B6.2 Summary questions

1. Intensive – Use of fungicides, keeping animals in confined spaces
   Organic – Removing weeds by hand, biological control, use of manure as a fertiliser

2. a. E, A, D, C, B
   b. Any two from: e.g. volume of milk produced, quality of milk produced, growth rate, quality of meat, fat content

3. a. the ability of human populations to access food of sufficient quality and quantity
   b. Any two from:
      - Population – the more people, the more food must be produced to support the population.
      - Diet of population – e.g. meat requires a greater area of land to produce than vegetarian foods.
      - Climate change – altering the ability to be able to farm land successfully.
      - Introduction of new pathogens e.g. which may affect the success of a crop.
      - Other reasonable suggestion with explanation.
   c. Any two from:
      - Maximising photosynthesis e.g. through the use of industrial greenhouses.
      - Use of artificial chemicals e.g. use of fertilisers to maximise plant growth.
      - Intensive farming practices e.g. keeping animals in warm environments of limited space to maximise meat production.
      - Planting pest resistant crops.
      - Use of genetically modified crops e.g. Bt corn.
      - Other appropriate suggestion.

4. a. Selective breeding – imprecise, takes many generations.
   b. Genetic engineering – targeted on one gene, occurs in one generation.
   c. Selective breeding reduces the gene pool. Genetic disorders occur more frequently when little variation exists in a species.
   d. Some people believe that altering an organism’s genome / inserting a gene from a different species is interfering with nature.

5. a. 40 kg
   b. 38–42 kg
   c. 42 kg

6. a. Any suitable example e.g. corn which contains a toxin that kills pests / frost-resistant tomatoes.
   b. Restriction enzymes cut the donor DNA at specific base sequences (either side of the desired gene). They make a staggered cut, resulting in ‘sticky ends’. The same restriction enzymes are also used to cut open the bacterial plasmid. Ligase enzymes then rejoin DNA strands at the sticky ends inserting the new gene into the plasmid DNA.
   c. Insert an antibiotic resistance gene (gene marker) into the plasmid at the same time as inserting the gene coding for the desired characteristic. Transfer the bacteria to an agar plate containing the antibiotic. Incubate, and allow time for the bacteria to grow. All bacterial colonies present contain the antibiotic resistance marker gene and therefore also the desired gene.