

1. (the probability that an organism will) survive and, reproduce / AW ;

2A) (Type 1) diabetes ;

II)

ref. to (human) gene / DNA that codes for (human) protein ;
(human) DNA / gene, is, identified / isolated ;
DNA / gene / plasmid, cut (out) using restriction enzymes ;
forming, complementary / sticky, ends ;
DNA / gene / plasmid, cut with the same restriction enzymes ;
formation of recombinant, DNA / plasmid ; into plasmid
(DNA) ligase used to join plasmid and, gene / DNA ;
plasmids (with gene) inserted into bacteria ;
bacteria (with the plasmid), replicate / reproduce / multiply ;
AVP ; e.g. purification / identification of transformed bacteria /

B)

disease resistance ;
large(r) / fast(er), yield ;
drought resistance ;
salt resistance ;
frost resistance ;
(named) nutritional enrichment ;
pest / insect, resistance ;
herbicide resistance ;
vaccine production ;
ref to benefits to, environment ;
ref to more desirable, product / increased income / AW ;
ref to a qualified benefit to humans ; e.g. food shortage / described
health benefit
AVP ; growth modification e.g. short stems / adaptations to extreme

environments / rapid improvement to crop / improvements using characteristic that are not present in natural population

3A)

- 1 correct ref to mutation of bacteria ;
- 2 variation in ability of bacteria to survive antibiotic treatment ;
- 3 bacteria with no / little resistance, die ;
- 4 bacteria with resistance, survive and breed ;
- 5 passing on resistant allele ;
- 6 ref to natural selection ;
- 7 AVP ; e.g. ref to strengthening of cell wall

C)

- more responsible use of antibiotics ;
- improved, detection / screening to avoid spread ;
- ref to improved cleanliness ;
- isolating infected patients ;
- development of new antibiotics / treatment ;

4)

- 1 mutation ;
- 2 change in, base sequence / DNA ;
- 3 in gene / allele, for haemoglobin ;
- 4 inherit the allele (for sickle cell anaemia / mutated haemoglobin / HbS) ;
- 5 having the recessive allele(s) / being, homozygous recessive / HbSHbS / heterozygous / HbSHbA ;
- 6 produce, abnormal / AW, haemoglobin ;
- 7 red blood cells have, sickle shape / described ;
- 8 AVP ;

5A)

- 1 killed by predators / not able to evade predators / new predators ;
- 2 not able to find food ;
- 3 more prone to disease / AW ;
- 4 poaching ;
- 5 ref to, low genetic variation ;
- 6 competition with new species ;
- 7 idea of no survival instinct /AW ;
- 8 AVP ; e.g. techniques not as advanced in 1980

B)

- 1 inbreeding / described ;
- 2 less / little, (genetic) variation ;
- 3 reduced number of alleles ;
- 4 increased risk of genetic disease ;
- 5 cannot reproduce / sterile ;
- 6 not enough animals to breed ;
- 7 less likely to, adapt / to evolve to / cope with, (named) change in environment ;
- 8 cost ;
- 9 AVP ;;

6)

- 1 *idea that* farmer, chooses / selects (animals that are best adapted to conditions) ;
- 2 appropriate named feature(s) ;
- 3 selected animals bred together / (cross) breed them ;
- 4 select the offspring that show the features required ;
- 5 repeat, the selection and breeding / the process ;
- 6 *idea that* imports (male) sheep with desired features to mate with flock ;
- 7 uses artificial insemination ;

7.I)

genetics / inherited (genes);
environmental factors ;
any two named environmental factors;
(natural) selection;

II) bar chart;

8)pancreas;

II)

recognize a specific, pathogen / antigen;
lock on antigens / antibody-antigen complex;
agglutination / clumping;
destruction by, phagocytes / white blood cells / lymphocytes;
AVP; e.g. neutralise / inhibit toxins;

9.I) gene

II)

drought / salt / pollution / metal / frost / stress / cold, resistant;
increased, yield / productivity;
extend range where crops can be grown;

herbicide resistance;
increased yield / productivity;

pesticide resistance;
increased yield / productivity;

crop plants produce own insecticides;
less insecticide used;
increased yield;

vitamin / nutrient, enrichment / β -carotene (Golden rice);
increased nutritional value

pathogen resistant / Bt;
increased productivity / less pesticide use;

antigens / vaccines / pharmaceuticals; e.g. insulin
cheap production of medicines;

flavour / texture / ripening;
Improved customer satisfaction / shelf life;