5.4 Evolution – *summary of mark schemes*

5.4.2	Outline the evidence for evolution provided by the fossil record, selective breeding of domesticated animals and homologous structures.

Mark Scheme

Homologous structures

    A. comparative anatomy of groups of animals or plants shows certain structural features are basically similar;
    B. homologous structures are those that are similar in shape in different types of organisms;
    C. structural similarities imply a common ancestry;
    D. (homologous structures) used in different ways;
    E. example is pentadactyl limb in vertebrates / modification of ovary wall or pericarp to aid seed dispersal / other suitable example;
    F. adapted to different mode of locomotion in particular environment / example of two differences such as bat's wing and human hand;
    G. illustrates adaptive radiation since basic plan adapted to different niches;
    H. the more exclusive the shared homologies the closer two organisms are related;
    I. certain homologous structures in some species with no apparent function such as human appendix (homologous with functional appendix in herbivores);
    J. organs / structures / anatomical features having similar basic structure / similar embryonic development as structures in other species said to be homologous;

Biogeography

    K. marsupials / monotremes found in Australasia / Australia / on one side of Wallace's line;
    L. placental mammals found in rest of world / on other side of Wallace's line;
    M. separation of land masses allowed different groups to evolve in isolation / no competition from placentals;
    N. convergent evolution / different species evolving to occupy same niche in different areas;
    O. reference to marsupials (opossums) in South America also;
    P. little variation in northern hemisphere as it was separated more recently;

5.4.7	Explain how natural selection leads to evolution.

Mark Scheme

    A. theory put forward by Darwin / Wallace;
    B. overproduction of offspring;
    C. more are produced that the environment can support;
    D. resources are limited;
    E. leads to struggle for survival;
    F. variation exists / (random) mutations give rise to variation;
    G. some varieties better adapted than others;
    H. best adapted survive and breed themselves;
    I. best adapted reproduce and pass on characteristics;
    J. characteristics are inheritable;
    K. so the new generation has these characters too;
    L. this leads to changes in the population as a whole;
    M. evolution is change in species / allele frequency with time;
    N. environmental change can trigger evolution;
    O. example of an environmental condition;
    P. evidence that species have evolved include observed evolution / fossil record;
    Q. example of evidence;

5.4.8	Explain two examples of evolution in response to environmental change; one must be antibiotic resistance in bacteria.

Mark Scheme

    A. eg antibiotic resistance;
    B. other named examples (eg peppered moth);

    C. environmental changes (eg application of antibiotics);
    D. affects some varieties more than others;
    E. best adapted survive;
    F. to reach reproductive age / breed to pass on alleles;
    G. result is alleles found in best adapted / become more frequent in population;
    H. this is referred to as natural selection;

I. results in change in species with time / change in allele frequency;
J. this is termed evolution;
K. discussion of punctuated equilibrium / gradualism;