

Past-paper walk-through

Classification ■ 18.1

eXercise

Questions in this set

- 9700/41 N25 Q2 ■ 13 marks
- 9700/44 N25 Q7 ■ 10 marks
- 9700/41 J25 Q9 ■ 10 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 2

9700/41 N25 ■ Q2 ■ 13 marks

- 2 *Exserohilum turcicum* is a fungal pathogen. The growth of the mycelium of the fungus damages the leaves of maize plants, *Zea mays*. Leaf damage reduces crop yield.

- (a) (i) Complete Table 2.1 to show **one** structural difference and **one** functional difference between *E. turcicum* and *Z. mays*.

Table 2.1

	<i>E. turcicum</i>	<i>Z. mays</i>
structural difference		

Question 2

functional difference		
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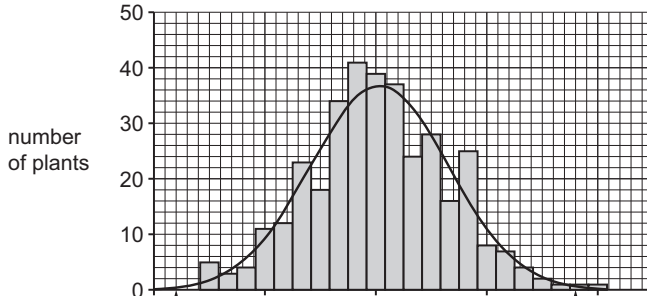
[2]

- (ii) Describe the principles by which organisms such as *E. turcicum* and *Z. mays* are classified in the taxonomic hierarchy.

Question 2

- (b) Two inbred varieties of maize, SKV50 and CML153, were crossed. The resulting F1 hybrids were self-crossed to produce F2 offspring. The F2 plants were grown, and the percentage area of leaf damage caused by *E. turcicum* was measured.

Fig. 2.1 shows the results for the F2 generation. The arrows show the mean percentage area of leaf damage for the two parent varieties.



Question 2

20 ▲ 30 40 50 ▲ 60

Question 2

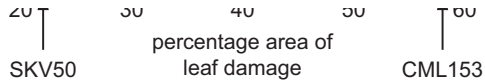


Fig. 2.1

- (i) Explain how Fig. 2.1 can be used to determine which parent maize variety shows the greatest resistance to infection by *E. turcicum*.

Question 2

- (ii) State the name of the type of variation shown by the maize F₂ generation in Fig. 2.1.

Question 2

- (iii) Explain the **genetic** basis of the type of variation shown by the maize F2 generation.

Question 2

[Total: 13] _

Solution 2

(a)(i) Mark scheme

- E. turcicum
- Z. mays
- 1
- structural
- difference
- chitin cell wall
- or
- no chloroplasts

Solution 2

- or
- hyphae / cells long and branching
- or
- syncytial / multinucleate / several nuclei per cell
- cellulose cell wall
- or
- chloroplasts
- or
- no hyphae / cells not long and branching
- or

Solution 2

- one nucleus per cell ;
- 2
- functional
- difference
- heterotroph(ic) / parasitic / obtain food from host / do
- not photosynthesise
- autotroph(ic) / phototrophic
- / photosynthesis(e) ;
- 2

Solution 2

(a)(ii) Mark scheme

- any four from:
- 1
- large groups divide into smaller groups ;
- 2
- common / similar / shared, features within a group ;
- 3
- ref. three of: kingdom – phylum – class – order – family ;
- 4

Solution 2

- genus and species = binomial / Linnaean / Latin / scientific, name ;
- 5
- (both in domain) Eukarya ;
- 6
- different kingdoms / Fungi and Plantae ;
- 4

Solution 2

(b)(i) Mark scheme

- any two from:
- 1
- low percentage leaf damage means high resistance (to infection) ;
- 2
- $SKV50 = 22\%$ and $CML153 = 58\%$;
- 3
- SKV50 shows greater resistance (to infection) ;
- 2

Solution 2

(b)(ii)

Mark scheme

- continuous ;
- 1
- 9700/41
- October/November 2025

Solution 2

(b)(iii) Mark scheme

- any four from:
- 1
- many / different / several / multiple, genes ;
- 2
- affect, same trait / (percentage) area of leaf damage / resistance ;
- 3
- alleles of, one / each, gene have a small effect ;
- 4

Solution 2

- (different) genes have, additive / combined / interactive, effects ;
- 5
- mathematical treatment to illustrate additive effect ;
- 4

Question 7

9700/44 N25 ■ Q7 ■ 10 marks

- 7 The kakapo, *Strigops habroptila*, is a species of large, nocturnal (active at night) parrot and is found only in New Zealand. The bird does not fly and lives on the ground.

The kakapo is classified as critically endangered on the International Union for Conservation of Nature (IUCN) Red List of Threatened Species™.

Fig. 7.1 shows a kakapo.



Question 7



Fig. 7.1

(a) Complete Table 7.1 to show the classification of the kakapo.

Table 7.1

taxonomic group	name
domain	Eukarya
kingdom	Animalia

Question 7

.....	Chordata
class	Aves
.....	Psittaciformes
family	Strigopidae
genus	

[3]

- (b) The kakapo was widely distributed before humans arrived in New Zealand. The Kakapo Recovery Programme started in 1995. Birds were moved to protected areas. In 2024 they were only found in these protected areas.

This is shown in Fig. 7.2.

Question 7

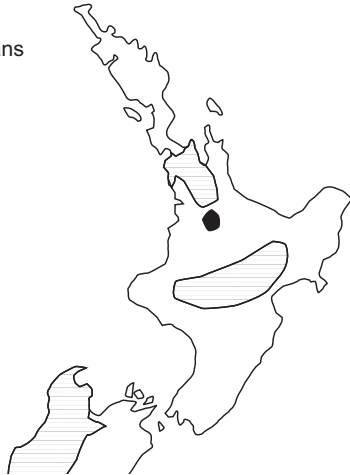
key



kakapo distribution before humans
arrived in New Zealand



protected areas 2024



Question 7



Question 7



Fig. 7.2

Suggest the ideal features of a protected area for the kakapo.

Question 7

- (c) DNA has shown that the kakapo population may have gone through one or more genetic bottlenecks after the arrival of humans in New Zealand.

Suggest the consequences of a genetic bottleneck to the kakapo population in New Zealand.

Question 7

[Total: 10]

Solution 7

(a) Mark scheme

- 1
- phylum ;
- 2
- order ;
- 3
- Strigops ;
- 3

Solution 7

(b) Mark scheme

- any three from:
 - 1
 - no / few, humans ;
 - 2
 - no / few, predators ;
 - 3
 - sufficient, vegetation / food ;
 - 4

Solution 7

- places to hide during day ;
- 5
- AVP ;
- 3

Solution 7

(c) Mark scheme

- any four from:
- 1
- inbreeding depression / little hybrid vigour ;
- 2
- low / decreased, genetic, diversity / variation or small gene pool ;
- 3
- disadvantageous recessive alleles (more likely to be) expressed ;
- 4

Solution 7

- infertility / low disease resistance / reduced fitness ;
- 5
- low / decreased, ability to adapt or high / increased, risk of extinction ;
- 6
- AVP ;
- 4
- 9700/44
- October/November 2025

Question 9

9700/41 J25 ■ Q9 ■ 10 marks

9 A species is classified into one of three domains.

(a) Two of the domains contain only prokaryotic species.

With reference to the two prokaryotic domains, describe the features used to classify prokaryotic species into two different domains.

Question 9

- (b)** Tigers are large mammals that live in many parts of Asia.

Fig. 9.1 shows a tiger, *Panthera tigris*.



Fig. 9.1

Question 9

Question 9

Complete Table 9.1 by writing the domain, kingdom and genus in which tigers are classified.

Table 9.1

taxon	name
domain	
kingdom	
phylum	Chordata
class	Mammalia
order	Carnivora
family	Felidae

Question 9

Question 9

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[3]

[Total: 6]

Solution 9

(a) Mark scheme

- any three from:
- 1
- (domains are) Archaea and Bacteria ;
- 2
- membrane lipids ester-linked (Bacteria) vs. ether-linked / not ester-linked (Archaea) ;
- 3
- single type of rRNA (Bacteria) vs. 3 types (Archaea)

Solution 9

- or
- Archaea, rRNA / ribosomal subunit, similar to eukaryotic ;
- 4
- peptidoglycan (Bacteria) vs. not peptidoglycan / different (Archaea) ;
- 5
- AVP ;
- 3

Solution 9

(b) Mark scheme

- taxon
- name
- domain
- Eukarya ;
- kingdom
- Animalia ;
- phylum
- Chordata

Solution 9

- class
- Mammalia
- order
- Carnivora
- family
- Felidae
- genus
- Panthera ;
- 3
- 9700/41

Solution 9

- May/June 2025