### Genetic variation and its control

1. **(a)**
   - (i) nucleus  
   - (ii) chromosome  
   - (iii) gene  
   - **(b)** a body cell  
   - **1 mark each**

2. **sex in order for 1 mark each**
   - genes  
   - chromosomes  
   - nucleus  
   - **4 marks**

3. **(a)** quick cheap / many can be produced from one plant cuttings produce plants identical (to parents) / outcome known  
   - any two for 1 mark each  
   - **2 marks**

   **(b)** idea that provides damp atmosphere / less likely to wilt reduces or stops transpiration or water loss / keeps it warmer (reject prevents animals eating it)  
   - **1 mark**

4. **(a)**
   - (i) chromosomes allow DNA ignore nucleus  
   - (ii) enzymes  
   - **1 mark**

   **(b)** asexual reproduction / no gametes / no fusion / only one parent ignore clones  
   - cells all contain same genetic information / same genes (as parent) / same DNA  
   - **1 mark**

   **(c)** can spray crop with herbicide – only weeds killed crop survives herbicide insufficient  
   - **1 mark**

   **(d)** any one from:  
   - fears / lack of knowledge about effects of GM food on health allow ‘think that GM food is bad for health’ ignore not natural or against religion  
   - crop plants may pass on gene to wild plants  
   - encourages use of herbicides  
   - **6 marks**

5. **(a)** asexual reproduction / mitosis ignore cloning  
   - no fusion of gametes or division after fusion or from fertilised egg or from same embryo or from same egg and sperm  
   - each embryo has identical genetic information / genes / DNA / chromosomes  
   - **1 mark**

   **(b)** any two from:  
   - experimental subject and control are identical or fair test since monkeys identical  
   - **2 marks**
• monkeys similar to humans, so effect of drugs likely to be similar
  allow closely related so...; ignore evolved from
• all identical so will have same reaction to drugs / disease
• it’s better than catching wild ones

6. (a) have identical genes / chromosomes / genetic material
  since asexual reproduction
  accept mitosis
(b) mixture of genes / chromosomes / genetic material from two parents
  accept meiosis
  sexual reproduction / fusion of gametes
(c) public misunderstand technique as cloning or worried about large numbers
  of clones or moral / ethical / religious issues or unnatural process or scientists
  must not play god or technique may lead to embryo death
  do not allow mark for embryos lost

7. (a) DNA carries genetic information
  DNA from skin cell of Nicky inserted into egg
  DNA replicated by cell division / mitosis as egg / embryo cells divide
(b) (i) eg religious groups
    (ii) believe procedure violates natural laws or animal rights
         groups against experimenting with animals

8. (a) idea
    advantages
    • large scale
    • cheaper
    • easy to grow/produce or quick to produce
    • non-seasonal
    disadvantages
    • loss of farmers’ income
    • loss of foreign exchange
    • less work in Kenya/developing country
    • mass use of a of particular pyrethin
    • can allow insect populations to become resistant
      any 6 for 1 mark each - maximum of 4 in advantages/disadvantages
(b) idea
    chromosomes /DNA carry genes
    cut off gene/part of chromosome/DNA
    insert into yeast chromosome/DNA/plasmid/nuclear
    Accept DNA answers
    for 1 mark each