**Succession**

**2.** (a) Explain the meaning of the term *primary succession*.

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The figure below shows a primary succession in a temperate climate.

**X** represents an example of deflected succession.



(b) Explain the role of pioneer plants in succession on a bare rock or sand dune.

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[3]

(c) Suggest two ways in which deflected succession at **X** could be caused.

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2 ......................................................................................................................

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[2]

**10.** Primary succession is the simplest type of succession, beginning with a bare surface such as rock or sand. The first organisms to colonise the area form the pioneer community.

Describe **two** effects of the pioneer community on the habitat.

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**11.** Chalk grassland communities are found in areas of southern England such as the South Downs. Woodland rather than grassland is the climax community for this habitat. Grazing by sheep and rabbits maintains the grassland.

(i) Define the term *climax community*.

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(ii) Suggest how grazing by sheep and rabbits could prevent a woodland climax community from developing.

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[Total 2 marks]

**19.** The figure below shows some of the stages that have occurred during succession at Glacier Bay in Alaska.



Using the information in the figure,

(i) explain what is meant by the term *succession* ;

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(ii) outline **two** changes which occur between mid and late succession;

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2 ......................................................................................................................

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(iii) suggest **one** biotic and **one** abiotic change which are **not** indicated in the figure.

biotic ................................................................................................................

abiotic .............................................................................................................. [2]

[Total 8 marks]

**2.** (a) starts with previously uncolonised area / bare ground / bare rock / AW;  
ref to pioneer species / named pioneer;  
series of recognisable, seres / stages;  
progresses to, climax / final equilibrium stage; max 2

(b) stabilise environment;  
soil development / increase humus / organic material;  
change soil pH;  
hold more water;  
release more minerals or nutrients / increase N content or fix N / hold  
 ions;  
form microhabitat / reduce exposure / provide shelter / reduce erosion; max 3

(c) *any two from following*:

grazing;  
burning;  
mowing / application of fertilizer / application of selective herbicide;  
exposure to wind;  
grass able to continue to grow (linked to a statement above); 2

(d) increases;  
plants at later stages are large / plants in early stages are small;  
trees / shrubs. are woody, appear later in succession; 2

[9]

**10.** idea of soil development; **A** ref to depth or fertility of soil  
(increase), organic material / humus;  
(increase) in availability of water;  
minerals available; **A** nutrients  
(some pioneer species) carry out nitrogen fixation;  
photosynthesis (fixing carbon);  
create habitats / provide shelter;  
AVP; e.g. increase weathering, stabilise sand / soil 2 max

**11.** (i) final stage in succession / AW;  
(community) in equilibrium with environment; 1 max

(ii) eat / trample, seedlings (of shrubs / trees) / AW; **R** eat grass  
prevents, succession / establishment of next sere; 1 max

**19.** (i) natural change in species composition (in an area) ;

ref to directional change ;

ref to named examples in the diagram (either species or category) ;

over a period of time ;

a number of recognisable stages / seres / seral stages ;

one sere changes the conditions for the next ;

e.g. depth of soil increases / soil stabilisation ;

leads to a climax community ;

creation of niches ;

ref to nitrogen fixation ;

AVP ; e.g. pioneer species 4 max

(ii) development of deeper soil ;

soil, becomes rich in humus / has more nutrients / is more fertile ;

dominant species change ;

plant species get larger / shrubs to trees / increase in biomass / larger root systems ;

**R** soil structure improves unqualified ;

AVP ; 2 max

(iii) **biotic** = animal species / number of soil organisms / decomposers /

detritivores / decrease in biodiversity ;

AVP ;

**abiotic** = pH of soil / nitrogen *or* mineral content of soil / soil texture

/ wind speed / humidity / shading / light intensity / soil  
water retention ;

AVP ; e.g. temperature 2 max

[8]