Name of the Student:_____
Max. Marks : 26 Marks **Time : 26 Minutes**

Mark Schemes

Q1.

(a) epistasis;
one gene influences the expression of another / description
using example in question;

2

(b) aaDD, aa Dd (or DDaa, Ddaa);

1

(c) (i) AaDd (or DdAa);

1

(ii) aadd, Aadd (or ddaa, ddAa);

1

(iii) cross with black individual / genotype aaDd or aaDD;
genotype is Aadd if agouti offspring / genotype is aadd if no agouti offspring;
Accept;
repeat cross using original parents many times;
ratio is 4 albino : 3 agouti : 1 black if Aa, or 2 albino : 1 agouti : 1 black if aa;

2

[7]

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Q2.

(a) zooplankton nearer surface at night;
algae only found at surface;
photosynthetic;
no / little light below 30 / 40m;

3

(b) (i) with increasing time predators have been present in the lake, the greater the depth at which the zooplankton occur during the day;

1

(ii) variation in migration behaviour;
vertical migration reduces chance of predation / prey can't be seen in low light intensity;
those that migrated more likely to reproduce;
genes / alleles (for behaviour) passed to next generation;
increase in frequency of gene / allele in population;

3 max

[7]

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Q3.

(a) 1 shore crab rapidly colonises / rapid growth;
2 ability to live different environments / no natural predators / will have similar / overlapping niche with native species / valid example / shore crab may be carrier of disease;
3 shore crab better competitor / more aggressive;
4 decreased population of prey species;
5 ecosystem less stable;

5

(b) between A and B water potential of blood rises as water potential of blood rises as water potential of surrounding water rises, after B rise in water potential less rapid / at C no further change occurs;

1

(c) No – as blood is isotonic with surrounding water / blood and surrounding water have same water potential;

1

(d) (i) water potential of blood maintained;
so (blood) cells not destroyed (by osmosis);

OR

replaces ions / salts lost diffusion;
ions / salts required for named metabolic process;

2

(ii) rate of respiration decreases;
less ATP made;
insufficient to maintain water potential of blood when in estuary;
isotonic in sea so no need to transport salts;

OR

sea temperature higher than river;
higher metabolic rate / higher enzyme activity;
advantage of this crab e.g. still able to escape from predators;

3 max

[12]

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