

Past-paper walk-through

Biotechnology ■ 21.2

eXercise

Questions in this set

- 0610/21 N25 Q39 ■ 1 mark
- 0610/22 J25 Q40 ■ 1 mark
- 0610/43 J25 Q5 ■ 13 marks

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 39

0610/21 N25 ■ Q39 ■ 1 mark

39 Why is pectinase useful in fruit juice production?

- A** Cloudier juice is produced.
- B** More juice can be extracted from the fruits.
- C** Proteins in the fruit are digested.

D Starch is digested to produce more sugar.

Solution 39

Answer: **B**

Why

- Pectinase breaks down pectin, which holds plant cell walls together.
- Breaking it down releases the juice trapped in the fruit tissue.
- So more juice is extracted, and it comes out *clearer*, not cloudier.

Question 40

0610/22 J25 ■ Q40 ■ 1 mark

40 Which features make bacteria useful in biotechnology?

- 1 They are unaffected by antibiotics.
- 2 They do **not** contain plasmids.
- 3 They make complex molecules.
- 4 They reproduce rapidly.

A 1 and 2

B 1 and 4

C 2 and 3

D 3 and 4

Solution 40

Answer: **D**

Why

- Bacteria reproduce very rapidly, so a useful strain can be multiplied quickly – statement 4.
- They can be made to build complex molecules such as insulin – statement 3.
- They *do* contain plasmids (that is how the gene gets in) and they *are* affected by antibiotics, so 1 and 2 are wrong.

Question 5

0610/43 J25 ■ Q5 ■ 13 marks

5 Penicillin is an antibiotic.

(a) (i) State the type of organism that antibiotics are used to kill.

Question 5

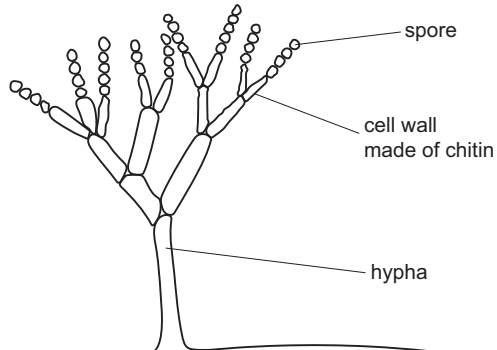
- (ii) It is important to try and limit the development of antibiotic resistance.

Describe ways of limiting the development of antibiotic resistance.

Question 5

(b) Penicillin is produced by an organism called *Penicillium chrysogenum*.

Fig. 5.1 is a diagram of *Penicillium chrysogenum*.



Question 5



Fig. 5.1

- (i) State what *Penicillium* in the scientific name of *Penicillium chrysogenum* represents in the binomial system.

Question 5

- (ii) Using the information in Fig. 5.1, identify the kingdom that contains *Penicillium chrysogenum*.

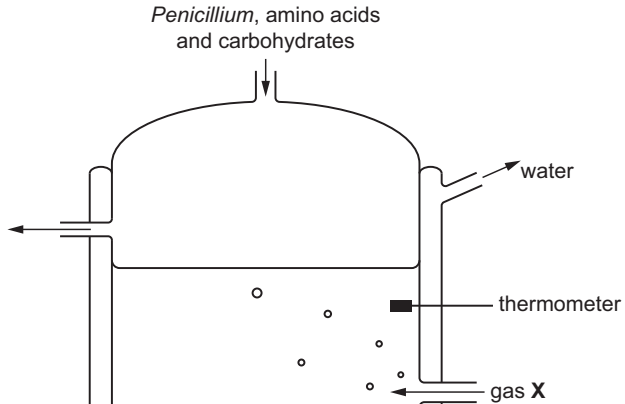
Question 5

(c) Penicillin can be made in a fermenter.

(i) State the name of **one other** product made in a fermenter.

Question 5

Fig. 5.2 shows a fermenter.



Question 5

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Question 5

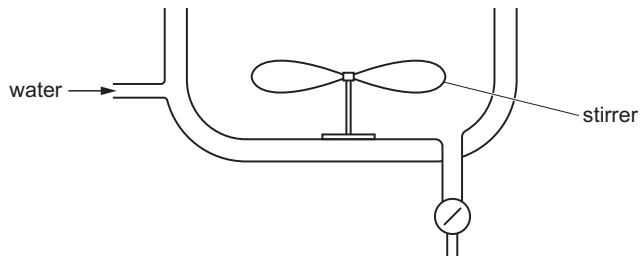


Fig. 5.2

- (ii) Gas **X** in Fig. 5.2 is needed for the production of penicillin.

State the name of gas **X**.

Question 5

- (iii) The concentration of gas **X** is one of the conditions that must be controlled to ensure that penicillin is produced.

State the **other** conditions required to produce penicillin **and** describe how they are controlled in the fermenter.

Question 5

(d) State the name of the organism that is used in bread-making **and** in biofuel production.

Question 5

[Total: 13]

Solution 5

(a)(i)

Mark scheme

- bacteria / prokaryote(s) ;
- 1

Solution 5

(a)(ii) Mark scheme

- any two from:
- only use for bacterial infections / when essential / when necessary ;
- use appropriate antibiotic ;
- AVP ;
- 2
- e.g. complete the course / shorter course /
- reduce use in livestock / take the full dose /
- do not share antibiotic

Solution 5

(b)(i)

Mark scheme

- genus ;
- 1

(b)(ii)

Mark scheme

- fungus / fungi ;
- 1

Solution 5

(c)(i)

Mark scheme

- insulin / mycoprotein / ethanol / (named) alcohol / carbon dioxide / amino acids /
- hormones / proteins / factor VIII / AVP ;
- 1

Solution 5

(c)(ii)

Mark scheme

- oxygen ;
- 1
- 0610/43
- May/June 2025
- Guidance

Solution 5

(c)(iii) Mark scheme

- any five from:
- 1
- monitoring ;
- 2
- temperature ;
- 3
- water jacket / described / water bath ;
- 4

Solution 5

- pH ;
- 5
- carbon dioxide might reduce pH ;
- 6
- buffer / described ;
- 7
- keep, pH / temperature, at suitable value for enzyme activity ;
- 8
- (named) nutrient supply ;
- 9

Solution 5

- carbon dioxide / waste products, removal ;
- 10 stirrer to equally (distributed), temperature / pH / nutrient concentration /
- oxygen concentration / microorganisms ;
- 11 idea of regulating (gas) pressure ;
- 12 vent or exhaust ;
- 13 sealed to prevent contamination / AW ;
- 5

Solution 5

(d)

Mark scheme

- yeast ;
- 1
- 0610/43
- May/June 2025
- Guidance