

Past-paper walk-through

Variation ■ 17.1

eXercise

Questions in this set

- 9700/41 N25 Q2 ■ 13 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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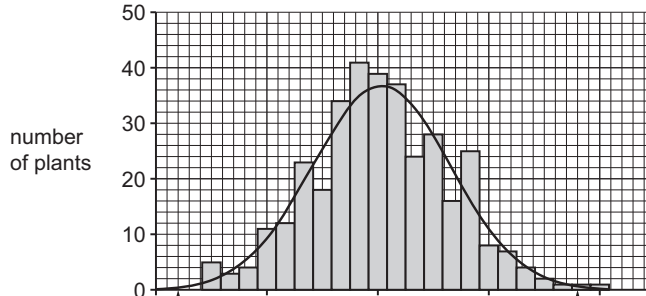
[2]

- (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

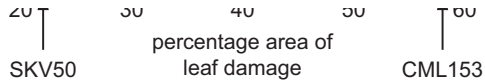


Fig. 2.1

- (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