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NZQA

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

For Supervisor's use only

Level 1 Science, 2008

90188 Describe aspects of biology

Credits: Five
2.00 pm Thursday 20 November 2008

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should answer ALL the questions in this booklet.

If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–10 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

For Assessor's use only	**Achievement Criteria**	
Achievement	**Achievement with Merit**	**Achievement with Excellence**
Describe aspects of biology. ☐	Explain aspects of biology. ☐	Discuss aspects of biology. ☐
Overall Level of Performance ☐		

You are advised to spend 40 minutes answering the questions in this booklet.

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QUESTION ONE

Fruit can be processed so that it can be stored for a long time and remain safe for eating. This can be done by preserving fruit (bottling), which reduces the risk of microorganism infection.

The steps in the process are:

1. **Cook** the fruit.
2. Put the fruit into **sterilised** jars.
3. Remove **all air bubbles**.
4. **Screw down** the sterilised lid.

Adapted from *Edmonds Cookery Book*, 1990, page 179.

(a) Discuss **how** microorganism infection is reduced by TWO of the steps in the process.

(b) Explain why jars of preserved fruit should be refrigerated once opened. In your answer, refer to the life processes of microorganisms.

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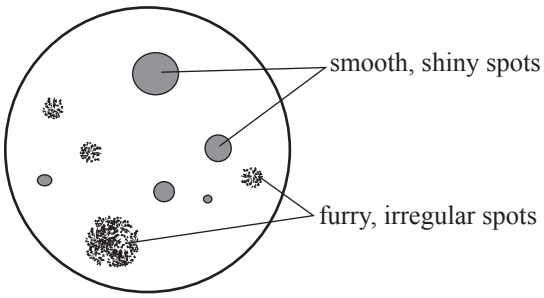
(c) Addition of some yeast to fruit in certain conditions can cause a small amount of alcohol to be produced.

Name and explain the process by which yeast produces alcohol from the fruit.

QUESTION TWO

Assessor's use only

By accident, a nutrient agar plate was left opened on a laboratory bench. The diagram below shows the growth of microorganism colonies on the agar plate after three days.



(a) Bacteria and fungi can be grown on nutrient agar plates, whereas viruses cannot.

Explain why bacteria and fungi have grown on the agar plate but not viruses. Refer to:

- conditions needed for microorganism growth
- viral replication.

(b) Discuss the similarities and differences in the microorganism colonies on the agar plate.
Refer to:

- how the microorganisms arrived on the plate
- the specific structures that led to the colonies' appearance
- the life processes involved in the growth of the colonies.

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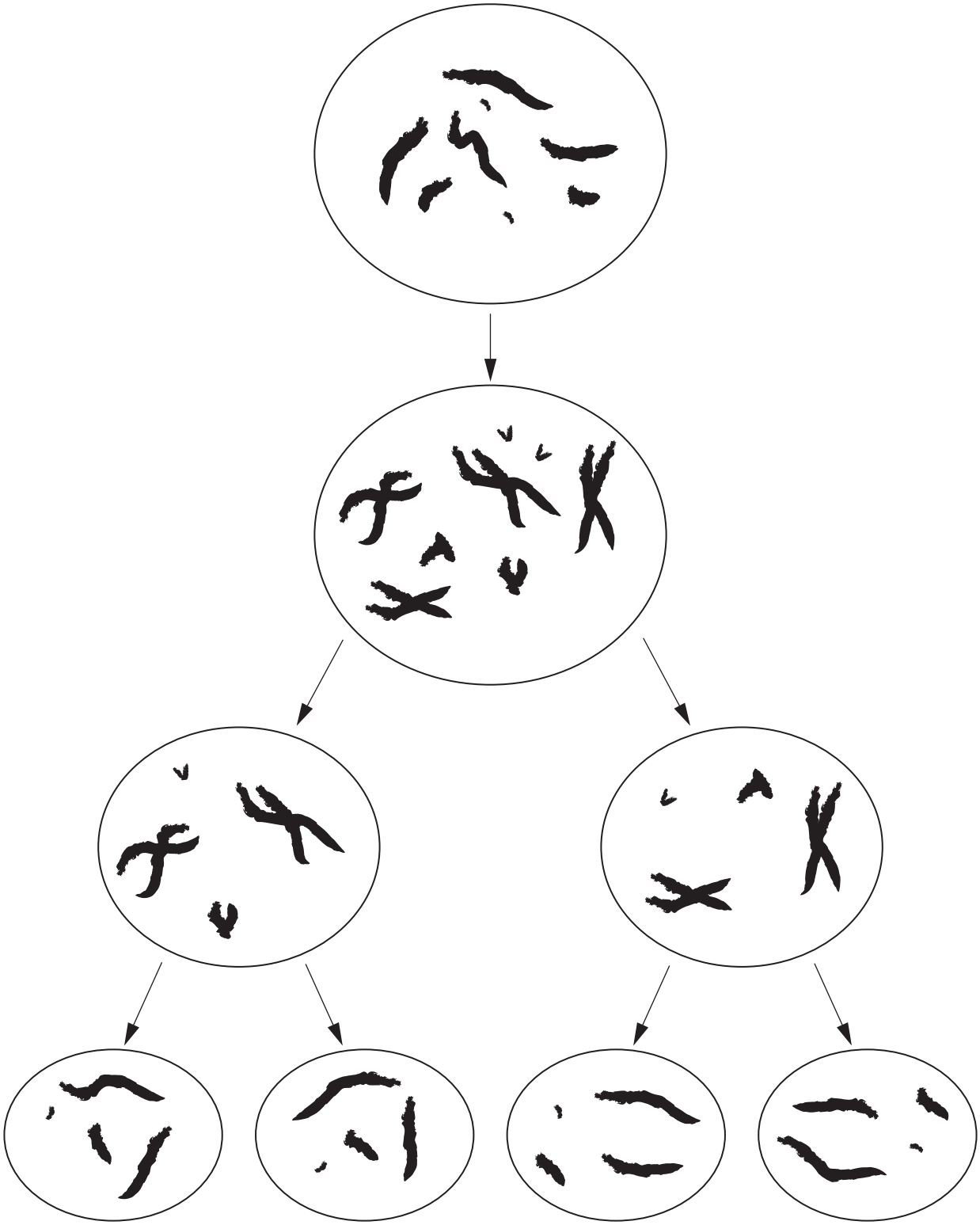
QUESTION THREE

Assessor's use only

Drosophila melanogaster (fruit fly) has eight chromosomes in each cell.

The following diagram shows these chromosomes during meiosis.



(a) Discuss the reasons for the **changes** to the number of chromosomes during meiosis, with reference to:

- the number of chromosomes at each stage
- the purpose of this type of cell division.

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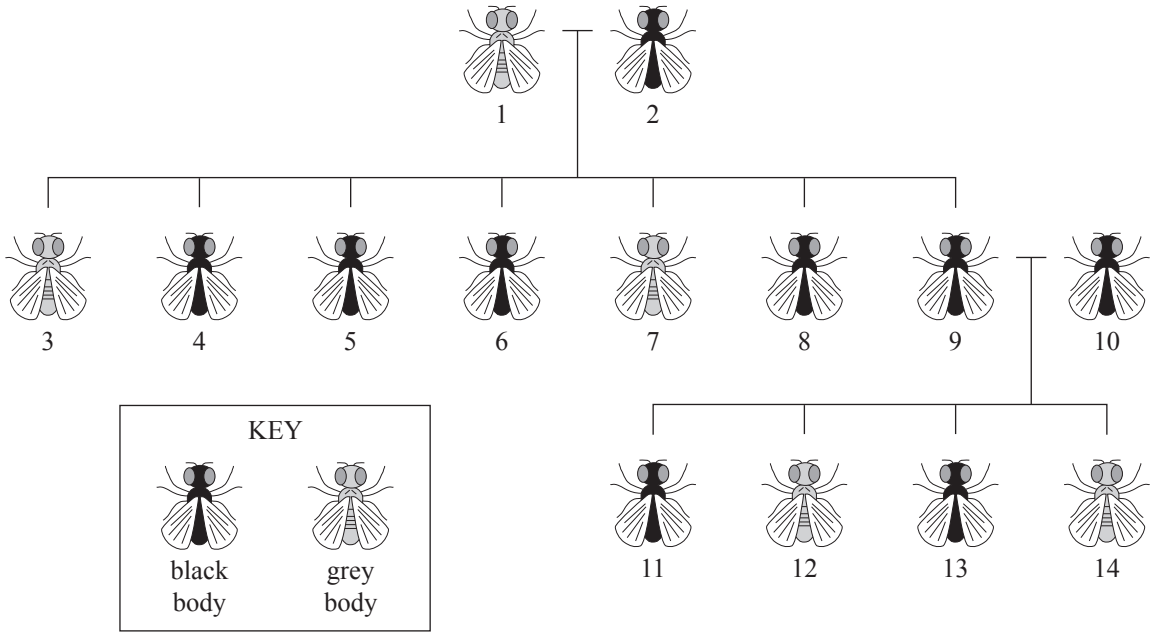
In *Drosophila*, body colour is controlled by a gene. The body colour can be black or grey.

The following is a pedigree diagram showing a *Drosophila* cross.



(b) Determine the **genotype** of flies 12 and 14. Support your answer with:

- reference to specific flies from the pedigree diagram
- reasons for which allele is dominant and which is recessive
- a Punnett square.

QUESTION FOUR

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> Fonterra New Zealand scientists have bred cows that can produce low-fat milk.
>
> The cows, which have a particular genetic mutation, were bred from a single female discovered by researchers when they screened milk from millions of cattle.
>
> *New Zealand Herald*, 28 May 2007

A whole herd of animals with the low-fat milk characteristic can be obtained by **selective breeding** or by **cloning**.

The genetic characteristics of the animals obtained by these two breeding techniques will be different.

Discuss the reasons for the differences in the genetic characteristics of the cows produced by selective breeding **and** cloning. Consider the type of cell division involved in **each** breeding technique.

Extra paper for continuation of answers if required.
Clearly number the question.

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Question number	