

Question Number	Answer	Marks
1.1	<ul style="list-style-type: none">• Blood glucose concentration• Body temperature• Water level	3
1.2	<ul style="list-style-type: none">• Endocrine system involves glands that secrete• The blood carries the hormone to a target organ where it produces an effect. Compared to the nervous system the effects are slower but act for longer.• Reference to synapses / gaps between neurones• Extra time for release / movement of chemical	3
1.3	<ul style="list-style-type: none">• Thermoregulatory Centre (in the hypothalamus of the brain)	1
1.4	<ul style="list-style-type: none">• Fluctuates• Identifies a peak and minimum time of day• Cyclical	3
1.5	<ul style="list-style-type: none">• Thermoregulatory centre in brain recognises the stimulus (muscular contraction), respiring a lot and warming the body up.• The Thermoregulatory centre contains receptors that are sensitive to change in blood temperature through the hypothalamus.• Muscles controlling hairs relax to flatten hair, minimising any insulating effect so cooling can take place. More sweat produced by sweat glands, cooling skin surface as sweat evaporates.• Blood vessels close to skin surface dilate, increasing volume of blood in capillaries to maximise cooling by radiation and convection from skin surface.	4
1.6	D	1
2.1	<ul style="list-style-type: none">• Type 1 is due to pancreas making insufficient insulin, whereas type 2 is caused by body cells not responding to the insulin produced by the pancreas• Type 1 requires insulin injections; type 2 requires insulin injections only if improved diet/increased exercise/losing weight/drugs not effective.• Type 1 diabetes is most common in children and teenagers• There is a correlation between Type 2 diabetes and obesity• Type 1 can be managed but not cured, type 2 may be cured.	3

Question Number	Answer	Marks
2.2	<ul style="list-style-type: none"> • Dialysis fluid contains glucose and salts (with similar concentration to the blood) • Exchange occurs across a partially permeable membrane • The blood taken from the arm of the patient flows in the opposite direction as the dialysis fluid • Minerals / salts / ions / urea move by diffusion down a concentration gradient from high to low concentration • Water, moves by osmosis • Proteins too large to move across membrane, • Glucose not removed • Toxic substances removed from the bloodstream 	4
2.3	<ul style="list-style-type: none"> • Cheaper long term for NHS / hospital • No need for regular / long hospital visits or is a long-term solution • Flexible lifestyle, such as can go on holidays • Costs of transport to/from hospital during dialysis • No risk of infection from frequent needles / treatment • Less / no need to control diet • Maintains correct concentration of substances in blood / body 	2
2.4	<ul style="list-style-type: none"> • The process of breaking down excess protein (primarily in the liver) 	1
2.5	<ul style="list-style-type: none"> • Filtration of the blood happens in the kidney • Substances are selectively reabsorbed • All the glucose and water is reabsorbed • Reabsorbs some of the ions • The waste products are released through the urine 	5
3.1	<ul style="list-style-type: none"> • The shoots grow upwards • Therefore, away from gravity 	2

3.2

Ethene

To control cell
division and
ripening of fruits

Auxins

To inhibit or
promote cell
elongation in
plant cuttings

Gibberellin

To kill harmful
pathogens

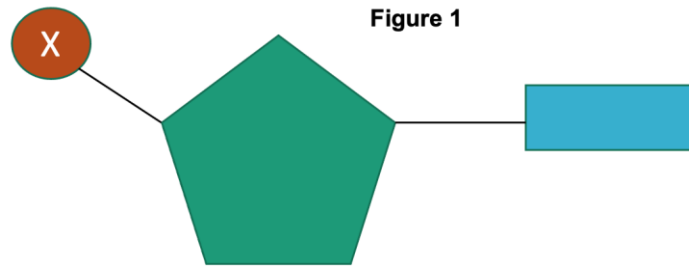
To initiate seed
germination

To reduce the rate
of fruit ripening

3

Question Number	Answer	Marks
3.3	<ul style="list-style-type: none"> Placed in different locations Two independent variables so cannot measure the effect of each factor on the dependent variable 	2
3.4	<ul style="list-style-type: none"> Unequal distribution Of auxins (growth hormones) The side not exposed to light has more auxins so experiences a greater rate of elongation that causes it to bend 	3
4.1	<ul style="list-style-type: none"> No mixing of genetic information No fusion of gametes Only mitosis is involved 	2
4.2	<p>Indicative content:</p> <p>Similarities:</p> <ul style="list-style-type: none"> Both involve the replication of DNA Both increased total number of sub-cellular structures <p>Differences:</p> <ul style="list-style-type: none"> Mitosis involves one cell division to form diploid cells Meiosis involves two divisions and forms haploid cells Mitosis produces two genetically identical daughter cells but meiosis produces four cells Meiosis induces genetic variation as it involves the mixing of genetic material from two parents Mitosis produces cells with two of each chromosome vs meiosis which produces cells with one of each chromosome 	4
4.3	<p>Indicative content:</p> <ul style="list-style-type: none"> The genome is the entire set of genetic material of an organism The analysis of the genome enables scientists to map out markers found in the modern-day human species The origins of all species are from ancestors of those who lived 60,000 years ago and migrated from regions of Africa Different ethnic groups express different genetic makeups and so DNA sampling and testing by scientists is needed Those who have more recent genetic links will have similar genetic patterns which explains modern inheritance 	5

4.4



1

Question Number	Answer	Marks									
4.5	Indicative content <ul style="list-style-type: none"> • DNA is a polymer made up of repeating sub-units • It has two strands and form a double helix structure • It has sugar, phosphate and base molecules • Alternating sugar and phosphate • T-A • G-C • Bases all form a nucleotide structure around a sugar molecule • Sequence of nucleotides 	6									
4.6	<ul style="list-style-type: none"> • The combination of alleles that controls each characteristic expressed 	1									
4.7	<ul style="list-style-type: none"> • Cystic fibrosis is a genetic disorder that leads to the body producing a large amount of mucus that gets trapped in respiratory passageways. • It affects cell membranes • Can lead to death 	3									
4.8	<ul style="list-style-type: none"> • Cystic fibrosis is due to the recessive allele • This is inherited from both parents for the inherited disease to pass to the child • People who are heterozygous are not affected by the disease but are known as 'carriers' <div style="text-align: center; margin-top: 20px;"> <div style="display: flex; justify-content: space-around; margin-bottom: 10px;"> C c </div> <table border="1" style="border-collapse: collapse; text-align: center; margin: 0 auto;"> <tr> <td></td> <td>C</td> <td>c</td> </tr> <tr> <td>C</td> <td>CC</td> <td>Cc</td> </tr> <tr> <td>c</td> <td>Cc</td> <td>cc</td> </tr> </table> <p style="margin-top: 10px;">25% chance</p> </div>		C	c	C	CC	Cc	c	Cc	cc	4
	C	c									
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c	Cc	cc									

Question Number	Answer	Marks
5.1	<ul style="list-style-type: none"> The interaction between community (biotic factors) and the abiotic factors 	2
5.2	Indicative content: <ol style="list-style-type: none"> Light intensity- plants require light for photosynthesis. More light leads to greater photosynthetic rate Temperature- limiting factor for photosynthesis in plants Moisture- Plants and animals require water for survival Soil pH and mineral content- Different species of plants are adapted to survive in different conditions with different nutrient levels Wind intensity and direction- affects the rate of transpiration in plants...etc Carbon dioxide levels in plants- fundamental for photosynthesis Oxygen concentration- some fish and aquatic species can only survive in water that has high oxygen concentration 	6
5.3	<ul style="list-style-type: none"> Rate of decay is faster As oxygen is exposed compost which enables microorganisms and decomposers to respire aerobically 	3
5.4	microorganisms / decomposers/ detritivores <ul style="list-style-type: none"> digest / decompose/ break down organic matter use of enzymes absorption by diffusion / active transport must be of breakdown products respiration / combustion release of carbon dioxide CO₂ can be used (by trees) in photosynthesis 	4
6.1	<ul style="list-style-type: none"> Calculates area of rectangle (200*150)=30,000 Calculate area of trapezium (200+100/2)*50= 7,500 Total area= 30,000 + 7,500= 37,500 	4
6.2	<ul style="list-style-type: none"> Greater sample size (more quadrats) Randomly placed to avoid bias 	1
6.3	<ul style="list-style-type: none"> Finds average from the table: (4+7+1+3+4)/5=3.6 3.6*37,500=135,000 1.35x10⁵ 	5

Question Number	Answer	Marks
6.4	<ul style="list-style-type: none"> • Quadrats are typically used with a transect • Quadrats are good for random sampling and transects are good for systematic sampling • Quadrats can show the overall distribution of organisms in an environment + good for avoiding bias <p>Transects used for specific study of specific area of a habitat and how it changes throughout</p> <ul style="list-style-type: none"> • E.g. could have been used for woodland investigation as light intensity varies throughout 	4
6.5	<ul style="list-style-type: none"> • Movement is limited so less energy wasted • Temperature is regulated to less energy lost in keeping warm and through respiration • Fed high protein foods to increase growth 	2
6.6	<ul style="list-style-type: none"> • Modern medicine • We are the top of the food chain (apex predators) • Building and construction to shelter us from weather • Modern farming methods • Discovery and mining of more natural resources (new methods of extraction...etc) 	3