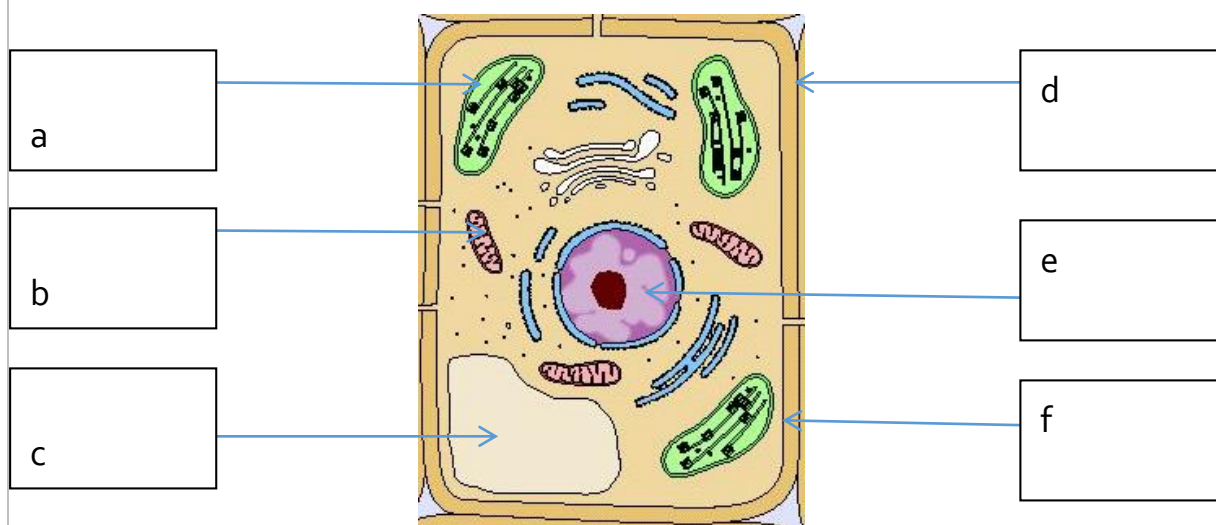


1

Name **each** of the organelles (a-f) and describe their function.



Answer:

- a. The **chloroplasts** carry out photosynthesis (1)
- b. The **mitochondria** carry out respiration (1)
- c. The **vacuole** stores water and nutrients and destroys wastes (1)
- d. The **cell wall** supports the cell and prevents it from bursting (1)
- e. The **nucleus** contains the genetic information that the cell needs to function properly (1)
- f. The **cell membrane** controls what enters and leaves the cell (1)

Only give mark for correctly naming and describing the function.

2 State **two** mandatory safety features on a chainsaw and explain how they protect the operator's hands.

Answer:

2 marks each for any two of the following; maximum of 4 marks.

- Front hand guard (1) - Provides protection against projecting branches (1) and helps prevent the left hand from touching the chain if it slips off the front handle/handle bar (1).
- Chain catcher (1) - Helps to reduce the risk of operator contact by a chain when it breaks or comes off the bar (1).
- Flared rear handle (1) - Gives added protection from chips/brush (1) and a broken or derailed chain to operator's right hand (1).

3 State **three** potential environmental impacts associated with stump or brush removal.

Answer:

1 mark for any three of the following; maximum of 3 marks.

- Noise (1)
- dust (1)
- stump grindings (1)
- wood chip (1)
- exhaust gas pollution (1)
- possible hydraulic oil pollution (1)
- visual damage (1)
- damage to ground and soil (1)
- any other relevant answer (1)

4. Describe **three** characteristics of clay soil and how they **each** affect tree growth.

Answer:

1 mark for any of the following; maximum of 3 marks, one per characteristic

Clay soil:

- hold water well (1) – more resource available for photosynthesis (1)
- tend to be rich in nutrients (1) - more resource available for photosynthesis (1)
- heavy to work (1) – Difficult to establish when planting (1)
- warm up slowly (1) – later root hair and bud development (1)
- prone to waterlogging (1) - limits root development and stability (1)

5. Describe the function of the following:

- a. Collenchyma cells
- b. Sclerenchyma cells

Answer:

- a. Collenchyma cells are used for flexibility and strength of growing points in the plant (1)
- b. Sclerenchyma cells are for support (1)

6. State a land-based machine, describe how it is powered and performs its task.

Answer:

For any acceptable land-based machine the candidate must describe the drive and/or transmission systems and how it performs its purpose

- Drive and/or transmission systems. (1)
- How it performs its purpose e.g. how brush is converted to chips. (1)

7. Explain how:

- a. a blocked air filter may affect performance of a two stroke engine.
- b. the fault may be remedied.

Answer:

One mark for each description

- a. The fuel: air ratio becomes imbalanced leading to poor running performance, cutting out and blackening of spark plugs. (1)
- b. Clean air filters regularly using either air or a soft brush (soapy water may also be used). (1)

8. Describe two key points of the Provision and Use of Work Equipment Regulations (PUWER) 1998.

Answer:

1 mark for any 2 of the following; maximum of 2 marks.

Provision and Use of Work Equipment Regulations (PUWER) 1998:

- Requires that all equipment and machinery are fit for purpose, maintained regularly and records kept. (1)
- All staff operating machinery are trained and qualified to do so.(1)
- Any defective machinery must be clearly marked as out of service and stored separately from operational machinery.(1)
- Any other relevant answer

You are required to fell a tree (max diameter 380mm at felling height) that is straight standing, but has the fruiting body of a fungus causing brown rot visible.

Discuss the importance of correct fungal identification and how the potential condition of the wood may affect control of felling. Justify how you would modify your felling technique and the felling aids you would use.

Answer:

Band 1 (1-4 marks)

Basic discussion of importance of correct fungal identification and the potential condition of the wood may affect control of felling. Discussion is not well developed or balanced. Limited justification of modified felling techniques and choice of felling. There will be little or no specialist terms.

Band 2 (5-8 marks)

Adequate discussion of importance of correct fungal identification and the potential condition of the wood may affect control of felling. Some evidence of understanding of interrelationships. Good justification of modified felling techniques and choice of felling, with good understanding of considerations shown. There will be some use of specialist terms, although they may not always be used appropriately.

Band 3 (9-12 marks)

Detailed and comprehensive discussion of importance of correct fungal identification and the potential condition of the wood may affect control of felling. Clear evidence of understanding of interrelationships. Detailed justification of modified felling techniques and choice of felling, with clear understanding of considerations shown. Specialist terms will be used correctly and appropriately.

Indicative content:

Importance of correct fungal identification:

- Effects of brown rot fungi on different trees
- Misidentification could lead to an inappropriate felling technique being used, causing death of or injury to the operator
- Uncontrolled felling could cause damage to persons or property, potentially leading to loss of professional reputation
- The consequences of misidentification including financial, legal, liability, environmental and reputation issues.

How the potential condition of the wood may affect control of felling:

- The wood may be dry and brittle
- This may cause the hinge to break early or unexpectedly
- Cause the tree to fall in an unwanted direction

Modified felling technique:

- Placing felling cuts higher up the stem in sound timber
- Use of assisted felling techniques to ensure accurate felling direction
- Non-removal of buttresses roots/basal flare to provide more holding timber
- Leaving a thicker hinge to allow the operator to break it, and to aid control

Felling aids:

- A winch or pull line to enable controlled breaking of hinge and felling in the desired direction
- Wedges to enable controlled breaking of the hinge without risk of damaging decayed wood, causing further problems

10 Name **three** abiotic disorders with the potential to affect tree health.

Answer:

1 mark for any 3 abiotic disorders; maximum 3 marks

Abiotic disorders:

- wind
- lightning
- frost
- drought
- hail
- waterlogging
- nutrient deficiencies
- herbicides
- air pollution
- planting failure
- snow
- compaction
- nutrient imbalance
- any other relevant answer.

11 Name one human influence with the potential to affect tree health.

Answer:

1 mark for any 1 human influences; maximum 1 marks

Human influences:

- vandalism
- vehicle impact
- fire damage
- incorrect pruning cuts
- mower damage
- strimmer damage
- root severance
- lowered gradient
- raised gradient
- pollution
- any other relevant answer.

12

12a State one biotic pathogen and describe any **four** stages of its lifecycle.

Answer:

1 mark for biotic pathogen stated.

1 mark for any stage of lifecycle described related to their pathogen; maximum of 4 marks

Example:

Biotic Pathogen :

Great Spruce Bark Beetle. (1)

Stages of lifecycle:

Eggs are laid within a small egg chamber in the cambium of the tree. (1)

The beetle has five larval stages which each become progressively larger. All larval stages feed under the bark in a similar manner. (1)

Pupae are the resting stage of beetle development before larvae can moult to the adult stage. (1)

The newly emerged adults are light brown in colour. As they mature the colour darkens to brown and black. (1)

12b For your chosen pathogen in 12a, describe **two** impacts on the host.

Answer:

Any relevant impact related to their chosen pathogen

Impact (example – Great Spruce Bark Beetle):

- Trees can become weakened. (1)
- Trees may be killed if attack is sustained. (1)

1 mark for each impact; maximum of 2 marks.

13 Describe **three** ways that knowledge and understanding of lifecycles of biotic pathogens can aid correct identification.

Answer:

1 mark each for any of the following; maximum of 3 marks

Knowledge and understanding of pathogen lifecycles:

- knowledge of seasonality
- knowing timings of signs and symptoms,
- knowledge and understanding of visible signs and occurrences (fructifications, grazing damage)
- any other relevant answer

14. Describe **two** ways a pathogen or pest can cause secondary infection and for **each** describe how it could be controlled or limited.

Answer:

1 mark each for any of the following; maximum of 2 marks

Factors causing infection:

- bark stripping,
- boring,
- browsing,
- vector,
- reduce vitality

1 mark each for any of the following; maximum of 2 marks

Control methods:

- tree guards
- individual tree protection
- chemical ie insecticides etc
- biological controls ie introducing new species to remove pathogen etc
- cultural controls
- any other relevant answer

15 Name **two** methods of preventing ill health in trees that promote healthy growth.

Answer:

1 mark each for any of the following; maximum of 2 marks

- irrigation
- feeding
- repellents
- physical barriers
- fencing
- tree shelters
- breeding for natural resistance
- any other relevant answer

16 State **two** poor soil conditions or characteristics and describe how they can adversely affect tree growth.

Answer:

2 marks for each soil condition/characteristic linked correctly to their effect on tree growth; maximum of 4 marks

- Rooting depth and plant stability (1) - Poor growth, windthrow (1)
- Drainage/water logging (1) - root death, secondary infections, windthrow (1)
- Compaction/poor aeration (1) - dieback, root death, death of tree (1)
- Effects on ability to prepare soil for planting (1) - failure to properly establish, restricted root growth and development (1)
- any other relevant answer