6BI01/01
Lifestyle, Transport, Genes & Health

Question Number	Answer	Mark
1(a)(i)	1 glycerol molecule and 3 fatty acid molecules ;	**(1)**

Question Number	Answer	Mark
1(a)(ii)	ester bond ;	**(1)**

Question Number	Answer	Mark
1(a)(iii)	condensation ;	**(1)**

Question Number	Answer	Mark
1(a)(iv)	have double bonds between carbon atoms and between carbon and oxygen atoms ;	**(1)**

Question Number	Answer	Mark
1(a)(v)	more hydrogen atoms than unsaturated lipids ;	**(1)**

Question Number	Answer	Mark
1(b)(i)	1. phosphate and base joined to pentose sugar ; 2. base correctly joined to sugar ; 3. phosphate correctly joined to two pentose sugars ;	**(3)**

Question Number	Answer	Mark
1(b)(ii)	(DNA) polymerase /(DNA) ligase / (DNA) helicase ;	**(1)**

Question Number	Answer	Mark
2(a)	**EITHER** 1. amniocentesis ; 2. amniotic fluid removed (from amniotic sac of mother) / eq ; 3. {fetal / embryonic} cells present in amniotic fluid /{fetal / embryonic} cells needed ; 4. DNA can be analysed / eq ; 5. to detect {defective / eq} gene(s) (in sample) / eq ; **OR** 1. chorionic villus sampling ; 2. placental tissue removed (from womb of mother) / eq ; 3. fetal cells present in {placenta / placental tissue / chorionic tissue} / fetal cells needed ; 4. DNA can be analysed / eq ; 5. to detect {defective / eq} gene(s) (in sample) / eq ;	**max (3)**

Question Number	Answer	Mark
2(b)	**Benefit:** 1. gives information about abnormalities (in fetus) / eq ; 2. {opportunity for choice / eq} / {consider termination / eq} / time for {preparation / treatment / eq } / {peace of mind / eq} ; **Risk:** 3. possibility of miscarriage (due to procedure) / eq ; 4. {potentially a healthy baby would be lost / eq} / {risk to mother / eq} ; **OR** 3. idea of {false positive / false negative} result ; 4. wrong decision made / description of wrong decision ;	**(2)**

	OR 3. {damage / harm} to fetus ; 4. subsequent health issues / miscarriages / eq ;	**(2)**

Question Number	Answer	Mark
2(c)	1. idea that a fetus is living ; 2. abortion is {wrong / murder} / eq ; **OR** 1. who has right to decide if tests should be performed / eq ; 2. implications of medical costs / disagreements over next step ; **OR** 1. issues relating to confidentiality of {parents / child} / eq ; 2. idea that {some other abnormality may be found / paternal DNA does not match / other family members have right to know results} ; **OR** 1. that or some other abnormality may be found ; 2. comment on possible problems with {future employment / insurance / what constitutes a serious condition} / eq ; **OR** 1. not fully understanding possible risks of prenatal testing; 2. possibility of {miscarriage / harm to child} / eq; **OR** 1. {who has the right to make the decision for the fetus / fetus has decision rights} (if the test is positive) ; 2. {denying them the opportunity to live / fetus should be allowed to live / fetus has a right to live} ;	**max (2)**

Question Number	Answer	Mark
3(a)	<table><tr><td>contracted</td><td>relaxed</td></tr><tr><td>relaxed</td><td>contracted</td></tr><tr><td>relaxed</td><td>relaxed</td></tr></table> **1 mark** for any two correct boxes ;;;	**(3)**

Question Number	Answer	Mark
3(b)	1. valves {separate / eq} atria from ventricles ; 2. open during atrial {systole / contraction } / eq ; 3. so that blood can pass through to ventricles / eq ; 4. closed during ventricular {systole / contraction} eq ; 5. to prevent {blood being forced back / backflow / eq} (up into atria) / to maintain pressure in ventricles ; 6. open during diastole / eq ; 7. so that ventricles can start to fill up (as atria are filling) ;	**max (4)**

Question Number	Answer	Mark
3(c)(i)	1. (time for complete cardiac cycle) = 0.96 to 0.98 (sec) ; 2. 60 ÷ cycle time ; 3. correct answer {beats per minute / bpm} ;	**(3)**

Question Number	Answer	Mark
3(c)(ii)	1. correct reference to <u>pressure</u> differences e.g. left is higher ; 2. left ventricle pumps blood {all around body / to rest of body / many arteries / systemic} / eq ; 3. right ventricle pumps blood to {lungs / pulmonary system / eq} ; 4. idea that if blood under high pressure there would be {damage / eq} to {lungs / capillaries / eq} ; 5. reference to lots of muscle (contracting in left ventricle) / reference to thick wall (of left ventricle) ;	**max (3)**

Question Number	Answer	Mark
4(a)	**Causation:** when a change in one variable is responsible for a change in another variable / eq ; **Correlation:** (relationship between two variables such that) a change in one of the variables is reflected by a change in the other variable / eq ;	**(2)**

Question Number	Answer	Mark
4(b)(i)	1. {no relationship / little difference} between ethnic group and cholesterol level / eq ; 2. {more / higher percentage of} black and African Americans have {highest / higher} blood pressure than both White and Mexican Americans / eq ;	**(2)**

Question Number	Answer	Mark
4(b)(ii)	not enough people surveyed / eq ;	**(1)**

Question Number	Answer	Mark
4(c)	1. idea that {other variables present / other variables need considering / no information available about other variables} (for a causal relationship) ; 2. named variable (e.g. genetics, ethnic group, mass of individuals, age of individuals, diet, smoking, exercise) ; 3. idea that cholesterol level of 204 mg dm^{-3} may not be significantly lower than 207 mg dm^{-3} ; 4. idea that {30% may not be significantly different from 26% / two values are not very different} ; 5. no information on how many tested / survey not repeated elsewhere ;	**max (3)**

Question Number	Answer	Mark
5(a)	1. both decrease ; 2. mortality rate in men is higher than that in women (throughout time period) / eq ; 3. this difference is greater at the start of the time period than at the end / eq ; 4. a valid comparison made about the difference in the changes e.g. between 1997 and 1998 the rate stays constant for males but falls for women / fall in mortality rate in men is steeper than the fall in women / decrease in mortality rate is greater in men than women / the decrease in men is less uniform than in women ; 5. correct manipulation of figures to quantify any of the above ;	**max (3)**

Question Number	Answer	Mark
5(b)	1. {people more aware of the dangers / better health education} / appropriate named example /eq ; 2. less stress /eq ; 3. {better / more} screening / eq ; 4. better treatments / eq ; 5. more exercise being taken / eq ; 6. changed diet / less obesity / eq ; 7. less alcohol intake / eq ; 8. decrease in smoking ; 9. change in population genetics / eq ;	**max (3)**

Question Number	Answer	Mark
5(c)	1. damage to {endothelial cells / epithelial cells /cells lining artery (wall)} ; 2. reference to inflammatory response ; 3. reference to (accumulation of) white blood cells in (damaged area) ; 4. {build up / eq} of cholesterol (in damaged area) ; 5. reference to build up of {calcium salts / fibrous tissue / fibrin / platelets} ; 6. reference to formation of {atheroma / plaque} ; 7. reference to {loss of elasticity (of artery) / narrowing of lumen} / eq ; 8. idea that this process is self-perpetuating ;	**max (4)**

Question Number	Answer	Mark
6(a)	1. vitamin C content decreases during first {145 / 150} days of storage / eq ; 2. no further decrease in vitamin C content (after first {145 / 150} days) / eq ; 3. idea that decrease is {fastest / greatest} up to 25 days ; 4. rate of decrease decreases with time / eq ; 5. correct manipulation of figures ;	**max (3)**

Question Number	Answer	Mark
6(b)	1. reference to DCPIP ; 2. reference to use of (camu-camu) juice ; 3. idea of titrating juice with DCPIP ; 4. correct reference to colour change e.g. from blue to {colourless / pink} ; 5. use of calibration curve to determine vitamin C concentration / comparison with standard vitamin C ; 6. reference to procedure being repeated at (regular) time intervals e.g. everyday ; 7. reference to replication ; 8. description of one controlled variable ; 9. reference to drawing graph of both sets of results ;	**max (5)**

Question Number	Answer	Mark
7(a)(i)	1. an allele is the {different form / eq} of a gene / eq ; 2. a gene is {a section of DNA / sequence of bases} that codes for a {polypeptide / eq} /occupies a particular {locus / eq} on a chromosome / eq ;	**(2)**

Question Number	Answer	Mark
7(a)(ii)	(allele) that is only expressed (in the phenotype of an organism) if the dominant allele is not present / eq ;	**(1)**

Question Number	Answer	Mark
7(b)(i)	alleles (of a particular gene) are the same / eq ;	**(1)**

Question Number	Answer	Mark
7(b)(ii)	1. Cara and Jasjeet ; 2. {Naveeda / one child} is an albino so must have inherited an albino allele from each parent / eq ; 3. Daniel ; 4. Cara must have inherited the albino allele from her father (as Susan was an unaffected homozygote) / eq ;	**(4)**

Question Number	Answer	Mark
7(c)	1. idea that {fewer albino squirrels survive / squirrels may not breed so frequently} ; 2. a suitable reason given (e.g. more predation, less camouflage) ; 3. idea of {frequency of albinism allele in squirrel (population) is lower / chances of two squirrels with the allele less likely to mate} ; 4. comment on the lower mutation rate (in squirrels) ;	**max (2)**

Question Number	Answer	Mark
7(d)	1. idea that dihydroxyphenyalanine cannot be synthesized from tyrosine if tyrosinase is absent ; 2. idea that precursor of melanin is dihydroxyphenylalanine / melanin only made if DHPA present ; 3. enzymes are (substrate) specific therefore no other enzyme will breakdown tyrosine / tyrosine does not breakdown on its own ;	**max (2)**

Question Number	Answer	Mark
8(a)	1. {movement / diffusion / eq} of water through a partially permeable membrane / eq ; 2. from a region with more free water to a region with less free water / down water concentration gradient / eq ;	**(2)**

Question Number	Answer	Mark
8(b)(i)	1. due to high uptake of more water / eq ; 2. as higher water concentration outside potato / eq ; 3. idea of largest difference in concentrations of solutions ;	**(3)**

Question Number		Mark
8(b)(ii)	**EITHER** 1. {mass increased / positive change} at 0.6 and {mass decreased / negative change} at 0.8 (mol dm^{-3}) ; 2. idea that concentration is closer to 0.8 than 0.6 mol dm^{-3} as the decrease in mass is greater than the increase in mass – 0.11 is closer to zero than + 0.31 ; 3. idea of no net movement of water ; **OR** 1. results were plotted onto a graph ; 2. the line crossed the x axis at 0.75 mol dm^{-3} eq ; 3. idea of no net movement of water ;	**max (2)**

Question Number	Answer	Mark
8(c)	**Any two from:** age, {type / variety / genotypes / country of origin / eq}, storage time, growth conditions, part of potato used, damage, sprouting, {storage conditions / temperature / humidity / light / eq} ;;	**(2)**

Question Number	Answer	Mark
8(d)	**Any two from:** potato pieces are not straight, potato widths are different, edges may not be cut straight, rulers are {subjective / analogues}, change in length is small, only measuring changes in one plane ;;	**(2)**