**BY2 January 2014**

| Question | Marking details | Marks Available |
|---|---|---|

1

| Characteristic | **Plant;** | **Animal;** Accept animalia | **Prokaryote;** Accept prokaryotic | **Protoctista;** NOT protozoa/ fungi |
|---|---|---|---|---|
| Eukaryotic | ✓ | ✓ | × | ✓ |
| Chloroplast | ✓ | × | × | Some species |
| Cell wall | ✓ | × | ✓ | Some species |
| Nucleus | ✓ | ✓ | × | ✓ |

4

**Question 1 total** **[4]**

| Question | | | Marking details | Marks Available |
|---|---|---|---|---|
| 2 | *(a)* | (i) | *atrio-ventricular node (max 2)*<br>{collects/ receives} {wave of excitation/ impulses} from SAN;<br>NOT signal<br>passes on to{Purkyne fibres/Bundle of His};<br>allows delay before wave passed to ventricles/ stops atria and ventricles contracting at the same time; | 2<br><br>2 |
| | | (ii) | *Bundle of His and Purkyne fibres*<br>conducts wave to {base/ apex} of ventricles/ heart;<br>ensures contraction (from base) upwards; | |
| | *(b)* | (i) | 11; | 1 |
| | | (ii) | 7; | 1 |
| | | (iii) | 1; | 1 |
| | | (iv) | 6; | 1 |
| | | (v) | 4; | 1 |
| | | (vi) | 2; | 1 |
| | | (vii) | 12; | 1 |
| | | (viii) | 10; | 1 |
| | | | **Question 2 Total** | **[12]** |

| Question | | | Marking details | Marks Available |
|---|---|---|---|---|
| 3 | *(a)* | (i) | 24/ 25/26%; | 1 |
| | | (ii) | Any two from<br>(vigorous) exercise/ OWTTE;<br>high levels of (aerobic) respiration;<br>oxygen used/ needed (by muscle cells); | 2 max |
| | *(b)* | | C/mouse; | 1 |
| | *(c)* | (i) | curve to right of C; | 1 |
| | | (ii) | Any three from<br>(move to right) lowers affinity of haemoglobin for oxygen;<br>more oxygen released/ oxygen more readily dissociates;<br>at the same partial pressure of oxygen;<br>for (aerobic) respiration; | 3 max |
| | *(d)* | | Any three from<br>curve shows haemoglobin has high affinity for oxygen;<br>can{ pick up/ absorb} oxygen at {low partial pressure/ high altitude}/ can be become saturated with oxygen {more easily/ lower partial pressure/ at altitude};<br>Llama lives at high altitudes where oxygen is scarce;<br>small change in partial pressure results in a large change in % saturation; | 3 max |
| | *(e)* | | Curve A; | 1 |
| | | | **Question 3 total** | **[12]** |

| Question | | | Marking details | Marks Available |
|---|---|---|---|---|
| 4 | *(a)* | (i) | organism that lives {on/in} another {organism/ host};<br>causes {harm/ damages} to host/ at the expense of the host; | 2 |
| | | (ii) | Any three from<br>{suckers/hooks} (for attachment to host gut);<br>large surface area to volume ratio;<br>{thin/ flattened}{proglottids/ segments};<br>covering resistant to host's digestive enzymes; NOT immune system<br>hermaphrodite/ OWTTE;<br>produces large number of eggs;<br>no digestive system; | 3 max |
| | | (iii) | Any three from<br>Carnivorous/ carnivore;<br>{Large/ pointed} canines for {tearing/grasping flesh/ killing prey};<br>molars/premolars for {cutting/ slicing} meat; NOT tearing<br>(small) incisors for {gripping/ stripping} flesh;<br>carnassials teeth for {crushing/cutting};<br>vertical movement of jaws; | 3 max |
| | *(b)* | (i) | obtains {food/ nutrients} from another organism/heterotrophic; | 1 |
| | | (ii) | **A** {requires food digested by host/ no digestive system}, **B** {digests food itself/ has digestive system};<br>**A** absorbs food {externally/at surface}, **B** internal absorption; | 2 |
| | | | **Question 4 Total** | **[11]** |

| Question | | | Marking details | Marks Available |
|---|---|---|---|---|
| 5 | *(a)* | (i) | Change in mass = 11.2 - 13.6 = **-**2.4;<br>% change in mass (-2.4/13.6) x 100 = 17.6/ 17.65 %;<br>NOT 17.7 | 2 |
| | | (ii) | {greater percentage of water lost/ largest change in mass} when upper surface <u>only</u> is covered/ when lower surface is covered there is less change in mass;<br>more stomata on lower surface;<br>some water is lost through upper surface as{some/ few/ less} stomata present; | 3 |
| | | (iii) | to ensure that {all of the / maximum loss of} water was lost from the leaves; | 1 |
| | *(b)* | (i) | xerophytes/xerophytic; | 1 |
| | | (ii) | {lower density of/ less} stomata;<br>(rolling causes) upper epidermis to face inwards/ stomata are on the inside of (rolled) leaf;<br><u>no</u> stomata on {lower/exposed} surface/ <u>all</u> stomata on the {upper/ inner} surface; | 3 |
| | | (iii) | Any two<br>waxy cuticle on lower surface;<br>reduced leaf surface area;<br>sunken stomata;<br>hairs;<br>long roots; | max 2 |
| | | | **Question 5 Total** | **[12]** |

| Question | | Marking details | Marks Available |
|---|---|---|---|
| 6 | *(a)* | lamellae/gill plates; | 1 |
| | *(b)* | water {forced/ flows} over gill (filaments);<br>by pressure changes/ OWTTE;<br>(pumping) action of mouth and operculum/ OWTTE;<br>water flows in opposite direction to blood/counter-current mechanism;<br>maintains {diffusion/ concentration} gradient across {entire/ whole} gill (filament);<br>as blood always meets water with a higher oxygen concentration/ equilibrium is never reached; | max 4 |
| | *(c)* | Any four<br>large surface area;<br>{(dense) network/ large number} of capillaries; NOT good blood supply<br>{thin/permeable} epithelium;<br>moist;<br>short diffusion pathway; | max 4 |
| | | **Question 6 Total** | **[9]** |

| Question | | | Marking details | Marks Available |
|---|---|---|---|---|
| 7 | | | | |
| | *(a)* | A | plants have well established root system/ OWTTE; | 10 max |
| | | B | leaves are thin/ large SA for photosynthesis/ gas exchange; | |
| | | C | {waxy cuticle/ shed leaves in winter} to reduce water loss; | |
| | | D | {stomata/ guard cells} to {control/ reduce} water loss; | |
| | | E | xylem transport water; | |
| | | F | phloem transports organic solutes/ amino acids; | |
| | | G | xylem/ tracheids provide structural support; | |
| | | H | brightly coloured {flowers/ petals/ scent/ nectar} to attract insects; | |
| | | I | Adaptation of pollen to insect pollination e.g. sticky/ hooks; | |
| | | J | large amounts and small sized pollen grains for wind pollination | |
| | | K | pollen grains have hard coats to prevent desiccation; | |
| | | L | no requirement for gametes to travel through water/ fluid; | |
| | | M | resistant {coat/shell} around the seed to {withstand adverse conditions/ protect}; | |
| | | N | food store in seeds; | |
| | | O | embryo develops in seed until {germination/ leaves are produced} (above ground); | |
| | | P | seed dispersal adaptations/ appropriate example | |

| Question | | Marking details | Marks Available |
|---|---|---|---|
| 7 *(b)* | | | |
| | A | reproduce by mitosis; | 10 max |
| | B | genetically identical/clones; | |
| | | *advantages* | |
| | C | less chance of mutation; | |
| | D | adapted to same conditions as parents/ owtte; | |
| | E | parent can provide support until independent; | |
| | F | example of asexual reproduction: strawberry/other appropriate named example; | |
| | G | no need for (second organism for) fertilisation/ only one parent is needed; | |
| | H | no wastage of gametes/ less energy wasted; | |
| | I | rapid increase in numbers/ large numbers produced; | |
| | J | no special mechanisms required; | |
| | | *disadvantages* | |
| | K | lack of genetic variation {means more susceptible to wiping out/ less able to adapt}; | |
| | L | (means more susceptible to wiping out) by disease; | |
| | M | (less able to adapt) environmental changes; | |
| | N | no chance of evolution/natural selection; | |
| | O | less chance of dispersal/ restricted to one niche; | |
| | P | more competition for resources; | |
| | | **Question 7 Total** | **[10]** |