



NSW Education Standards Authority

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Centre Number

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Student Number

2024 HIGHER SCHOOL CERTIFICATE EXAMINATION

Agriculture

General Instructions

- Reading time – 5 minutes
- Working time – 3 hours
- Write using black pen
- Draw diagrams using pencil
- Calculators approved by NESA may be used
- Write your Centre Number and Student Number at the top of this page

Total marks: 100

Section I – 80 marks (pages 2–27)

This section has two parts, Part A and Part B

Part A – 20 marks

- Attempt Questions 1–20
- Allow about 30 minutes for this part

Part B – 60 marks

- Attempt Questions 21–27
- Allow about 1 hour and 45 minutes for this part

Section II – 20 marks (pages 29–30)

- Attempt ONE question from Questions 28–30
- Allow about 45 minutes for this section

Section I
80 marks

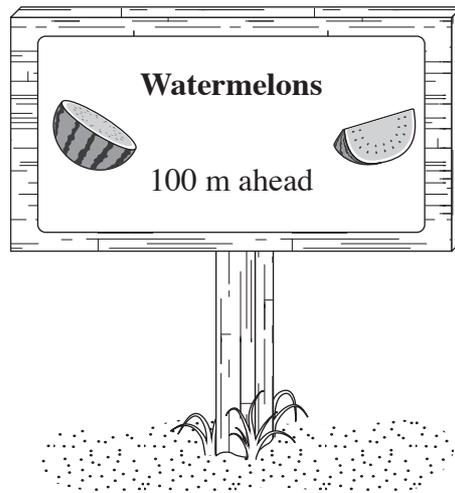
Part A – 20 marks

Attempt Questions 1–20

Allow about 30 minutes for this part

Use the multiple-choice answer sheet for Questions 1–20.

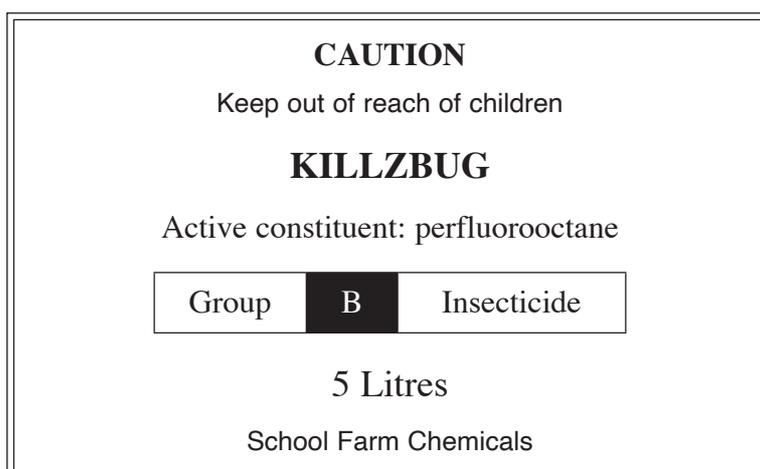
- 1** A farmer is selling watermelons from a stall at the farm gate. A sign is placed 100 metres down the road from the stall.



What is the purpose of this simple form of advertising?

- A. To make people aware of the stall
- B. To advertise the quality of the watermelons
- C. To promote the health benefits of watermelons
- D. To encourage people to buy watermelons because they are cheap

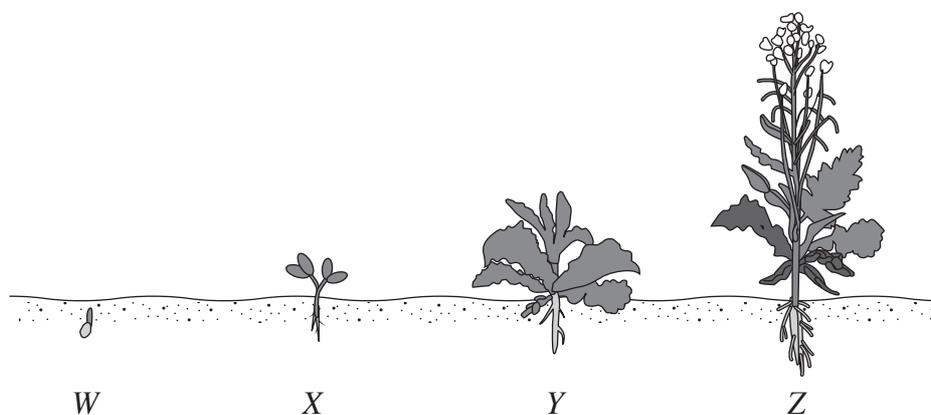
2 A pesticide label is shown.



What is the name of the key ingredient?

- A. Group B
- B. Killzbug
- C. Insecticide
- D. Perfluorooctane

3 The diagram shows the developmental stages of a plant.



Which row of the table identifies the correct terms for the stages labelled W, X, Y and Z in the diagram?

	W	X	Y	Z
A.	emergence	vegetative	reproductive	germination
B.	emergence	germination	reproductive	vegetative
C.	germination	vegetative	emergence	reproductive
D.	germination	emergence	vegetative	reproductive

- 4 The result of a plant breeding program was an increase in the level of a vitamin in the harvestable product.

Which of the following features was improved?

- A. Yield
- B. Quality
- C. Drought tolerance
- D. Disease resistance

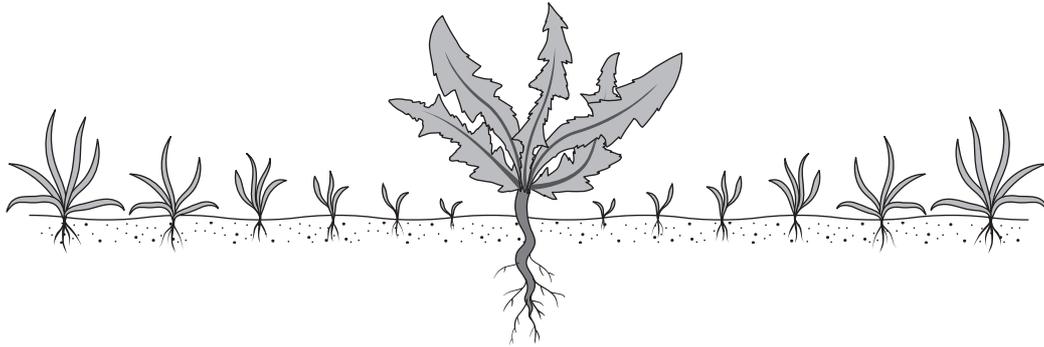
- 5 Which of the following accurately identifies a feature of family farms and corporate enterprises?

	<i>Family farms</i>	<i>Corporate enterprises</i>
A.	Always small scale	Always large scale
B.	Well cared for and maintained	Maintained but not cared for
C.	Only family workers employed	Only farm hands employed
D.	Managed by owner	Controlled by a business manager

- 6 What is the purpose of animal welfare legislation in animal production systems?

- A. To prevent all pain and suffering
- B. To monitor the activities of farmers
- C. To promote animal wellbeing and prevent cruelty
- D. To ensure the animals have adequate food and water

- 7 The diagram shows the effect of a weed on the growth of a sown pasture.



- Which of the following is NOT a reason for this effect?
- A. The pasture plants closest to the weed were shaded.
 - B. The weed has taken up valuable nutrients from the soil.
 - C. The weed released chemicals into the soil inhibiting pasture growth.
 - D. The pasture is a grass and cannot use the nitrogen released by the weed.
- 8 Soil fertility can be managed by growing plants for grazing in between years of cereal crop production.
- What is this technique known as?
- A. Crop rotation
 - B. Green manuring
 - C. Pasture ley phase
 - D. Conservation tillage
- 9 Which of the following ONLY lists invertebrates involved in decomposition?
- A. Maggots, fungi, beetle larvae, termites
 - B. Bacteria, earthworms, termites, protozoa
 - C. Grasshoppers, millipedes, bacteria, spiders
 - D. Earthworms, maggots, beetle larvae, millipedes

10 An unexpected ban has been placed on an export product.

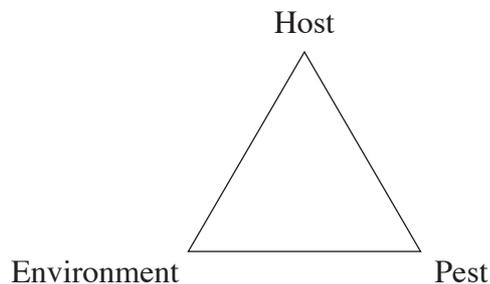
What type of financial pressure is this?

- A. Fluctuating interest rates
- B. Dynamic nature of markets
- C. High expenditure on inputs
- D. Seasonally irregular income

11 Which of the following is NOT correct in regard to a diverse pasture mix?

- A. Management of the pasture is easier.
- B. It extends the growing season of the pasture.
- C. It provides better resilience against pasture pests and diseases.
- D. The nutritional needs of the grazing animals are more easily met.

12 The diagram shows the interaction between host, pest and environment in relation to disease.

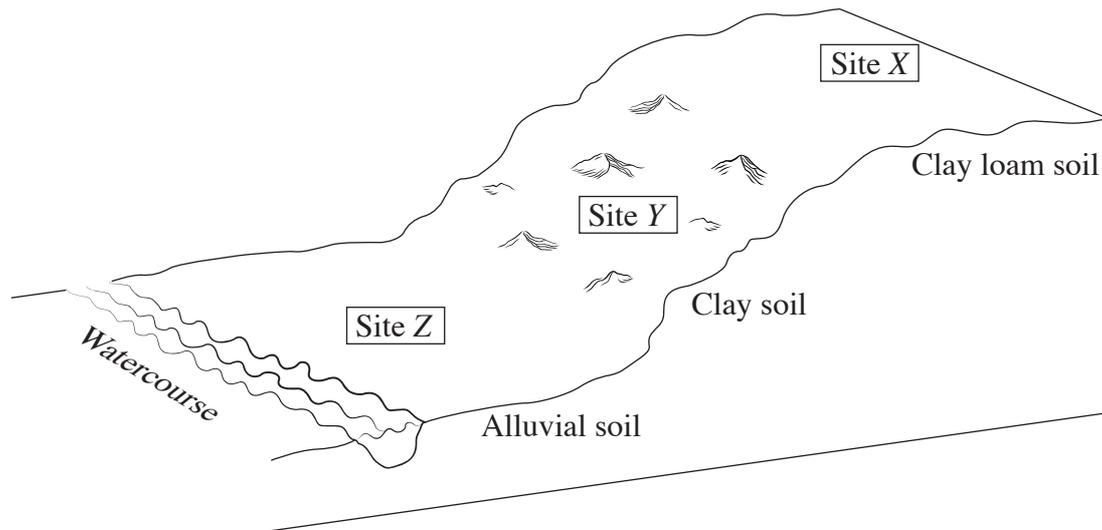


A farmer routinely uses the same single chemical on their animals to control a pest.

Which row of the table shows the interaction involved and the influence on pest resistance?

	<i>Interaction involved</i>	<i>Likelihood of pest population developing resistance</i>
A.	Pest and environment	Increases
B.	Host and pest	Decreases
C.	Host and pest	Increases
D.	Pest and environment	Decreases

- 13 Which pair of factors are both environmental influences on male fertility in livestock?
- A. Hot weather, day length
 B. Nutrition, male social status
 C. Sex drive, scrotal circumference
 D. Age, number of females to service
- 14 The diagram shows a sector of a farmer's property and 3 sites for farming activities.



The table shows descriptions for some land capability classes in Australia.

<i>Class 1 and 2</i>	Highly productive land suited to cropping
<i>Class 3</i>	Moderately productive land suited to improved pasture and to cropping with pasture rotation
<i>Class 4 and 5</i>	Marginal lands not suitable for cultivation and very low productivity for grazing

Which row of the table indicates the sites best suited to each class of land use?

	<i>Class 1 and 2</i>	<i>Class 3</i>	<i>Class 4 and 5</i>
A.	Site X	Site Y	Site Z
B.	Site Z	Site X	Site Y
C.	Site Y	Site Z	Site X
D.	Site Z	Site Y	Site X

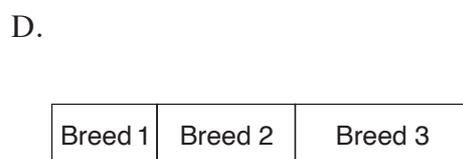
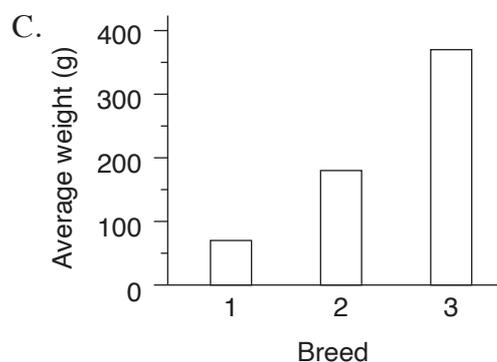
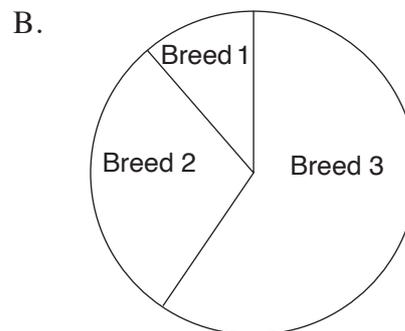
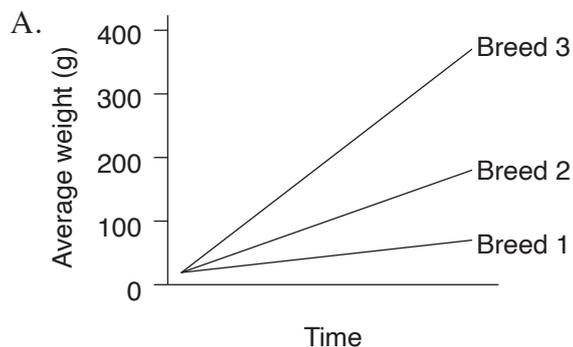
15 Which row of the table shows the soil with the highest ion exchange capacity?

	<i>Sand (%)</i>	<i>Silt (%)</i>	<i>Clay (%)</i>	<i>Organic matter/ soil carbon (%)</i>
A.	48	30	20	2
B.	30	15	50	5
C.	60	25	9	6
D.	44	20	33	3

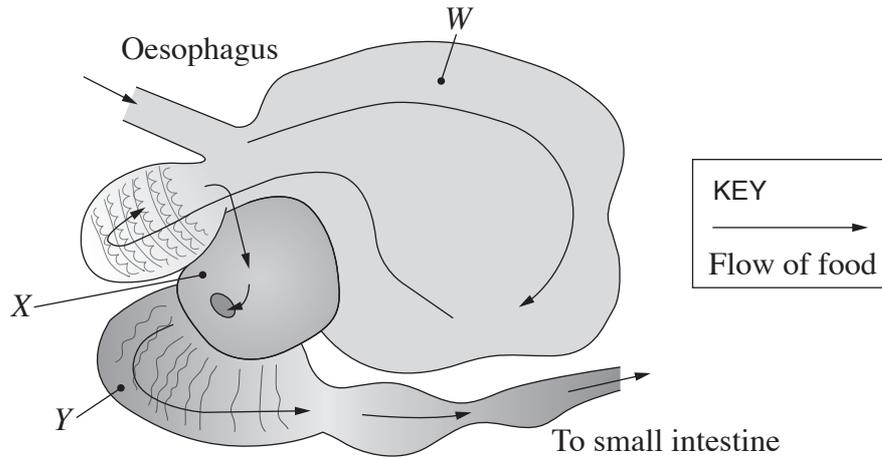
16 A student recorded the weights of three different breeds of chickens two weeks after hatching. The table below shows the data collected.

<i>Breed</i>	1	2	3
<i>Average weight (g)</i>	70	180	370

Which diagram correctly represents this data?



17 The diagram represents part of the digestive system of a ruminant animal.



Which row of the table correctly identifies the function of the labelled part?

	W	X	Y
A.	Microbial digestion	Water absorption	Chemical digestion
B.	Mechanical digestion	Chemical digestion	Microbial digestion
C.	Mechanical digestion	Microbial digestion	Chemical digestion
D.	Microbial digestion	Chemical digestion	Water absorption

18 The following annual financial data relates to a dryland grain farm.

Farm area: 1000 ha

Total income: \$840 000

Fixed costs: \$80/ha

Variable costs: \$180/ha

Total farm capital value (assets): \$17 600 000

Which of the following is the correct gross margin and return to capital for this farm?

	<i>Gross margin (\$/ha)</i>	<i>Return to capital (%)</i>
A.	580	4.8
B.	580	3.3
C.	660	3.3
D.	660	4.8

19 Which of the following matches the plant hormone to its effect on plants?

	<i>Gibberellin</i>	<i>Auxin</i>	<i>Cytokinin</i>	<i>Ethylene</i>
A.	Stimulates cell division	Boosts root and shoot growth	Speeds germination	Ripens fruit
B.	Speeds germination	Ripens fruit	Stimulates cell division	Boosts root and shoot growth
C.	Speeds germination	Boosts root and shoot growth	Stimulates cell division	Ripens fruit
D.	Boosts root and shoot growth	Stimulates cell division	Ripens fruit	Speeds germination

- 20 Five lambs were weighed during a trial, and the weight gains are shown in the table.

<i>Lamb</i>	<i>Weight gain (kg)</i>
1	22
2	18
3	19
4	18
5	20

Which of the following is the correct mean weight gain and sample standard deviation for this data?

	<i>Mean weight gain</i>	<i>Sample standard deviation</i>
A.	19.4	4.0
B.	19.0	1.7
C.	19.0	4.0
D.	19.4	1.7

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Centre Number

Agriculture

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Student Number

Section I Part B Answer Booklet

60 marks

Attempt Questions 21–27

Allow about 1 hour and 45 minutes for this part

Instructions

- Write your Centre Number and Student Number at the top of this page.
- Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.
- Show all relevant working in questions involving calculations.
- Extra writing space is provided at the back of this booklet. If you use this space, clearly indicate which question you are answering.

Please turn over

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Question 21 (6 marks)

(a) Identify TWO farming practices that have led to a decline in water quality. **2**

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(b) Explain how grassed waterways can improve water quality. **4**

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Question 22 (continued)

(c) Describe how TWO factors affect demand for the product.

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End of Question 22

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Question 23 (10 marks)

Answer parts (a)–(c) with reference to a named product you have studied.

Name of product:

- (a) What happens to the product if it does not meet market specifications? **2**

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- (b) Outline ONE government influence on the production or marketing of the product. **2**

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Question 23 continues on page 19

Do NOT write in this area.

Question 25 (8 marks)

- (a) A student performed a first-hand investigation to determine the effect of light on plant growth. 4

Explain the purpose of replication. In your answer, provide a specific example that could be used for this investigation.

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- (b) Explain ONE technique, other than modifying light, that can be used by farmers to manage an environmental constraint in plant production. 4

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Question 26 (continued)

(c) Explain ONE purpose of oestrus synchronisation in an animal breeding program. **4**

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End of Question 26

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Section I Part B extra writing space

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Agriculture

Section II

20 marks

Attempt ONE question from Questions 28–30

Allow about 45 minutes for this section

Answer the question in the Section II Writing Booklet. Extra writing booklets are available.

Your answers will be assessed on how well you:

- demonstrate knowledge and understanding relevant to the question
 - communicate ideas and information using relevant examples
 - present a logical and cohesive response
-

Please turn over

Question 28 — Agri-food, Fibre and Fuel Technologies (20 marks)

- (a) In this elective you analysed a research study of the development and/or implementation of an agricultural biotechnology.
- (i) Explain why this research was conducted. **4**
 - (ii) How was the data in the study collected and presented? **4**
- (b) Evaluate biofuel production with respect to world food demands and environmental sustainability. **12**

OR

Question 29 — Climate Challenge (20 marks)

- (a) In this elective you analysed a research study of climate variability or management strategies related to climate variability.
- (i) Explain why this research was conducted. **4**
 - (ii) How was the data in the study collected and presented? **4**
- (b) Analyse water storage and water trading issues in relation to river flows in Australian agricultural systems. **12**

OR

Question 30 — Farming for the 21st Century (20 marks)

- (a) In this elective you analysed a research study of the development and/or implementation of a recent agricultural technology.
- (i) Explain why this research was conducted. **4**
 - (ii) How was the data in the study collected and presented? **4**
- (b) Evaluate one recent technological development in agriculture in terms of its environmental and social impacts. **12**

End of paper