Topical Past Papers IGCSE (9-1) Edexcel

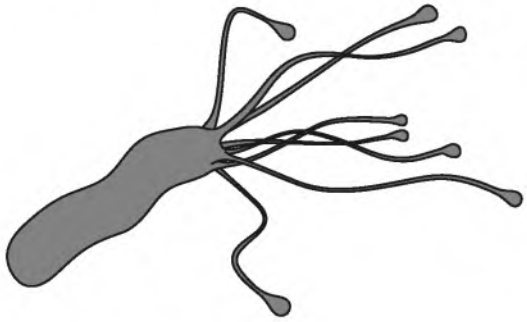
BIOLOGY

PAPER 1B, 1BR 2020 - 2025

1 – (4BI1/1B_Summer_2020_Q1) – *The Nature And Variety Of Living Organisms, Structure And Functions In Living Organisms, Reproduction And Inheritance*

The bacterium *H. pylori* causes stomach ulcers.

(a) The diagram shows this bacterium.



(i) Which of these is found in this bacterium?

(1)

☒ **A** cellulose

☒ **B** chitin

☒ **C** cytoplasm

☒ **D** nucleus

(ii) The bacterium has evolved to release an enzyme called urease.

The action of the bacterium neutralises the acid in the stomach.

What is the pH changed to?

(1)

☒ **A** 1

☒ **B** 2

☒ **C** 7

☒ **D** 12

(iii) Use the theory of evolution by natural selection to explain how *H. pylori* bacteria could have evolved to produce urease.

(4)

(b) Probiotics are live microorganisms that can have health benefits when consumed.

Scientists investigate the ability of probiotics and cranberry juice to reduce the growth of *H. pylori*.

The scientists give various treatments to a group of people who have *H. pylori*.

The treatments are given daily for three weeks.

The scientists measure the mean percentage reduction of *H. pylori* for each treatment.

The table shows the scientists' results.

Treatment	Mean percentage (%) reduction in *H. pylori*
probiotics	14.9
cranberry juice	16.9
probiotics and cranberry juice	22.9
control	1.5

Give two conclusions from these results.

(2)

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2 – (4BI1/1B_Winter_2020_Q2) – *The Nature And Variety Of Living Organisms, Structure And Functions In Living Organisms*

Organisms can be classified into groups based on their features.

(a) State three differences between eukaryotic and prokaryotic organisms.

(3)

1 .....

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2 .....

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3 .....

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(b) Give an example of a disease caused by a protoctist.

(2)

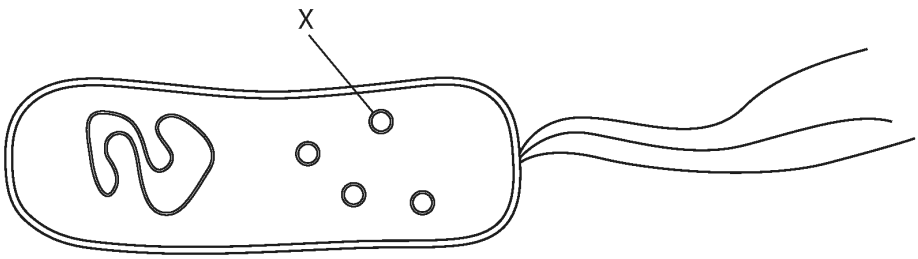
name of protoctist .....

name of disease .....

3 – (4BI1/1BR_Winter_2020_Q4) – *The Nature And Variety Of Living Organisms, Reproduction And Inheritance*

Some bacteria are pathogenic and cause infections.

The diagram shows the structure of a pathogenic bacterium.



(a) Name the part labelled X.

(1)

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(b) Antibiotics can be used to cure some infections.

Some bacteria are resistant to antibiotics.

Explain how resistance to an antibiotic occurs and increases in a population of bacteria.

(3)

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(c) The table shows the number of deaths in 2014 caused by bacteria that are resistant to antibiotics.

The table also shows the predicted number of deaths in 2050 caused by resistant bacteria.

Year	Number of deaths $\times 10^6$
2014	0.7
2050	10.0

(i) Calculate the percentage increase in the predicted number of deaths in 2050 compared with the number of deaths in 2014.

(2)

percentage increase = ...

(ii) A doctor claims that if he stops giving antibiotics to any patients who are ill, he can reduce the number of predicted deaths caused by resistant bacteria in 2050.

Comment on this claim.

(4)

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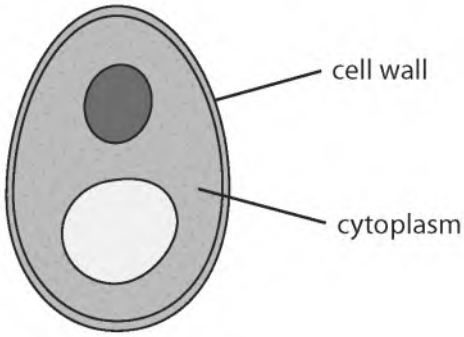
4 – (4BI1/1B_Summer_2021_Q4) – *The Nature And Variety Of Living Organisms, Use Of Biological Resources*

The diagram shows a yeast cell.



(a) (i) Which row of the table is correct for this yeast cell?

(1)

	Substance in cell wall	Substance stored in cytoplasm
☒ **A**	cellulose	glycogen
☒ **B**	cellulose	starch
☒ **C**	chitin	glycogen
☒ **D**	chitin	starch

(ii) Which type of organism is a yeast cell?

(1)

☒ **A** a bacterium

☒ **B** a fungus

☒ **C** a plant

☒ **D** a protoctist

(b) Biofuel is made from ethanol.

Scientists use genetically modified (GM) yeast to produce biofuel.

The GM yeast contains an enzyme that digests plant cell walls to produce glucose.

The yeast uses the glucose in respiration to produce ethanol.

(i) Which of these equations shows the respiration in the yeast?

(1)

- ☐ **A** glucose → ethanol
- ☐ **B** glucose → ethanol + carbon dioxide
- ☐ **C** glucose + oxygen → ethanol
- ☐ **D** glucose + oxygen → ethanol + carbon dioxide

(ii) Name an enzyme used by scientists to genetically modify the yeast.

(1)

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(iii) The GM yeast is a recombinant strain.

State what is meant by the term **recombinant**.

(1)

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(iv) Suggest why biofuel produced using glucose from plants could reduce global warming.

(2)

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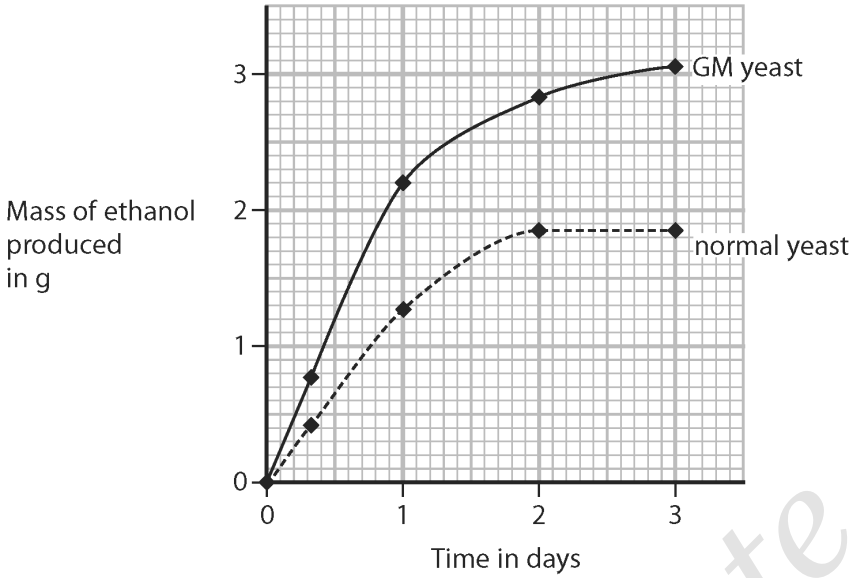
(c) The graph shows the mass of ethanol produced by GM yeast and by normal yeast over a period of 3 days.



(i) Calculate the percentage increase in the mass of ethanol produced by GM yeast compared to normal yeast after 1 day.

(2)

percentage increase = ... %

(ii) Give two reasons why the rate of ethanol production decreases after 1 day.

(2)

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ANSWERS

1 – (4BI1/1B_Summer_2020_Q1) – *The Nature And Variety Of Living Organisms, Structure And Functions In Living Organisms, Reproduction And Inheritance*

Question Number	Answer	Mark
(a)(i)	C cytoplasm *A is not correct as cellulose is not found in the bacterium* *B is not correct as chitin is not found in the bacterium* *D is not correct as a nucleus is not found in the bacterium*	**1 comp**

Question Number	Answer	Mark
(a)(ii)	C 7 *A is not correct because 1 is not neutral pH* *B is not correct because 2 is not neutral pH* *D is not correct because 12 is not neutral pH*	**1 comp**

Question Number	Answer	additional guidance	Mark
(a)(iii)	An explanation that makes reference the following points: • mutation (1) • variation (1) • <u>survive</u> (1) • reproduce / breed / offspring (1) • pass on allele / gene (1)		**4 exp**

Question Number	Answer	Mark
(b)	An answer that makes reference the following points: • probiotic / cranberry / both / treatments (better than control) reduce (bacteria) /eq(1) • more reduction if taken together / eq (1) • cranberry (alone) reduces more than probiotic (alone) / eq(1)	**2 grad**

2 – (4BI1/1B_Winter_2020_Q2) – *The Nature And Variety Of Living Organisms, Structure And Functions In Living Organisms*

Question Number	Answer	Additional guidance	Mark
(a)	An answer that makes reference to three of the following: • have nucleus (1) • have organelles / mitochondria / chloroplasts eq (1) • have chromosome**s** / more than one chromosome (1) • lack plasmids (1)	**allow** converse for prokaryotes prokaryotes have a nucleoid prokaryotes have circular chromosome / loop of DNA	**3**

Question Number	Answer	Additional guidance	Mark
(b)	An answer that makes reference to suitable organism and matched disease: • plasmodium (1) • malaria (1)	**allow** other examples e.g. amoeba and dysentery Trypanosoma and sleeping sickness must be matched so amoeba with malaria scores 1 malaria plasmodium wrong way round scores 1	**2**

3 – (4BI1/1BR_Winter_2020_Q4) – *The Nature And Variety Of Living Organisms, Reproduction And Inheritance*

Question Number	Answer	Mark
(a)	plasmid	**1**

Question Number	Answer	Additional Guidance	Mark
(b)	An explanation that makes reference to three of the following points: • mutation (1) • survive/ not killed (1) • reproduce / multiply / eq (1) • pass on DNA / allele / gene (1)	**Ignore** pass on characteristics alone	**3**

Question Number	Answer	Additional guidance	Mark
(c)(i)	10 – 0.7 = 9.3 10 000 000 – 700 000 = 9 300 000 9.3 ÷ 0.7 x 100 9 300 000 ÷ 700 000 × 100 1329 % allow 1328.6 or 1328.57 (2)	award full marks for correct numerical answer without working one mark for 9.3 or 9 300 000	**2**

Question Number	Answer	Additional guidance	Mark
(c)(ii)	An answer that makes reference to four of the following points: • stopping antibiotics allows non-resistant bacteria to increase / grow / no more increase in resistance **or** antibiotics allow resistant bacteria to increase / grow (1) • less selection pressure (for antibiotic resistance) / competition (for resources) (1) • most infections (would now be) caused by non-resistant bacteria (1) • antibiotics will be effective in most cases / against more bacteria (1) • use new / different antibiotics (instead of not using any) (1) • some patients may die / suffer / eq if not given antibiotics / from other things (1)	**Allow** converse	**4**

4 – (4BI1/1B_Summer_2021_Q4) – *The Nature And Variety Of Living Organisms, Use Of Biological Resources*

Question Number	Answer	Mark
(a)(i)	**The only correct answer is C chitin glycogen** A is not correct as it is not cellulose and glycogen B is not correct as it is not cellulose and starch D is not correct as it is not chitin and starch	**1**

Question Number	Answer	Mark
(a)(ii)	**The only correct answer is B fungus** A is not correct as it is not a bacterium C is not correct as it is not a plant D is not correct as it is not a protoctist	**1**

Question Number	Answer	Mark
(b)(i)	**Only correct answer is B glucose → ethanol + carbon dioxide** A is not correct as it is not the correct equation C is not correct as it is not the correct equation D is not correct as it is not the correct equation	**1**

Question Number	Answer	additional guidance	Mark
(b)(ii)	• restriction / endonuclease / ligase (1)	allow correctly named endonuclease	**1**

Question Number	Answer	Mark
(b)(iii)	• contains new DNA / new gene / foreign DNA / foreign gene / altered genes / DNA from other organism/ DNA from other species / gene from other organism / gene form other species / contains gene for digesting cell walls / contains gene for digesting cellulose / gene for cellulase / eq /	**1**

Question Number	Answer		Mark
(b)(iv)	An answer that makes reference to two of the following points: • less burning of fossil fuels / eq (1) • less carbon dioxide in air / carbon neutral / plants use CO_2 (in photosynthesis) / eq (1) • less trapping of heat / less greenhouse effect / eq (1) • uses renewable resource (1)	allow named fossil fuel	**2**

Question Number	Answer	Additional guidance	Mark
(c)(i)	• 2.2 – 1.25 = • 0.95 ÷ 1.25 = 0.76 • × 100 = 76% (2)	award full marks for correct numerical answer without working allow 2.2 -1.3 =0.9 0.9÷1.3 = 0.69 ×100 = 69% allow 2.2 – 1.2 =1 1÷ 1.2= 0.8 0.8×100 = 80% allow 1 mark for dividing by mass of normal yeast / 1.2 to 1.3 percentage between 69 and 80 (2)	**2**

Question Number	Answer	additional guidance	Mark
(c)(ii)	An answer that makes reference to two of the following points: • running out of glucose / food / eq (1) • (build-up of) ethanol (1) • yeast cells die (1)	allow one mark for oxygen becomes available ethanol kills the yeast = mp2 and mp3	**2**