

**WJEC (Eduqas) Biology A-level**  
**Topic 2.6: Variation and**  
**Evolution**  
**Questions by Topic - Mark**  
**Scheme**

1.

Question		Marking details	Marks Available
1	(a)	All the alleles (of all the genes) in a population;	1
	(b)	(i) The harder the food the {larger / wider / deeper} the beak/ long beaks for flowers and fruits / wide beaks for eating seeds;	1
		(ii) The higher the CaM the longer the beak / low CaM results in short beak / ORA;	1
	(c)	(i) Genetic drift / founder effect / or descriptions of ; Accept mutation	1
		(ii) Any 4 from: A. Birds with (high) CaM (allele) will have longer beaks; B. (birds with longer beaks) will get <u>more</u> food from cactus flowers / better adapted for feeding; C. (more of) these birds will survive, reproduce and pass on their (high) CaM <u>alleles</u> to the next generation; D. CaM (alleles) will {become more common/ increase in frequency} in the next generation; E. use of {natural selection / selective advantage / survival of the fittest/ selection pressure} anywhere in the account, in the correct context;	4
	(d)	(i) They are not able {to interbreed / or description of interbreeding} / breed or reproduce <u>with each other</u> and produce fertile offspring;	1
		(ii) <ul style="list-style-type: none"> <li>• geographic isolation / correct reference to allopatric speciation;</li> <li>• over time develop adaptations which prevent successful breeding with original population / there is no flow of genes between the two populations / or description of example e.g. courtship behaviour;</li> </ul>	2
<b>Question 1 total</b>			<b>[11]</b>

2.	(a)	Wolf, dingo, coyote, <u>golden</u> jackal; Interbreed producing fertile offspring;	2
	(b)	share same gene pool; Similar physiology; Similar behaviour; Similar genetic makeup/ref DNA; Similar proteins; Similar morphology Similar genetic profile (not: same/same number of chromosomes)	Max 2
	(c) (i)	Black backed and side striped jackal (not: jackals/golden jackal)	1
	(ii)	reproductive cycles different; Difference in reproductive/courtship behaviour /pheromones; Changes in chromosome numbers/ploidy; Different activity times; Mechanical isolation; Any sensible suggestion e.g. gamete attack by immune system.	Max 1
	(d)	Chromosomes not <u>homologous</u> ; (not: ref. number) Cannot pair/form bivalents; During prophase 1 (of meiosis); Meiosis does not take place; no gametes produced;	Max 4

3.

Question	Marking details	Marks Available
<b>3</b>	(a) (i) CGC is replaced by TGC/ C is replaced by T; Amino acid cys has replaced arg;  (ii) Change in {protein/tertiary} structure/ different protein is made; MC1R will not be stimulated (by the hormone); {Less/no} eumelanin will be produced;	2
(b)	(i) Mice with light fur found in an environment providing {light backgrounds/sandy beaches} <b>AND</b> mice with dark fur in {forest /dark backgrounds}/ Dark fur is found in the darker background/ light fur is found in the lighter background; For camouflage/ OWTTE;	2
	(ii) Small populations (of mice);	1
	(iii) Mice with light fur {are less easily seen/caught by predators/ correct reference to camouflage/ have a selective advantage}; Light fur mice (survive to) reproduce and <u>pass {allele C/ advantageous allele/ light fur allele}</u> to next generation; Increasing the frequency of the allele; 95% of population (have allele C);	4
	(iv) {Genetic/behavioural/geographic/allopatric/reproductive/ sympatric/ seasonal/temporal} isolation;	1
<b>Question 3 Total</b>		<b>[12]</b>

4.

Question			Marking details	Marks Available
4.	(a)	(i)	<p>A. <u>Variation</u> in age at which sexual maturity is reached;</p> <p>B. Caused by mutation;</p> <p>C. Reach sexual maturity earlier/ Small fish {have a selective advantage/ pass through net}/ ora;</p> <p>D. Breed/ reproduce; <i>reject mate</i></p> <p>E. Pass on alleles to offspring; <i>reject genes</i></p> <p>F. Allele frequency for earlier maturity / hence small size at maturity increases;</p> <p>G. Figs quoted from graph (in context);</p>	Max 5
		(ii)	<p>Very few large cod survived/ ORA; <i>reject none</i> reduced gene pool;</p> <p>{No/ little} mutation (to increase size) / insufficient time for genetic drift (to increase size) / No gene flow from another gene pool;</p> <p>Small fish produce less gametes/ difficulty in breeding/ few fish remain to reproduce/ reproductive isolation;</p> <p>Not enough food/ increased competition for food/ increased predation/ disease;</p> <p>Change in {temperature/ pH}/ pollution;</p>	Max 3
			<b>Question 4 total</b>	<b>[8]</b>

5.

Question			Marking details	Marks available					
				AO1	AO2	AO3	Total	Maths	Prac
5	(a)		Discontinuous -Colour/hairs/smooth/wrinkled coat/shape + Continuous – length/width/size (1) <b>1 mark FOR BOTH</b> Continuous - shows a gradation from one extreme to another/controlled by more than one gene (1) Discontinuous-. When characters are clear-cut/controlled by a single gene (1)		3		3		
	(b)	(i)	100			1	1		
		(ii)	mode = 6.45 (1) It is in the {most common class/6.40-6.49 class}/it has the greatest number at <u>25</u> /it is the highest bar/the median is the middle value which would be the 50 <sup>th</sup> grain which is in the 6.50-6.59 class (1)			2	2		
		(iii)	Mean, Mode and median are not the same/ correct reference to shape not being tallest in the middle/not bell shaped/not symmetrical/skewed to left			1	1		
		(iv)	{Samples/hybrids} have more similar {mean/median/mode} to parent B (than parent A) (1) Null (hypothesis)(1) (students) t test(1) Accept Spearmans rank/Mann Whitney	2	1		3	3	
			<b>Question 5 total</b>	<b>2</b>	<b>4</b>	<b>4</b>	<b>10</b>	<b>3</b>	