Name of the Student:_____
Max. Marks : 19 Marks **Time : 19 Minutes**

Mark Schemes

Q1.

(a) colder / below 0°C (January) areas, cyanogenic plants die in this cold / acyanogenic survive;
non-cyanogenic allele / gene passed on more often / its frequency increases;
warmer (January) areas cyanogenic plants at advantage,
because of less herbivore selection pressure / feeding;
so cyanogenic survive more often to pass on cyanogenic allele / gene.

4 max

(b) large (and equal) number of quadrats in each area;
(reject several)
random sampling method, described;
(accept described 'systematic' method)
percentage cover / point hits per quadrat / count plants;
mean / average value for each area;
statistics test to see if differences significant.

4 max

[8]

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Q2.

(a) principle of intraspecific competition;
for amount of food available;
more energy needed to find food / less energy to produce eggs;

OR

number of territories;
more energy spent fighting / defending territory;

OR

availability as prey;
predators spend less time searching for nests;

2 max

(b) (i) age of bird - young or old birds produce fewer eggs;
time of breeding - early or late breeding less food available / temperature effect;
genotype - variation in genetic ability to produce eggs;
quality of territory - description of some relevant resource in territory;
(reject food as resource in territory if given in(a))
predation of eggs - lays more to replace eaten eggs;

1 max

(ii) when high number of eggs, each individual young will receive less food; reference to mortality rates to disease / predators for low numbers of eggs; so in both cases low number of offspring will reach maturity / survive; so less likely to pass on genes / alleles;

3

[6]

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Q3.

(a) *Two linked points:*

Crossing over / exchange of material (between chromatids);
Different combinations of alleles / linkage groups changed / broken;

OR

Independent assortment / alignment of (homologous) chromosomes;
Different combinations of (maternal and paternal) chromosomes / alleles;

2 max

(b)

Gamete genotype

$\frac{D}{M}$ $\frac{\quad}{\quad}$ $\frac{d}{m}$;

Offspring genotype

$\frac{D}{M}$ $\frac{\quad}{\quad}$ $\frac{d}{m}$;

Offspring phenotypes

Abnormal males / (all) (no females);

3

[5]

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