**AQA, OCR, Edexcel**

# A Level

# A Level Biology

## Populations Answers

Name:

MME
Mathsmadeeasy.co.uk

Total Marks: /26

# The Nervous System

| Answer | Marks |
|---|---|
| 1.<br><br>a)<br>i) Population: group of organisms of the same species living in the same area<br><br>Gene Pool: All the genes or alleles present in the population<br><br>Allele: a version of a gene | 3 marks |
| b)<br>i) $p^2$ = frequency of the homozygous dominant genotype<br>2pq = frequency of the heterozygous genotype<br>$q^2$ = frequency of the homozygous recessive phenotype | 3 marks |
| ii)  $q^2$ = 1 in 2500 = 0.0004<br>    q =  √0.0004 **=** 0.02<br>    p + q = 1<br>    1 – q = p<br>    1 – 0.02 = 0.98 = p<br>    2pq = 2(0.98x0.02) = 0.0392<br><br>  **3.92%** of the population are carriers | 4 marks |
| c)<br>i) p = 0.75<br>    q = 0.25<br>    $q^2$ = 0.0625<br>    $p^2$ = 0.5625<br><br>2pq = 0.375 | 3 marks |

SO:
BB = 0.5625 = 56.25% = Brown
Bb = 0.375 = 37.5% = Brown
bb = 0.0625 = 6.25% = Grey

ii) <u>Any three from:</u>
- large population of mice
    - Mating between the mice must be random
    - No immigration or emigration of mice from the population
    - No mutations
    - No selection/ natural selection

3 marks

iii) Proportions of alleles within a population must stay the same from one generation to the next

1 mark

2.
a)
i) <u>2 marks:</u>
-Stabilising – where individuals with traits towards the middle of the range are more likely to survive
- Caused by a stable environment

-Directional – where individuals of one extreme type are more likely to survive and reproduce
- Due to changes in the environment

4 marks

| | |
|---|---|
| ii) – Antibiotic resistance has increased over time for all three species of bacteria<br>- Environmental changes as more antibiotics are used<br> - Some bacteria become resistant which causes natural selection to occur<br>- Frequency of the resistant allele increases in the population and forces the population to move in a particular direction –<br>- Example of directional selection<br>- Selection pressure is strongest for MRSA/ | 5 marks |

ii) – Antibiotic resistance has