Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Mark Schemes

Q1.

(a) 1. (Colour vision involves) cones;

*1, 2 and 3 Reject 'red cones/photoreceptors' and 'green cones/photoreceptors' only **once**.*

*1 and 2 Each cone has a different pigment or absorbs particular wavelengths = **two** marks.*

*1 and 3 Greater absorption by 'red sensitive' than 'green sensitive' cones = **two** marks.*

2. (Each type of) photoreceptor has a different pigment

OR

(Each type of) photoreceptor absorbs particular/different (range of) wavelength(s)

OR

(Each type of) photoreceptor stimulated by particular/different (range of) wavelength(s);

3. Greater absorption by 'red sensitive' than 'green sensitive' (cells/photoreceptors/cones)

OR

Provides percentage values which indicate difference in light absorption (at 600nm)

OR

More impulses to brain from 'red sensitive' than 'green sensitive' (photoreceptors/cones)

OR

More impulses along optic nerve from 'red sensitive' than 'green sensitive' (photoreceptors/cones);

Allow approximately correct percentage values.

Accept suitable alternatives for 'sensitive' e.g. detecting/absorbing.

Accept action potentials for impulses.

*Do **not** credit 'signals', 'messages' for third or fourth options for mark point 3.*

3

(b) Box 3 correct - Several photoreceptors connecting to one neurone and spatial summation

Downloaded from www.merit-minds.com

(c) 1. Geographical isolation/separation due to elevation/altitude;

2. Allopatric speciation due to isolation/separation;

3. Different selection pressures

OR

Different environment(s);

Accept selection (due to) flower colour.

Accept different 'abiotic conditions/factors' for 'different environment(s)' or different named factor e.g. temperature, humidity but 'different altitudes' on its own is not enough.

4. (However) some overlap in distribution

OR

(Both) plants found in same area/habitat/altitude;

5. So (possibly) sympatric speciation;

Only awarded if mark point 4 is credited.

6. (Variation due to) mutation(s);

Reject mutation(s) if context incorrect e.g. 'mutate to adapt'.

7. Reproductive isolation/separation due to different pollinators/distributions/altitudes

OR

Separate gene pools due to different pollinators/distributions/altitudes;

Accept 'no gene flow' for separate gene pools.

8. Change in allele frequency (in each population)

OR

Different allele frequency (in each population);

Accept 'increase' or 'decrease' for 'change'.

9. Different species) can no longer (interbreed to) produce fertile offspring;

5 max

[9]

Downloaded from www.merit-minds.com

Q2.

(a) 1. Microvilli provide a large surface area

OR

Folded (cell-surface) membrane provides a large surface area;

Ignore 'brush border'.

2. Many channel/carrier proteins for facilitated diffusion;

3. Many carrier proteins for active transport;

3 and 4 Accept sodium-potassium pumps as an alternative to carrier proteins.

4. Many channel/carrier proteins for co-transport;

Accept 'cotransport protein' or 'symport' for type of transport protein.

5. Many mitochondria produce ATP

OR

Many mitochondria for active transport;

Accept co-transport for active transport.

6. Many ribosomes to produce carrier/channel proteins;

Accept abundant rough endoplasmic reticulum for many ribosomes, but abbreviation is not enough.

3 max

(b) Collecting duct **and** distal (convoluted) tubule;

Do not accept DCT for distal convoluted tubule.

1

(c) 1. Has a (specific) tertiary structure/shape;

Accept in context of ADH or receptor.

Ignore 3D.

Reject reference to Antigen or antibody.

1 and 2 Reject reference to active site, enzyme, substrate or induced fit only once.

2. (Structures are) complementary;

2

(d) 1. Aorta

OR

Carotid artery/sinus;

Ignore arteries but reject named incorrect artery.

2. (ADH) increases (re)absorption of water;

Reject if other substances are also absorbed e.g. glucose, ions.

3. Increases volume of (blood) **and** pressure increases

OR

Increases volume of (blood) **and** pressure returns to normal;

3

[9]

Downloaded from www.merit-minds.com