

- (b) The ribosomes in both prokaryotic and eukaryotic cells are involved in protein synthesis.

The photograph shows a Golgi apparatus found in eukaryotic cells.



(Source: Aldona Griskeviciene / Shutterstock)

- (i) Compare and contrast the structure of the Golgi apparatus with the structure of the rough endoplasmic reticulum (rER).

(3)

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(ii) Describe the roles of the rER and the Golgi apparatus in the processing of proteins.

(3)

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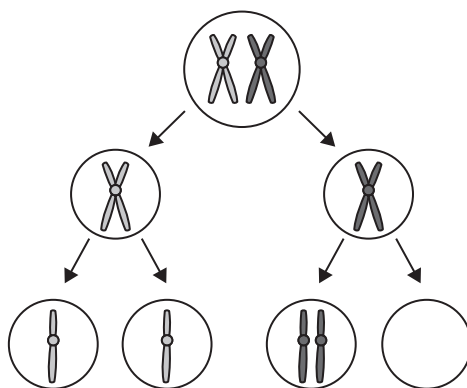
(Total for Question 2 = 10 marks)

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(b) During the process of meiosis, chromatids may not separate properly.

The diagram shows this effect.



Deduce how this can cause problems at fertilisation.

(2)

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Explain how a change from monocultural pasture to agroforestry can increase biodiversity.

(6)

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(Total for Question 8 = 13 marks)

TOTAL FOR PAPER = 80 MARKS

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| Question number | Answer                                                                                                                                                                                                                                                                                                                  | Additional guidance                                                                                                                                                   | Mark |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 2(b)(ii)        | <p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>proteins are folded in the rER (1)</li> <li>proteins are modified within the Golgi apparatus (1)</li> <li>proteins are packaged into {transport vesicles by rER / secretory vesicles by Golgi apparatus } (1)</li> </ul> | <p>ALLOW {secondary / tertiary} structure of proteins</p> <p>ALLOW description of transport or secretory function of vesicle<br/>IGNORE proteins forming vesicles</p> | (3)  |

| Question number | Answer                                                   | Additional guidance | Mark |
|-----------------|----------------------------------------------------------|---------------------|------|
| 7(a)(i)         | <ul style="list-style-type: none"> <li>1:4.25</li> </ul> | ALLOW 4:17          | (1)  |

| Question number | Answer                                                                                                                                                                                                                                                                                                                                   | Additional guidance                                                                                          | Mark |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------|
| 7(a)(ii)        | <p>And description that makes reference to three of the following:</p> <ul style="list-style-type: none"> <li>greater genetic variation in gametes (1)</li> <li>(active MSH4 gene) increases number of recombinants (1)</li> <li>due to more crossing over (1)</li> <li>(MSH4 has) a greater effect on longer chromosomes (1)</li> </ul> | <p>ALLOW less effect on shorter chromosomes</p> <p>ALLOW decreased effect as chromosome number increases</p> | (3)  |

| Question number | Answer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Additional guidance                                                  | Mark |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|------|
| 7(d)            | <p>A description that makes reference to five of the following:</p> <ul style="list-style-type: none"> <li>• strawberry plants of different species grown in same conditions (1)</li> <li>• (standardised) sample of root tips (1)</li> <li>• soften tissue with hydrochloric acid / tease tissue with mounted needle to separate cells / maceration of tissue (1)</li> <li>• use of named stain to make chromosomes more visible) (1)</li> <li>• count number of cells visible under microscope and number of cells undergoing mitosis (1)</li> <li>• {calculate/compare} mitotic index for each species (1)</li> </ul> | <p>e.g 5mm in length</p> <p>e.g. toluidine blue, (acetic) orcein</p> | (5)  |



| Question number | Answer                                                                                                                                                                                                       | Additional guidance                                   | Mark |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------|
| 8(a)            | <p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> <li>species richness / index of biodiversity (1)</li> <li>genetic diversity / heterozygosity index (1)</li> </ul> | <p>ALLOW counting of number of species in an area</p> | (2)  |

| Question number | Answer                                                                                                                                                                                                                                                                                                | Mark |
|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| 8(b)            | <p>The only correct answer is D – they can reproduce asexually</p> <ul style="list-style-type: none"> <li>A is incorrect because A is a behavioural adaptation</li> <li>B is incorrect because B is an anatomical adaptation</li> <li>C is incorrect because C is an anatomical adaptation</li> </ul> | (1)  |

| Question number | Answer                                                                                                                                                                                                                                                   | Additional guidance | Mark |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------|
| 8(c)            | <p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> <li>more cotton plants can be grown / cotton is renewable (1)</li> <li>therefore { does not run out / is available to future generations} (1)</li> </ul> |                     | (2)  |