1.2 Asexual Reproduction and Its Comparison With Sexual Reproduction: Test Pack

EDEXCEL 4BI1 · Calculator allowed · about 15 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Define the term 'asexual reproduction' as it is used for single-celled and multicellular organisms in biology.

(Total for Question 1 is 1 mark)

2 State briefly what is meant by a clone in biology and give one example from plants produced by asexual reproduction.

(Total for Question 2 is 1 mark)

3 Give one clear biological reason why asexual reproduction may be favoured by organisms that live in isolated or extreme habitats, and give one named organism that uses asexual reproduction in those conditions.

(Total for Question 3 is 1 mark)

4 Describe briefly how mitosis is involved in asexual reproduction in multicellular organisms such as plants forming new shoots from a bulb.

(Total for Question 4 is 2 marks)

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5 In an illustrative investigation, a student plants 10 potato tubers and 10 potato seeds, each in a separate pot. All pots receive the same compost and 40 ml of water daily. The student records the day each shoot first appears. State how to increase the number of independent observations for each method, and describe how to summarise the emergence times to compare the methods.

(Total for Question 5 is 2 marks)

6 Suggest one reason why asexual reproduction may make a population more vulnerable to a disease outbreak, using the idea of genetic similarity in your explanation.

(Total for Question 6 is 2 marks)

7 In an illustrative investigation, a researcher compares two ways of propagating the same garden plant species under the same growing conditions. Of 20 cuttings, 16 survive; of 20 seed-grown plants, 12 survive. Calculate and compare survival percentages and give one cautious conclusion about which method performed better in this sample.

(Total for Question 7 is 3 marks)

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Mark scheme · 1.2 Asexual Reproduction and Its Comparison With Sexual Reproduction: Test Pack

Question 1

a form of reproduction involving one parent producing offspring genetically identical to the parent, usually without fusion of gametes (involves mitosis) **B1**

Answer: Reproduction from one parent producing genetically identical offspring, without fusion of gametes, usually by mitosis.

Question 2

a clone is an organism genetically identical to another; example: potato plants grown from tubers are clones **B1**

Answer: A clone is a genetically identical individual; example: potato plants from tubers are clones.

Question 3

valid reason and organism, e.g. it allows reproduction without mates so a single coloniser can establish a population; example: hydra by budding or some bacteria by binary fission **B1**

Answer: Reason: allows reproduction without a mate so a single coloniser can found a population; example: hydra (budding) or bacteria (binary fission).

Question 4

states that mitosis produces new cells with the same number of chromosomes **B1**

links to growth of new shoots or structures from the bulb composed of genetically identical cells **B1**

Answer: Mitosis makes new body cells with the same chromosome number; these identical cells form the new shoot or plant part that develops from the bulb.

Question 5

repeat with additional independent pots or larger replicate groups **B1**

calculate and compare a mean time to first shoot for each propagation method **B1**

Answer: Plant more tubers and more seeds, each in its own pot under the same conditions. Calculate and compare the mean time to first shoot for each propagation method.

Question 6

states that offspring are genetically identical **B1**

explains that if one individual is susceptible to a pathogen, many will be susceptible so disease spreads rapidly **B1**

Answer: Because offspring are genetically identical, if one is susceptible to a pathogen many others will be too, so a disease can spread quickly through the population.

Question 7

cutting survival = 16/20 x 100 = 80% **M1**

seed-grown survival = 12/20 x 100 = 60% **M1**

concludes cuttings did better in this sample while noting small sample or need for more repeats before generalising **B1**

Answer: Cuttings: 16/20 x 100 = 80%; seed-grown plants: 12/20 x 100 = 60%. Cuttings had higher survival in this sample, but more plants or repeats are needed before generalising.

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