

Answers for extension worksheet – Option D

- 1**
- a** lightning and the atmosphere of the time (1)
 - b** amino acids (especially glycine) and sugars (1)
 - c** ammonia (NH₃), methane (CH₄) and hydrogen (H₂) (2)
 - d** RNA can act as a catalyst and can self-replicate. (2)
- 2**
- a** two from: no mutations; no migration; random mating (2)
 - b** $9\% = 0.09 = q^2$
Frequency of s = $\sqrt{0.09} = 0.3$
 $p = 1 - 0.3 = 0.7$
 $2pq = 2(0.7 \times 0.3) = 0.42$
Answer: 42% of the population are heterozygous (Ss) (2)
 - c**
 - i** There are a total of 40 alleles, of which 2 are recessive.
Frequency of the recessive allele is $2 \div 40 = 0.05$
 $q^2 = (0.05)^2 = 0.0025$
So 0.25% of the mice will have the disorder. (2)
 - ii** $0.25 \div 0.059 \approx 4$
The incidence of the condition is about 4 times greater on the island. (2)
- 3**
- a** A clade includes an ancestral species and all the descendants of that species. (1)
 - b**
 - (have eukaryotic cells)
 - multicellular (1)
 - vertebrate (1)
 - egg with an amnion (1)
 - (have hair)
 - opposable thumbs (1)
 - c** If there is doubt about a cladogram, a second cladogram should be drawn using biochemical data. (1)