

Name of the Student: _____

Max. Marks : 23 Marks

Time : 23 Minutes

Mark Schemes

Q1.

- (a) 1. Variation/differences due to mutation/s;
2. (Reference to) allopatric (speciation);
Ignore sympatric speciation.
3. Smaller/different lakes have different environmental conditions
- OR**
- Smaller/different lakes have different selection pressures;
Accept different populations for different lakes.
4. Reproductive separation/isolation
- OR**
- No gene flow
- OR**
- Gene pools remain separate;
5. Different alleles passed on/selected
- OR**
- Change in frequency of allele/s;
6. Eventually different species/populations cannot breed to produce fertile offspring;
- 4 max**
- (b) 1. Correct answer of $10/10.4 = 2$ marks;;
Ignore any numbers after 10.4
2. Working shows $14,112 = 1$ mark
- OR**
- $13.09/13.1 = 1$ mark;

2

- (c) 1. (Growth/increase of) algae/surface plants/algal bloom blocks light;

2. Reduced/no photosynthesis so (submerged) plants die;
3. Saprobiotic (microorganisms) aerobically respire

OR

Saprobiotic (microorganisms) use oxygen in respiration;

Accept: Saprobiont/saprophyte/ saprotroph

Neutral: decomposer

4. Less oxygen for fish to respire;

4

- (d)
1. Capture/collect sample, mark and release;
 2. Ensure marking is not harmful (to fish)

OR

Ensure marking does not affect survival (of fish);

Accept examples e.g., marking should not be toxic.

3. Allow (time for) fish to (randomly) distribute before collecting a second sample;
4. (Population =) number in first sample × number in second sample divided by number of marked fish in second sample/number recaptured;

4

- (e)
1. Less chance of recapturing fish

OR

Unlikely fish distribute randomly/evenly;

Accept 'harder to capture marked fish' (recaptured fish) but ignore 'harder to capture fish'.

Accept that fish may remain in one area.

Accept fish may congregate.

1

[15]

Q2.

- (a) 1. Crossing over;
2. Independent segregation/assortment (of homologous chromosomes);
Accept independent assortment of alleles.
Accept meiosis as an alternative for 1 or 2 if neither of these marks is awarded.
3. Random fusion of gametes

OR

Random fertilisation;
Accept random mating.

2 max

- (b) Codominance;
Accept incomplete dominance

1

- (c) 1. ttC^RC^W **and** TtC^WC^W ;
2. TtC^RC^W , TtC^WC^W , ttC^RC^W **and** ttC^WC^W ;
3. Tall pink, tall white, dwarf pink, dwarf white, **and** ratio 1 : 1 : 1 : 1;
Accept: any order of genotypes and phenotypes and ignore if on incorrect answer lines.
Accept: sequence of phenotypes does not need to mirror genotypes but must be correct.
Accept equivalent ratios e.g. 4:4:4:4.
Allow equivalent of mark points 2 and 3 for cross using homozygous tall parent i.e. TTC^WC^W .
*Allow **one mark** for correct dihybrid genotypes of offspring from incorrect parental genotypes.*

3

- (d) 1. Correct answer of 42% = **2 marks**;;
Accept: 0.42 for 1 mark.
2. Incorrect answer but shows understanding that $2pq$ = pink/heterozygous/carriers = **1 mark**

OR

Answer = 0.42 = **1 mark OR**

Answer = $16.38 / 16.4$ = **1 mark**;
Accept $1 - (p^2 + q^2)$ for $2pq$ or equivalent using numbers.
Accept: understanding of $2pq$ by using a calculation involving $2 \times$ two different numbers.

2

[8]