' .....

..... [2]

(c) **(i)** Draw a large, labelled diagram to show **two** features present in most viruses.

[3]

(ii) Outline how the human immunodeficiency virus (HIV) affects the immune system.

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..... [3]

[Total: 10]

4 The blood of a fetus does not mix with the blood of its mother, but substances are exchanged across the placenta.

(a) Table 3.1 shows five substances that cross the placenta, their direction of movement and the reason for the movement.

Complete Table 3.1. The second row has been completed for you.

Table 3.1

substance	direction of movement	reason
amino acids		
carbon dioxide	from fetus	waste gas from respiration
glucose		
oxygen		
urea		

[4]

(b) During pregnancy, women are often given dietary advice.

Explain why pregnant women require more iron and vitamin D in their diet.

iron .....

vitamin D ..... [2]

(c) Mothers may be encouraged to breast-feed their newborn babies. The first milk that a mother secretes is called colostrum and contains antibodies.

(i) Name the cells that produce antibodies.

..... [1]

(ii) Explain why it is important for newborn babies to have antibodies.

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..... [3]

(iii) Some mothers bottle-feed their newborn babies with formula milk rather than breast-feed.

Describe **four advantages** of breast-feeding, **other than** providing antibodies.

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..... [4]

[Total: 14]