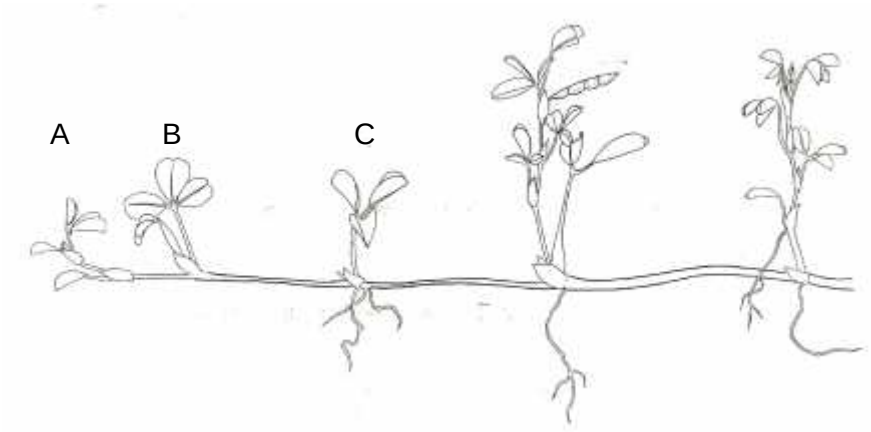
9 Asexual reproduction and cloning in plants

1 In natural vegetative propagation, which of the following structures are most likely to give rise to new individuals: (a) stems, (b) roots, (c) buds, (d) leaves, (e) flowers?

2 The drawing shows a plant which reproduces vegetatively.
(a) What will need to happen before shoots A - C become independent plants?
(b) How might a gardener assist this process?
(c) What name is given to the horizontal stem in this kind of propagation?
(d) Name a commercially grown fruit whose plants are propagated in this way



3 Before stem cuttings are planted, the cut end of the stem is often dipped in a hormone powder. What is the point of this?

4 The following are thought to be some of the advantages of either vegetative reproduction or sexual reproduction:

produces greater variety in the offspring, good at colonising new areas, reduces competition from other species, maintains desirable qualities in the offspring, good at colonising favourable areas

Make a table with these qualities under the headings of 'Sexual reproduction' and 'Vegetative reproduction'.

5 If a gardener wanted to propagate a useful variety of apple tree in a way which maintained all its desirable qualities, which of the following techniques would be used:
(a) planting stem cuttings in potting compost
(b) grafting stem cuttings onto a rootstock
(c) grafting buds on to a root stock
(d) growing the seeds produced from the useful variety
(e) cross-pollinating the variety with another good variety and growing the seeds resulting from the cross?

6 What name is given to the population of genetically identical offspring which result from a process of asexual (vegetative) reproduction?

7 Which structures of a flowering plant give rise to (a) potatoes, (b) the fleshy scales of an onion?

8 In the process of tissue culture in plants, what is needed to induce the formation of a complete plant, in addition to a growth medium with nutrients?

9 Asexual reproduction and cloning in plants - answers

1 The plant structures most likely to give rise to new individuals are (c) buds and (a) stems (because stems carry buds).

2 (a) The shoots A-C would need to develop a root system and produce enough leaves to maintain the shoots' food supply by photosynthesis. To become fully independent of the parent plant the stem connecting the daughter plants to the parent must die and disappear.
(b) Gardeners may assist this process by pegging down the potential daughter plants at the nodes, to encourage root growth. The connecting stems can later be cut.
(c) The horizontal stem is called a runner.
(d) The most familiar fruit propagated by runners is the strawberry.

3 The hormone powder contains a plant growth substance which promotes the formation of roots. It may also contain a fungicide which reduces the chance of fungus attack on the cut stem.

4

Sexual reproduction	**Vegetative reproduction**
Greater variety in the offspring	Reduces competition from other species
Good at colonising new areas	Maintains desirable qualities
	Good at colonising favourable areas

5 To propagate a useful variety of apple tree the gardener would graft either stem cuttings (b) or buds (c) on to a rootstock. Stem cuttings (a) from apple trees do not usually produce roots but, for other species, this is a method of propagation which maintains the genetic characteristics of the parent. The seeds from cultivated varieties do not breed true.

6 The population of genetically identical offspring from asexual reproduction is called a ‘clone’.

7 (a) A potato is a tuber formed at the end of an underground stem (b) Onion scales are modified leaves containing a food store.

8 The appropriate plant growth substances (‘hormones’) would need to be added.