M1. (a) species present change the habitat/named change;
other species able to colonise;
new species better competitors;

3 max

(b) D - as more species present;
more complex food webs;
change in one species will have little effect on others;
as alternative food sources;

2 max

(c) sand drains easily/low water retention;
(sunken stomata) reduce transpiration;
as pocket pf saturated air trapped near stomatal pore;
this reduces diffusion/water potential gradient;

3 max

(d) series of changes over a distance;
gradient of environmental factor/named environmental factor/cline present;
ensures sampling of each community;

1 max

[9]

M2. (a) 1. (Colonisation by) pioneer (species);

2. Change in environment/example of change caused by organisms present;

3. Enables other species to colonise/survive;

4. Change in diversity/biodiversity;

5. Stability increases/less hostile environment;

6. Climax community;

Example of change e.g. formation of soil/humus/organic matter/increase in nutrients;

Do not accept genetic diversity for mark point 4.

5 max

(b) Advantages

1. Specific (to one pest);

2. Only needs one application/reproduces;

3. Keeps/maintains low population;

4. Pests do not develop resistance;

5. Does not leave chemical in environment/on crop/no bioaccumulation;

6. Can be used in organic farming;

Disadvantages

7. Does not get rid of pest completely;

8. May become a pest itself;

9. Slow acting/lag phase/takes time to reduce pest population;

Max 3 for advantages or disadvantages.

Ignore references to leaching, eutrophication.

Ignore references to cost.

5 max

(c) 1. Geographical isolation;

2. Separate gene pools/no interbreeding (between populations);

3. Variation due to mutation;

4. Different environmental/abiotic/biotic conditions/selection pressures;

5. Selection for different/advantageous, features/characteristics /mutation//allele;

6. Differential reproductive success/(selected) organisms survive and reproduce;

7. Leads to change in allele frequency;

8. Occurs over a long period of time;

In this question must refer to allele where appropriate, not gene.

5 max

[15]

M3. (a) pioneers/suitable example colonise land;
example of change in environment;
enables change in species;
conditions change further/example to favour trees;

4

(b) stable community/no further succession/final community;

1

(c) roots unable to respire (aerobically);
active transport of minerals/other metabolic effect stops;

2

(d) action of bacteria/decomposers inhibited/ fewer bacteria/decomposers;
acid conditions inhibits enzymes/enzymes denatured/changes active site;
H^+ ions affect active site;
anaerobic conditions;

3 max

[10]

M4. (a) populations of different species;
living in the same environment/habitat;
(often) named after dominant plant/example;
(one mark for principle:all the species living in the same place)

2 max

(b) more species/diversity (in the field);
more niches/habitats;
more feeding opportunities (range of types available);

3

(c) one method named, e.g.:
mark, release, recapture;
sweep netting/kick sample;
pitfall traps;
light trap;

1 max

[6]

M5. (a) 1. colonisation/pioneering;
2. microscopic plants at start;
3. death / decomposition;
4. named change in environment e.g. increase in organic matter/ stabilisation;
5. new species colonise once there is a change;
6. increase in number of species/diversity;
7. increase in total amount of living material/biomass/ more niches;
8. increase in nutrient availability;
9. change from more extreme conditions / more stability;

6 max

(b) marking principles:
one mark – direct result of removing forest cover;
e.g. soil erosion/leaching
one mark – specific effect on organisms in lake;
e.g. more sediment/nutrients (for plants to grow)

2

(c) 1. named nutrient availability;
2. numbers of producers providing energy (for a food chain);
3. light intensity affecting the rate of photosynthesis;
4. disease killing (weaker) members of species;
5. space for nest building / niches;
6. reproductive rate balancing death rate;
7. competition for a named limited resource;
8. (intra and interspecific) competition explained;
9. predation described;

5 max

[13]

M6. (a) (Increase in) dead organisms/humus/decomposition;

Leading to (increase in) nitrification/ammonia to nitrate/activity of nitrifying bacteria;

Nitrogen fixation;

Accept: pioneer species for plants

2 max

(b) (i) Bare soil temperatures fluctuate;

Reject: environmental temperature
Accept: converse

More bare soil, early/at start of succession/when few plants;

2

(ii) Plant will grow/survive in the shade/when overshadowed (by taller plants)/when receiving less light;

Effect on plant with reason for effect
Ignore reference to competition

1

(c) (Grassland consists of) small/annual plants;

Must be in the context of grassland

Will be replaced by/outcompeted by woody plants;

Need idea of replaced not just an increase in percentage cover

So these (woody plants) must be removed/have growth checked/grazed;

2 max

[7]

M7. (a) Increase in number of species;

Increase in numbers of some species;

2

(b) Initial environment hostile / few organisms adapted;

These organisms change the environment / suitable example;

More niches / more habitats;

Allowing other organisms to become established;

max. 3

[5]

M8. (a) (i) change in community over time;
either due to change environmental/abiotic factors / change is due to species present;

2

(ii) stable community/no further succession/final community;

1

(b) (increased) interspecific competition;
for light/nutrients/named nutrient/water;

2

(c) fewer leaves/lower surface area/shading of leaves;
less photosynthesis to produce new biomass/glucose/growth;
competition with other species for nitrates/named nutrient;
reduced synthesis of protein or named compound;
ratio of leaves to woody parts and roots decreases;
so higher respiration relative to photosynthesis;

3 max

[8]