

A Level Biology B

H422/03 Practical skills in biology

Question Set 5

1. (a) Researchers were studying the possible association between smoking and the respiratory tract infections, pneumonia and bronchitis.

The study included an analysis of the infection figures for **all** admissions to a hospital.

- Data from 5018 patients were collected.
- 4022 of these patients were **non-smokers**.
- Each patient had only **one** infection.

Some of the data from this study are shown in Table 5.1.

	Number of patients admitted with a respiratory tract infection		Number of patients admitted with other type of infection
	Pneumonia	Bronchitis	
Smokers	335	230	431
Non-smokers	1166	526	2330

Table 5.1

Calculate the percentage of patients who were **smokers**.

Give your answer to **two** decimal places.

[2]

- (b) (i) The researchers stated the following null hypothesis:

Smoking does not affect the incidence of respiratory tract infections.

Analyse the data in this study **and** comment on the researchers' hypothesis.

In your answer you should use data to support your analysis.

[3]

- (b) (ii) Suggest **one** statistical test that could be used to analyse the data further.

[1]

- (b) (iii) Why would this statistical test be the most useful?

[1]

- (c) Fig. 5.1, is a photomicrograph showing tissues in the respiratory tract from one of the patients in the study.

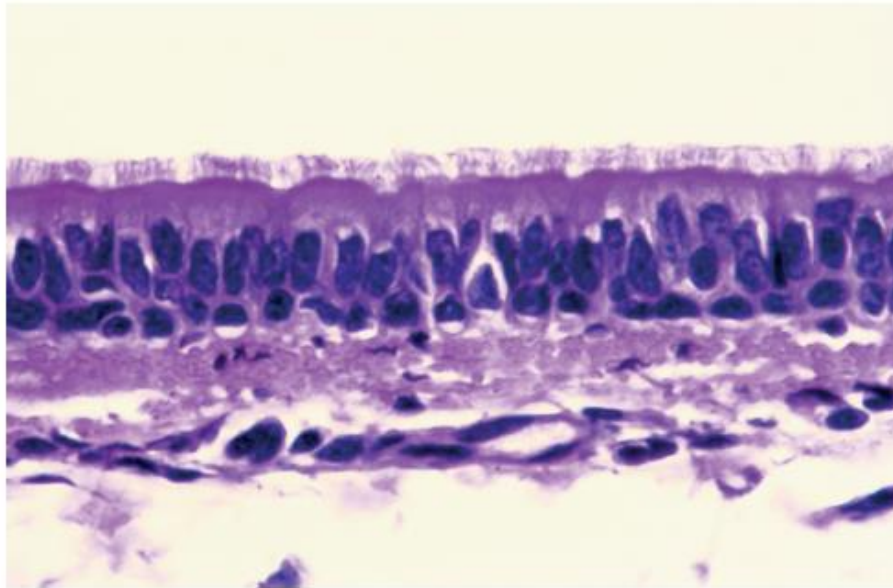


Fig. 5.1

Name **one** structure, visible in Fig. 5.1, involved in the **primary** defence system.

[1]

- (d) A sample of bacteria from a patient with pneumonia was collected and a pure culture was prepared.

A Kirby-Bauer test was carried out to allow the doctor treating the patient to decide on the correct concentration of antibiotic to use.

Six different concentrations of the antibiotic were used, as shown in Table 5.2.

Kirby-Bauer disc	Concentration of antibiotic (a.u.)
A	0.0001
B	0.0010
C	0.0100
D	0.1000
E	1.0000
F	10.0000

Table 5.2

Describe the apparatus and method necessary to produce the six different concentrations.

You are supplied with an antibiotic solution of 10.0000 a.u. concentration and distilled water.

[4]

(e) Fig. 5.2 shows the result of the Kirby-Bauer test.

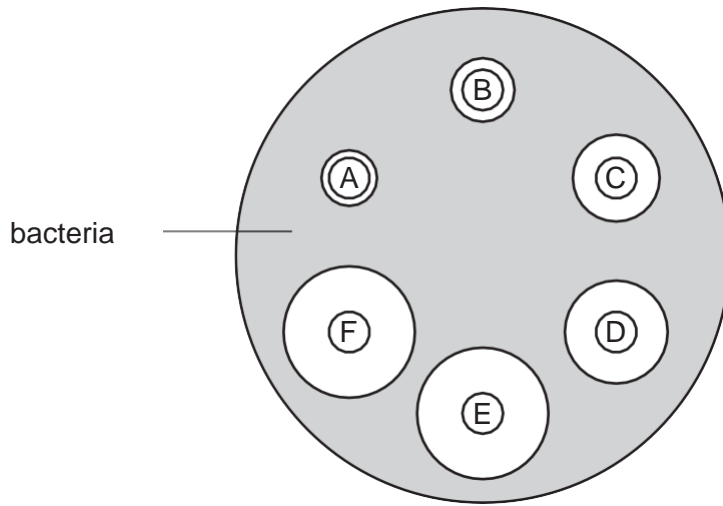


Fig. 5.2

Use the information in Fig. 5.2 to advise the doctor on the most appropriate concentration of antibiotic to use. Explain your choice.

[3]

Total Marks for Question Set 5: 15

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