Oxford Cambridge and RSA

GCSE Biology A (Gateway)

J247/04 Biology A B4-B6 and B7 (Higher Tier)

Question Set: 3

1 Erythromycin is an antibiotic drug.

(a) What is an antibiotic?

[2]

(b) It is important to get the dose of erythromycin right. Too much erythromycin can be harmful.

However, recently some strains of bacteria have developed resistance to low concentrations of erythromycin.

To see how effective erythromycin is, it is tested using bacteria grown on agar plates.

This method is used:

- A petri dish is used that has the bacteria growing evenly over the surface.
- A disc of filter paper is soaked in erythromycin.
- The disc is placed on the agar in the centre of the petri dish using sterile forceps.
- The dish is incubated at 37°C.

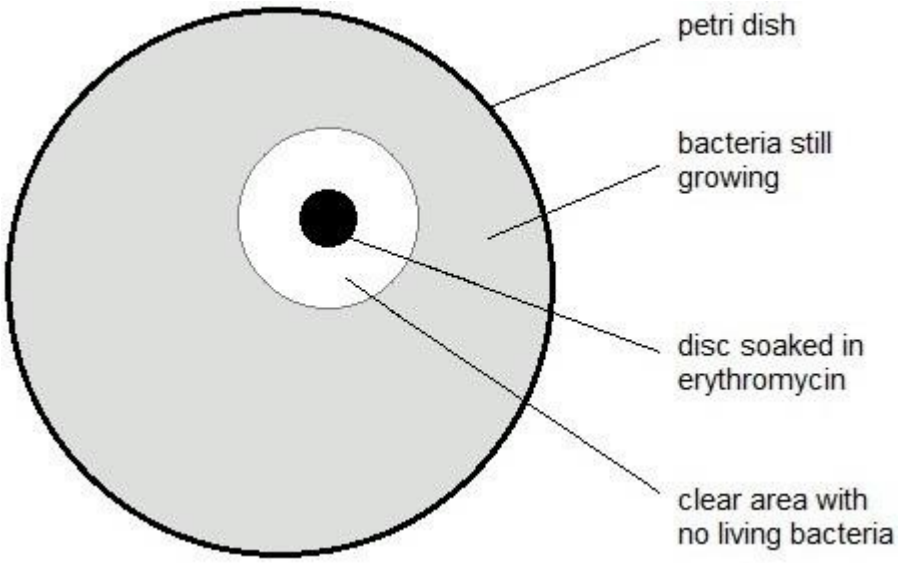
(i) Why did the scientists incubate the dish at 37°C rather than at higher or lower temperature?

[2]

(ii) Why is the filter paper disc moved using sterile forceps?

[1]

(c) **(i)** The diagram shows the actual size of the dish after incubation.



This table is used to analyse the results of the experiment.

Area clear of bacteria including the area of the disc in mm^2	**Level of resistance**
less than 133	resistant
133 to 416	intermediate resistance
more than 416	not resistant

Use the results of the experiment and the table to judge the level of resistance in this strain of bacteria.
(The area of a circle = πr^2 and $\pi = 3.14$.)

[3]

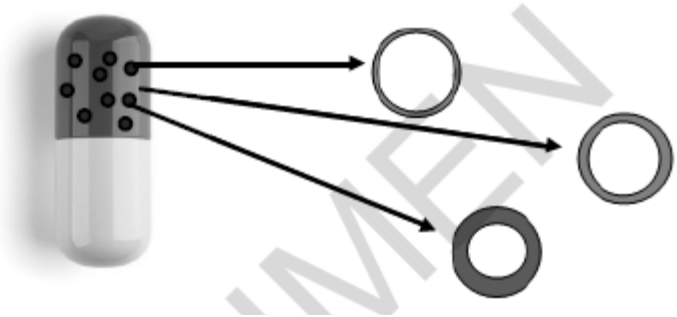
(ii) Suggest any limitations to measuring the level of resistance with this method.

[2]

(d) Erythromycin is usually given to patients in a capsule.

The capsule has lots of small spheres containing the drug. The walls of the spheres are different thicknesses.

They are made of a carbohydrate polymer.

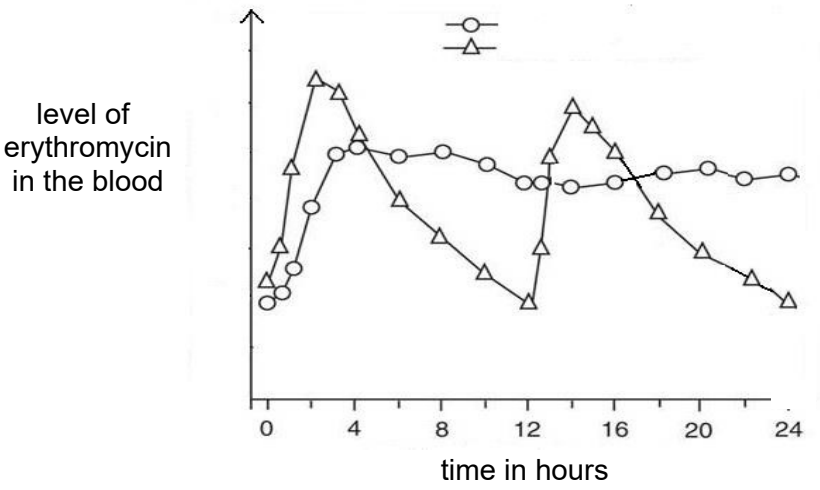


(i) Explain why the drug is released from the spheres in the small intestine.

[2]

(ii)* The graph shows the levels of erythromycin in the blood when given using this capsule and in a normal tablet.

A coated capsule taken every 12 hours A normal tablet taken every 12 hours



Explain the shape of the two graphs and why it is better to give erythromycin in capsules.

[6]

Total Marks for Question Set 3: 18