A level Biology A

H420/03 Unified biology

Question Set 12

1 Accurate analysis of an ecosystem's biodiversity requires a detailed classification of organisms.

The spruce pine plant is given the binomial name *Pinus glabra*.

(a) **(i)** Place a tick (✓) in the box next to the species most closely related to *Pinus glabra*.

Diplodia pinea ☐

Ilex glabra ☐

Pinus resinosa ☐

Annona glabra ☐

[1]

(ii) Explain why *Pinus glabra* and humans, *Homo sapiens,* are classified in the same domain but in different kingdoms. **[2]**

(b) A scientist sampled the species of trees present in two different habitats containing *Pinus glabra*.

The results of the sampling are shown in Table 5.

Species	Number of individuals in habitat A	Number of individuals in habitat B
P. glabra	45	60
M. grandiflora	23	10
F. grandiflora	55	20
L. styraciflua	0	10
L. tulipifera	0	0
S. shumardii	23	4

Table 5

Using Simpson's Index of Diversity, the scientist calculated the biodiversity (*D*) of Habitat A as 0.71.

Use the formula given to calculate the biodiversity of Habitat B.

$$D = 1 - \left(\Sigma\left(\frac{n}{N}\right)^2\right)$$

Show your working.

State which habitat, A or B, has the greater biodiversity.

D (Habitat A) = 0.71

D (Habitat B) = ...

Habitat with the greater biodiversity = ...

[2]

(c) Habitat B was situated beside a lake and showed evidence of ecological succession.

The scientist planned to investigate how the biodiversity changed from the edge of the lake to the other side of habitat B.

(i) State the collective name of the animal and plant populations that are present at the end of primary succession. **[1]**

(ii) Suggest how the scientist could achieve the following during their investigation:

Sample all stages of succession in the habitat .....

Minimise sampling bias .....

Sample insect biodiversity .....

[3]

(iii) The scientist also measured primary production in both the woodland and lake habitats.

Suggest the units the scientist should use to measure primary production in the two habitats.

Woodland .....

Lake .....

[1]

Total Marks for Question Set 12: 10

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