**Biological Molecules Questions**

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| 1 | What is the difference between a polymer and a monomer? |
| 2 | Identify examples of three biological polymers |
| 3 | What is the name of the reaction that joins two monomers together? |
| 4 | What is the name of the reaction that breaks bonds between monomers? |
| 5 | What type of carbohydrate are glucose, galactose and fructose? |
| 6 | What monomers make up sucrose, lactose and maltose? |
| 7 | What do we call a molecule that consists of two monosaccharides? |
| 8 | What do we call a molecule that consists of many monosaccharides bonded together? |
| 9 | Glucose has two isomers. What does this mean? |
| 10 | Identify one similarity and one difference between glycogen and starch. |
| 11 | Identify two differences between starch and cellulose. |
| 12 | How would you test for a reducing sugar? |
| 13 | How would you test for a non-reducing sugar? |
| 14 | What type of bond joins the monomers on carbohydrates? |
| 15 | What type of biological molecule are triglycerides? |
| 16 | What are triglycerides made of? |
| 17 | What type of bond joins the components of a triglyceride? |
| 18 | What is the difference between a saturated and an unsaturated fatty acid? |
| 19 | What is the difference between a triglyceride and a phospholipid? |
| 20 | Describe how you could test a food for the presence of lipid |
| 21 | Draw a sketch of the structure of an amino acid |
| 22 | What do you call two amino acids bonded together? |
| 23 | What would you call many amino acids bonded together? |
| 24 | What type of bond joins two amino acids together? |
| 25 | What does the primary structure of proteins mean? |
| 26 | What does secondary structure mean? |
| 27 | What does tertiary structure mean? |
| 28 | Name 3 types of bond that hold the tertiary structure of a protein |
| 29 | What are the components of a DNA nucleotide? |
| 30 | What type of bond joins two nucleotides? |
| 31 | Which bases join together by complimentary base pairing? |
| 32 | What type of bond forms between two complimentary bases? |
| 33 | Identify three differences between RNA and DNA |
| 34 | What is ATP made of? |
| 35 | Why is ATP important in cells? |
| 36 | What is ATP easily hydrolysed into to release energy? |
| 37 | Identify 3 properties of water that make it useful in biology |

**Enzymes Questions**

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| 1 | How do both enzymes and catalysts speed up chemical reactions? |
| 2 | Explain why an enzyme can only catalyse one particular reaction. |
| 3 | What needs to happen in order for an enzyme to catalyse a reaction? |
| 4 | Explain the effect of low temperatures of the rate of enzyme activity? |
| 5 | Explain the effect of very high temperatures on the rate of enzyme activity? |
| 6 | Why would a change in pH slow the rate of enzyme activity? |
| 7 | Draw a sketch graph to show the effect of substrate concentration on enzyme activity |
| 8 | Draw a sketch graph to show the effect of enzyme concentration on enzyme activity |
| 9 | Describe the lock and key model of enzyme activity |
| 10 | Explain how the induced fit model is a more realistic model of enzymes |
| 11 | What does a competitive inhibitor do? |
| 12 | How could you overcome the effect of a competitive inhibitor? |
| 13 | What does a non-competitve inhibitor do? |

**Species Diversity Questions**

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| 1 | What is a species? |
| 2 | How does courtship behavior help in the reproduction of some animals? |
| 3 | How does a phylogenetic system organise living organisms? |
| 4 | How does a hierarchy organise living organisms? |
| 5 | Identify the taxa (groups) that we organise living organisms into (in order!) |
| 6 | What is the binomial name of humans? |
| 7 | What is species richness? |
| 8 | How is diversity index a better measure of diversity than species richness? |
| 9 | Identify two ways farming decreases biodiversity. |
| 10 | Explain how hedges can increase biodiversity around a field. |
| 11 | Identify 3 ways in which diversity between species can be measured. |
| 12 | When investigating variation in a habitat why are samples taken? |
| 13 | How would you ensure your samples are representative of the whole population? (2) |
| 14 | What does standard deviation show us? |

**Cells Questions**

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| 1 | Name 3 components of the plasma membrane |
| 2 | What organelle contains genetic information? |
| 3 | What organelle is found in large numbers in active cells? |
| 4 | What organelle is found in plant and algae cells but not animal cells? |
| 5 | What organelle is used by phagocytes to digest pathogens? |
| 6 | What organelle carriers out protein synthesis? |
| 7 | What does the RER do? |
| 8 | What does the SER do? |
| 9 | What does the golgi body do? |
| 10 | What is the function of a cell wall in plant cells? |
| 11 | What name do we give to a group of the same type of cell working together? |
| 12 | What is an organ? |
| 13 | What type of cell are animal and plant cells? |
| 14 | What type of organelles do prokaryotic cells not have? |
| 15 | Describe the DNA in a prokaryote |
| 16 | Name 3 structures that make up a virus |
| 17 | What cannot be seen in an optical microscope but can be seen in an electron microscope? |
| 18 | What can be seen observed using an optical microscope that cannot be observed using an electron microscope? |
| 19 | Why does an electron microscope have a better resolution than an optical microscope? |
| 20 | What laboratory process can be used to separate the organelles? |
| 21 | Explain two conditions needed for the process above. |
| 22 | What is semi-conservative DNA replication? |
| 23 | What bonds are broken at the start of DNA replication? |
| 24 | What enzyme breaks these bonds? |
| 25 | What binds to the exposed bases on the single DNA strand? |
| 26 | Why are the two strands produced identical? |
| 27 | What enzyme joins the newly bound nucleotides together? |
| 28 | What stage of the cell cycle does this happen in? |
| 29 | Name the stages of mitosis in order |
| 30 | How can you tell if a cell is undergoing mitosis when observing it under a microscope? |
| 31 | During which phase do chromosomes line up along the equator of the cell? |
| 32 | During what stage are the sister chromatids separated? |
| 33 | What part of the cell is needed for the stage above to happen? |
| 34 | What happens during prophase? |
| 35 | Bacteria carry out a different cell cycle. What is it called? |
| 36 | Identify the two steps of the bacterial cell division. |
| 37 | How do viruses replicate? |

**Transport Questions**

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| 1 | What can diffuse directly though the plasma membrane? |
| 2 | What cannot diffuse directly through the plasma membrane? |
| 3 | Identify a similarity between channel proteins and carrier proteins |
| 4 | Identify a difference between channel proteins and carrier proteins |
| 5 | Identify a similarity between active transport and facilitated diffusion |
| 6 | Identify two differences between active transport and facilitated diffusion. |
| 7 | If you dissolve sugar into water what happens to the Ψ? |
| 8 | What is an isotonic solution? |
| 9 | What is a hypertonic solution? |
| 10 | What is a hypotonic solution? |
| 11 | If you placed plant tissue into a hypotonic solution what would happen? |
| 12 | What is co-transport? |
| 13 | Describe an example of co-transport in the body. |
| 14 | Identify 2 ways in which a cell can increase the diffusion of a large, water soluble molecule across its membrane. |
| 15 | Which organelle would you expect in large numbers in a cell that carries out active transport? |

**Exchange Questions**

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| 1 | What is the relationship between size and surface area:volume ratio? |
| 2 | What must large animals have to ensure all cells can exchange molecules efficiently? |
| 3 | How would a prokaryote carry out gas exchange? |
| 4 | Draw a flow chart to show the structures an O2 molecule passes in insect gas exchange |
| 5 | How does an insect limit water loss? |
| 6 | Explain how insects respond to an increased need for O2 when active. |
| 7 | What is the purpose of the lamellae in the fish gills? |
| 8 | What is the benefit of water flowing in opposite directions to the blood in a fish gill? |
| 9 | Describe the structures of a leaf CO2 would diffuse through to reach the photosynthesising palisade leaf cells |
| 10 | What is the difference between ventilation, breathing and gas exchange? |
| 11 | Name the structures a CO2 molecule would pass through when being excreted. |
| 12 | What happens to the volume of the thorax when inhaling? |
| 13 | How does this change in volume come about? |
| 14 | What happens to the pressure inside the thorax when inhaling? |
| 15 | What happens to the volume of the thorax when exhaling? |
| 16 | How does this change in volume come about? |
| 17 | What happens to the pressure inside the thorax when exhaling? |
| 18 | What is tidal volume? |
| 19 | What is pulmonary ventilation rate? How could you calculate it? |
| 20 | In the digestive system what does the enzyme lipase hydrolyse? |
| 21 | Name 3 enzymes that digest carbohydrates. |
| 22 | What is the difference between endopeptidases and exopeptidases? |
| 23 | What is the benefit of having membrane bound dipeptidases? |
| 24 | What is a micelle? |
| 25 | What is the purpose of the villi in the ileum? |
| 26 | How are amino acids and glucose absorbed in the ileum? |
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**Mass Transport Questions**

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| 1 | Haemoglobin has a quaternary structure. What does this mean? |
| 2 | What is the role of haemoglobin? |
| 3 | In the lungs what is the pp of O2 like? |
| 4 | In the lungs what is the affinity of haemoglobin for oxygen like? |
| 5 | In respiring tissue what is the pp of O2 like? |
| 6 | In respiring tissue what is the affinity of haemoglobin for oxygen like? |
| 7 | What effect doe the binding of one oxygen molecule have on the affinity of haemoglobin for oxygen? |
| 8 | What effect does CO2 have on the affinity of haemoglobin for oxygen. |
| 9 | In which direction would you expect an oxygen dissociation curve shift for animals living at high altitudes? |
| 10 | In which direction would you expect an oxygen dissociation curve shift for animals with a high metabolic rate? |
| 11 | Draw a sketch of a heart and label the blood vessels, chambers and valves |
| 12 | Draw a flow chart to show the movement of blood around the body. |
| 13 | During the cardiac cycle what happens during diastole? |
| 14 | During the cardiac cycle what happens during atrial systole? |
| 15 | During the cardiac cycle what happens during ventricular systole? |
| 16 | Describe the pressures in the heart required for the AV valves to be open. |
| 17 | Describe the pressures in the heart required for the semilunar valves to close. |
| 18 | What is cardiac output? How do you calculate it? |
| 19 | Identify 3 differences between the structure of veins and arteries |
| 20 | What is the difference between the components of tissue fluid and blood plasma? |
| 21 | What causes the formation of tissue fluid at the arteriole end of a capillary? |
| 22 | What causes tissue fluid to return to the venule end of a capillary? |
| 23 | The volume of tissue fluid returning to the capillary is lower than the volume of fluid leaving the capillary. Explain why. |
| 24 | What is the purpose of xylem vessels? |
| 25 | Describe the cohesion tension theory of plant mass transport. |
| 26 | What effect would a low wind speed have on uptake of water from roots? |
| 27 | The total volume of water taken up by the roots is not equal to the total volume of water lost from the leaves. Explain why. |
| 28 | What is the function of phloem tissue? |
| 29 | Draw a flow chart to describe the mass flow theory of transport in plants. |
| 30 | Describe an observation you would make if you removed the bark of a tree (ringing). The outer layer of a tree trunk is the location of the phloem vessels. |

**Protein Synthesis Questions**

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| 1 | Identify 3 differences between DNA in a prokaryote and a eukaryote |
| 2 | What is the name of the proteins that eukaryotic DNA is coiled around? |
| 3 | What name is given to the DNA and associated proteins? |
| 4 | What is mitochondrial DNA like? |
| 5 | What is a gene? |
| 6 | What are different versions of a gene called? |
| 7 | What is a triple of DNA bases? |
| 8 | The genetic code is universal. What does this mean? |
| 9 | The genetic code is degenerate. What does this mean? |
| 10 | Identify one other feature of the genetic code and explain what it means. |
| 11 | Within a gene only some of the bases code for amino acids. What are these parts called. |
| 12 | Some parts of the gene are “non-coding”. What are they called? |
| 13 | What is a genome of an organism? |
| 14 | What name is given to the process by which a sequence of RNA is synthesized that is complimentary to the base sequence of the gene. |
| 15 | What name is given to the RNA molecule produced immediately at the end of this process? |
| 16 | What needs to happen to this RNA before it leaves the nucleus? |
| 17 | What is a codon? |
| 18 | In translation what type of RNA is needed? |
| 19 | Which organelle does translation take place in? |
| 20 | How is the correct amino acid brought to the mRNA? |
| 21 | What type of gene mutation often results in a non-functional protein? Explain why. |
| 22 | What type of gene mutation results in no change to the protein? Explain why. |

**Meiosis Questions**

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| 1 | What type of cell is produced by meiosis? |
| 2 | How many cell divisions are involved in meiosis? |
| 3 | How many chromosomes would be in the daughter cells? |
| 4 | Describe what happens to the chromosomes at the beginning of the first division of meiosis. |
| 5 | Describe what happens to the chromosomes at the beginning of the second division of meiosis. |
| 6 | Why are the daughter cells genetically unique to each other? (2) |
| 7 | Describe an example of a chromosome mutation that could occur during meiosis |

**Diversity and Adaptation Questions**

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| 1 | What is genetic diversity? |
| 2 | What is a gene pool? |
| 3 | How are new alleles originally formed? |
| 4 | What is evolution of a population? |
| 5 | Describe the steps that cause the evolution of a population (long answer) |
| 6 | Explain how antibiotic resistance has evolved in some bacteria as a result of the over-use of antibiotics (long answer) |
| 7 | What is meant by directional selection? |
| 8 | Describe an example of directional selection. |
| 9 | What is meant by stabilising selection? |
| 10 | Describe an example of stabilising selection. |