Neap

Trial Examination 2022

HSC Year 12 Biology

Solutions and Marking Guidelines

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SECTION I

Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 1 B **B** is correct. Gene cloning is a technique used to create large numbers of a specific gene to be used in further applications. **A** is incorrect. This process is only carried out in a laboratory and does not occur in nature. **C** is incorrect. In the gene cloning process, all the cloned genes are identical. **D** is incorrect. Gene cloning is a multi-stage process.	Mod 6 Genetic Technologies BIO12–13 Band 2
Question 2 A **A** is correct. Mitosis produces genetically identical cells and meiosis produces genetically unique cells. **B** is incorrect. Mitosis results in diploid cells, which have two sets of chromosomes, and meiosis results in haploid cells, which have one set of chromosomes. **C** is incorrect. Mitosis is involved in asexual reproduction and meiosis is involved in sexual reproduction. **D** is incorrect. Mitosis forms two daughter cells and meiosis forms four daughter cells.	Mod 5 Cell Replication BIO12–12 Band 3
Question 3 D **D** is correct. External fertilisation only occurs in organisms living in a body of water or a very moist environment. **A** is incorrect. External fertilisation is a type of sexual reproduction. **B** is incorrect. Offspring usually receive very little parental care. **C** is incorrect. Terrestrial animals use internal fertilisation.	Mod 5 Reproduction BIO12–12 Band 2
Question 4 C **C** is correct. The inheritance type is autosomal (not located on the sex chromosome) as no sex-linkage is shown in the diagram. For the trait to be expressed, both (recessive) alleles coding for the trait must be present. This gives a ratio of 25% of the offspring being healthy, 50% of the offspring being carriers and 25% of the offspring being sick. **A** is incorrect. There is no 'mixing' of traits. **B** is incorrect. Only one gene is expressed. **D** is incorrect. The trait is not expressed when two different genes are present.	Mod 5 Reproduction BIO12–6, 12–12 Band 5

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Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 5 A **A** is correct. Cells can be divided into prokaryotic and eukaryotic types. Prokaryotes have no nucleus and a single loop of DNA. Eukaryotes have a nucleus and non-looped DNA. **B** is incorrect. This option shows a eukaryotic cell. **C** and **D** are incorrect. These options show a mix of eukaryotic and prokaryotic cells.	Mod 5 DNA and Polypeptide Synthesis BIO12–12 Band 3
Question 6 C **C** is correct. Chromosomal mutations involve a change in the number of chromosomes in the genome. For example, individuals with Down syndrome have a total of 47 chromosomes in their genome because they have three copies of chromosome 21. **A** is incorrect. Chromosomal mutations involve large-scale changes. **B** is incorrect. Chromosomal mutations do not affect specific gene sequences; they act on part of or the whole chromosome. **D** is incorrect. This option describes point mutation.	Mod 6 Mutation BIO12–13 Band 3
Question 7 B **B** is correct. In inversion, a segment of the chromosome is removed and then replaced in reverse order. Mutation *P* is an example of inversion, as the positions of 'Pro' and 'Thr' have been reversed. In duplication, a part of the chromosome is copied, resulting in duplicate segments. Mutation *Q* is an example of duplication, as 'Phe' has been copied and inserted. In deletion, a portion of a chromosome is lost. Mutation *R* is an example of deletion, as 'Phe' has been removed. In translocation, segments of two chromosomes are exchanged. Mutation *S* is an example of translocation, as 'Glu' (which does not occur in the original sequence and assumedly comes from another chromosome) has replaced 'Pro'. **A**, **C** and **D** are incorrect. These options do not correctly identify each type of mutation.	Mod 6 Biotechnology Mod 6 Genetic Technologies BIO12–6, 12–13 Band 6
Question 8 D **D** is correct. Around 98% of genes are non-coding genes. Originally called 'junk' DNA, research has shown that, although non-coding DNA doesn't code for proteins, it does have some other important functions. **A**, **B** and **C** are incorrect. mRNA, autosomal DNA and mitochondrial DNA all make up a much smaller part of the human genome, do not lie between genes and have well-known functions.	Mod 6 Mutation BIO12–12 Band 3

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Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 9 C **C** is correct. Gene flow is the transfer of genetic variation from one population to another. **A** is incorrect. This option refers to mutations. **B** is incorrect. Gene flow introduces new genetic material to a population and existing genetic material can be exported; thus, the genetic mix may be changed. **D** is incorrect. Gene flow can also occur in plants because pollen and seeds may be carried great distances by animals or wind.	Mod 6 Mutation BIO12–13 Band 3
Question 10 B **B** is correct. The slight difference in the nucleotide can help to differentiate between individuals in the population. **A** and **C** are incorrect. This particular change in genotype is stated to have no effect on phenotype (physical characteristics). **D** is incorrect. The overall shape of the organism's DNA would be the same (double helix) even if there were a change in nucleotides.	Mod 5 Genetic Variation BIO12–6, 12–13 Band 5
Question 11 B **B** is correct. Viruses are DNA or RNA that are made up of chains of nucleotides, and prions are proteins that are made up of amino acid chains. **A** is incorrect. Both viruses and prions are non-cellular. **C** is incorrect. Viruses do not fold to give a specific three-dimensional structure, but prions do. **D** is incorrect. Prions and viruses are both microscopic.	Mod 7 Causes of Infectious Disease BIO12–7 Band 3
Question 12 B **B** is correct. Quadrant 1 contains people at the intersection of poor general health and high exposure to the pathogen; thus, they will be the most susceptible to getting symptoms of the disease. Quadrant 4 contains people at the intersection of good general health and low exposure to the pathogen; thus, they will be the least susceptible to getting symptoms of the disease. **A**, **C** and **D** are incorrect. People in quadrant 2 are in good general health and are, therefore, not the most or the least likely to develop symptoms of the disease, despite their high exposure to the pathogen. People in quadrant 3 are in poor general health but have low exposure to the pathogen; therefore, they are neither the most nor the least likely to develop symptoms.	Mod 7 Prevention, Treatment and Control BIO12–7 Band 2

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Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 13 **A** **A** is correct. Koch's postulates link only one pathogen that is grown in culture to the presence of disease. **B** and **C** are incorrect. These statements are part of Koch's postulates, not the purpose of the postulates. **D** is incorrect. This statement refers to Pasteur's experiments, not Koch's.	Mod 7 Causes of Infectious Disease BIO12–7 Band 3
Question 14 **D** **D** is correct. The infected family members have isolated themselves from the rest of their family. **A** and **B** are incorrect. From the information given in the question, there has been no public health campaign or vaccination. **C** is incorrect. Hygiene involves cleaning.	Mod 7 Prevention, Treatment and Control BIO12–7 Band 2
Question 15 **A** **A** is correct. Helper T cells act on both T and B cells, as shown in the diagram. **B** is incorrect. Cytotoxic T cells release chemicals that destroy infected cells. **C** is incorrect. Suppressor T cells work to slow down the immune response once the pathogen has been defeated. **D** is incorrect. Memory T cells are stored for subsequent infections.	Mod 7 Immunity BIO12–8 Band 4
Question 16 **D** **D** is correct. Haemophilia is transferred between generations on the X chromosome, so it is genetic. **A** is incorrect. Haemophilia is not related in any way to cancer. **B** is incorrect. There is no environmental agent that causes haemophilia. **C** is incorrect. Haemophilia is not linked to any nutritional factor.	Mod 8 Causes and Effects BIO12–8 Band 1
Question 17 **A** **A** is correct. Prevalence is a measurement of the proportion of people who have a disease at one point in time. **B** is incorrect. Prevalence does not relate to the rate that people develop a disease. **C** is incorrect. Mortality, not prevalence, relates to death. **D** is incorrect. Hospitalisation does not indicate how many people have a disease.	Mod 8 Epidemiology BIO12–8 Band 3

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Answer and explanation	Syllabus content, outcomes and targeted performance bands
Question 18 **A** **A** is correct. The educational programs are about preventing obesity. The incidence of diabetes is linked to obesity, but is not the focus of the programs. **B** is incorrect. The programs do not relate to a cure for type 2 diabetes. **C** is incorrect. Children may become more aware of the treatments for diabetes as a result of the programs, but this is not the purpose of the programs. **D** is incorrect. There is no evidence that the programs discuss discrimination.	Mod 8 Prevention BIO12–8 Band 2
Question 19 **C** **C** is correct. The cochlear implant is a technology used to treat some forms of hearing loss by replacing the damaged cochlear in the ear. **A, B** and **D** are incorrect. These organs do not have a cochlear.	Mod 8 Technologies and Disorders BIO12–8 Band 1
Question 20 **C** **C** is correct. This option gives the correct pathway of a negative feedback loop. The pathway begins with a receptor, communicates via nerves and ends with an effector (muscles). **A** is incorrect. This option begins with the correct step of a feedback loop (III), but then moves straight to the response (IV). **B** is incorrect. This option begins with detection via a receptor (III), followed by communication via nerves (I and II) and ends with a response by the effector (IV). **D** is incorrect. In this option, the brain is interpreting a signal before the stimulus has been detected, which is incorrect.	Mod 8 Homeostasis BIO12–8 Band 4

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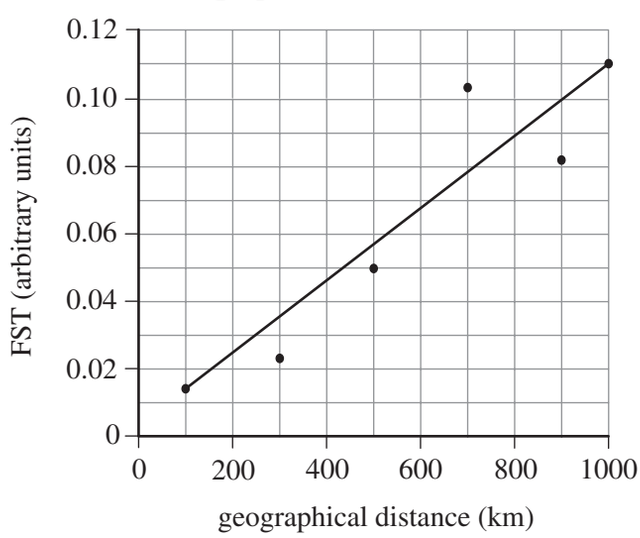
SECTION II

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 21	
(a) A somatic cell is any cell in the body that is not a gamete (sex cell) or a stem cell. *(It is diploid, meaning it has two sets of chromosomes.)* A germ cell is a gamete. This is a cell that can unite with a cell from the opposite sex to form a new individual. *(It is haploid, meaning it has one set of chromosomes.)*	Mod 6 Mutation BIO12–12 Band 2 • Defines somatic cells AND germ cells . . . . . .2 • Defines somatic cells OR germ cells 1
(b) Somatic mutations occur in body (somatic) cells and germ-line mutations occur in gametes (sex cells). Somatic mutations are not inherited by the offspring. In germ-line mutations, the offspring inherit the mutation and carry it on to future generations. Somatic mutations affect only the tissue derived from the mutated body cell, while germ-line mutations affect every cell of the organism.	Mod 6 Mutation BIO12–13 Band 4 • Provides a clear outline of at least TWO differences . . . . . .2 • Provides some relevant information 1
Question 22	
(a) **Geographical distance versus FST**  	Mod 5 Genetic Variation Mod 5 Inheritance Patterns in a Population BIO12–4 Band 5 • Uses appropriate scales. AND • Plots the points. AND • Draws a line of best fit. AND • Labels axes AND includes an appropriate title . . . . . .4 • Any THREE of above points . . . . . .3 • Any TWO of above points . . . . . .2 • Provides some relevant information 1

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	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(b)	The FST value for 700 km is the outlier. To check if this outlier is accurate, more readings could be taken at or near this value to see how closely they resemble the initial piece of data. *Note: Consequential on answer to **Question 22(a)**.*	Mod 5 Genetic Variation Mod 5 Inheritance Patterns in a Population BIO12–5 Band 3 • Identifies the outlier. AND • Provides ONE appropriate method for checking accuracy 1
(c)	The further from the central point, the greater the genetic difference. *Note: Consequential on answer to **Question 22(a)**.*	Mod 5 Genetic Variation Mod 5 Inheritance Patterns in a Population BIO12–6 Band 3 • Provides an appropriate conclusion 1
Question 23		
(a)	*For example:* Progesterone has many functions. It keeps the placenta functioning properly and maintains the uterine lining. It also facilitates thyroid hormone action, regulates blood sugar levels, stimulates the growth of mammary glands and reduces the contractability of the uterus. Progesterone levels normally rise during the first 36–38 weeks of the pregnancy, then fall towards the birth date.	Mod 5 Reproduction BIO12–12 Band 5 • Provides an outline of the hormone's role. AND • Provide an outline of how the hormone's level changes . . . . . .3 --- • Provides some details of the hormone's role. AND • Provides some details of how the hormone's level changes . . . . . .2 --- • Provides some relevant information 1

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Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(b) *For example, any three of the following rows of characteristics:*	Mod 5 Reproduction BIO12–12 Band 4 • Draws an appropriate table. AND • Provides at least THREE appropriate comparisons . . . . . .3 • Draws an appropriate table. AND • Provides TWO appropriate comparisons . . . . . .2 • Draws a table. AND • Provides some comparisons. 1

	Sexual reproduction	*Asexual reproduction*	
		Vegetative propagation	*Spores*
Parents	two	one	one
New plants	made from seeds	made from original plant, not seeds	needs one parent
Offspring	genetically different	genetically identical	genetically identical
External agent	external agent (such as wind or insects) needed to spread gametes	no external agent needed	external agent (such as wind or insects) needed to spread gametes
Spread of genetic material	large amount of genetic material (such as pollen) ‘wasted’ by being spread into the environment and not resulting in offspring	no wholesale spreading of genetic material	large amount of genetic material (such as pollen) ‘wasted’ by being spread into the environment and not resulting in offspring

Note: Accept responses that list the characteristics of vegetative propagation or spores for asexual reproduction.

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Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 24	
(a) Step *X* is transcription and step *Y* is translation. Transcription occurs in the nucleus. An enzyme (RNA polymerase) 'unzips' a length of DNA and one strand of this DNA acts a template. RNA nucleotides link with this strand to form complementary pairs. Messenger RNA (mRNA) is formed, which detaches and leaves the nucleus. The original DNA template rejoins itself. Transcription occurs in the cytoplasm. The mRNA moves to ribosomes in the cytoplasm and is attached to transfer RNA (tRNA). Amino acids are deposited until a chain of amino acids (polypeptide) forms. The polypeptides move into the cytoplasm and travel to the Golgi apparatus for assembly. *Note: Responses may also refer to initiation, elongation or termination.*	Mod 5 DNA and Polypeptide Synthesis BIO12–6, 12–12 Band 5 • Identifies BOTH steps. AND • Outlines what happens in BOTH stages . . . . . .5–6 • Identifies BOTH steps. AND • Gives some details of BOTH stages . . . . . 3–4 • Identifies BOTH steps. AND • Provides some relevant information 1–2
(b) Polypeptides are long chains of amino acids held together by peptide bonds. The proteins are complex macromolecules made from one or more of the polypeptide chains and control many of the activities of an organism's cells. Antibodies and enzymes are examples of essential proteins. Without antibodies, the body's immune system would be less effective. Without enzymes, many chemical processes would not occur. *Note: Without polypeptide synthesis, genetic material could not be replicated and the proteins that enable bodies to function could not be fabricated. Responses could also mention hormones, messengers or toxins.*	Mod 5 DNA and Polypeptide Synthesis BIO12–12 Band 5 • Provides the major features of polypeptides. AND • Makes an assessment . . . . . .3 • Provides some features of polypeptides. AND • Makes an assessment . . . . . .2 • Provides some relevant information 1

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Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 25	
Biodiversity refers to every living thing, including plants, bacteria, animals, and humans, in a particular area. Biotechnology is an area of biology that uses organisms and living systems to develop or make products and has been used for thousands of years. A major component of biotechnology that is currently used is genetically modified plants, the first of which (a type of insect-resistant cotton) was introduced into Australian agriculture by CSIRO in 1996. A particular gene is introduced into a plant with the aim of increasing crop yield in agriculture. Techniques have been used to develop plants that are not affected by glyphosate (such as the herbicide 'RoundUp') and also to produce their own chemical insecticides. Cotton is a common genetically modified crop. Over 90% of cotton planted in Australia is a genetically modified variety. These tend to be self-pollinating varieties, which leads to less genetic variation. The technology needed to grow this type of transgenic cotton efficiently leads to large scale farms, which are monocultures. The heavy use of glyphosate will also reduce biodiversity by killing all non-cotton plants in the area. The initial effect of introducing genetically modified plants is increased biodiversity as new varieties are introduced. However, in the long term, these genetically modified varieties are likely to displace traditional varieties and lead to less biodiversity.	Mod 6 Biotechnology Mod 6 Genetic Technologies BIO12–6, 12–13 Band 6 • Provides a definition of biodiversity AND biotechnology. AND • Provides an appropriate example. AND • Describes how this biotechnology works. AND • Describes the effects of this biotechnology on biodiversity. AND • Provides an evaluation. . . . . .5 • Any FOUR of the above points . . . .4 • Any THREE of the above points . . .3 • Any TWO of the above points. . . . .2 • Provides some relevant information 1

Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 26	
The gene pool of an interbreeding population of the same species is the sum of all the different genes in that population. A large gene pool has a great deal of genetic diversity, so it can cope better with changes in the environment. A small gene pool makes populations or species less likely to survive when faced with some type of stress. Genetic drift is a change in allelic frequencies in a population due to a haphazard selection of certain genes. It can occur because of random events. These changes in alleles can change the total number of alleles in a population. Genetic drift occurs in both small and large populations; however, its effects are likely to be more significant in small populations because the fewer organisms there are, the greater the chances of losing alleles. As a result, the size of the gene pool decreases. Gene flow introduces new organisms into a population. This increases the number of different alleles – and, hence, the size of the gene pool – as organisms interbreed. Migration from a population can decrease the number of alleles. This effect is also much more significant in small populations when compared to large populations. Both genetic drift and gene flow can affect the size of a gene pool, but other factors also must be considered. For example, mutation and natural selection also have a major effect.	Mod 6 Mutation BIO12–6 Band 6 • Outlines the meaning of a gene pool. AND • Describes genetic drift. AND • Describes effects of genetic drift on the gene pool. AND • Describes gene flow. AND • Describes effects of gene flow on the gene pool. AND • Provides an evaluation . . . . . .6 • Any FIVE of the above points . . . . .5 • Any FOUR of the above points . . . .4 • Any THREE of the above points . . .3 • Any TWO of the above points . . . . .2 • Provides some relevant information 1

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Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 27	
Whole organism cloning creates a copy of an entire organism. Scientists have used genetic technologies to clone animals, the most famous being Dolly the sheep (1996), which was the first animal to be cloned from an adult cell. Not all attempts at whole organism cloning are successful – it took nearly 300 attempts successfully clone Dolly. Despite more recent research developments, reproductive cloning remains highly inefficient. It takes a significant amount of time and resources to clone even a single animal. In addition, cloned animals are not as healthy as animals that have been born using sexual reproduction (and usually do not live as long). There may be eventual benefits to cloning, but current technology needs to be vastly improved before it is widespread. *Note: Responses may also include plant cloning.*	Mod 6 Genetic Technologies BIO12–6, 12–12 Bands 4–5 • Defines whole organism cloning. AND • Describes the effectiveness of whole organism cloning. AND • Refers to ONE appropriate example . . . . . .4 • Describes the effectiveness of whole organism cloning. AND • Refers to ONE appropriate example . . . . . .3 • Describes briefly the effectiveness of whole organism cloning. AND • Refers to ONE appropriate example . . . . . .2 • Provides some relevant information 1
Question 28	
On the second exposure to a pathogen, the individual has stored memory B and T cells (produced from initial exposure). This results in a very fast response to the pathogen. The cells multiply quickly to produce antibodies or cytotoxic chemicals that destroy the pathogen before it has time to invade tissue and cause the corresponding disease.	Mod 7 Immunity BIO12–14 Band 3 • Identifies that the individual has stored memory B and T cells. AND • Explains how the memory B and T cells deliver a response. AND • Explains that the memory B and T cells destroy the pathogen before symptoms appear . . . . . .3 • Any TWO of the above points. . . . .2 • Any ONE of the above points 1

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Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 29	
(a) A fever is a sign that the body's immune system is responding to an infection because fever results in elevated body temperature, which inhibits bacterial reproduction. This is part of the second line of defence and will help the patient overcome the infection.	Mod 7 Prevention Treatment and Control BIO12–14 Band 3 • States that fever is part of the body's immune response AND fever is a mechanism to fight the infection . . . . . .2 • States that fever is part of the body's immune response. OR • Provides some relevant information 1
(b) Antibiotics should not be prescribed, as the pathogen is a virus and antibiotics do not work on viruses. Antibiotics are only used for bacterial infections.	Mod 7 Prevention Treatment and Control BIO12–14 Band 2 • States that the doctor should not prescribe antibiotics. AND • States that antibiotics do not destroy viruses 1
(c) Historically, antibiotics have been very successful in the treatment of bacterial infections. During World War II, many soldiers' lives were saved due to the use of antibiotics to treat wounds. The rate of death from infection in World War II was, consequently, much lower than World War I. The overuse of antibiotics in the present day has resulted in the evolution of antibiotic-resistant bacteria. Some patients have died from these antibiotic-resistant bacteria, particularly in hospitals where outbreaks are more common. Outbreaks in the general population have been controlled.	Mod 7 Prevention Treatment and Control BIO12–14 Bands 4–5 • Assesses the use of antibiotics historically. AND • Assesses the use of antibiotics in the present day. AND • Supports the assessment with evidence . . . . . .3 • Assesses the use of antibiotics with limited evidence . . . . . .2 • Assesses the use of antibiotics. OR • Provides some evidence that could support an assessment of the use of antibiotics 1

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Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
Question 30	
(a) Bacteria can form spores that are dormant for many years, such as those frozen in the reindeer carcass. When the spores find the host in optimal conditions, such as the reindeer carcass being thawed, they return to their active form.	Mod 7 Causes of Infectious Disease BIO12–14 Band 3 • Identifies spores as the form of the pathogen. AND • Describes the features of the pathogen being dormant and then active in optimal conditions. . .3 • Identifies spores as the form of the pathogen. AND • Describes the pathogen being dormant. . . . . .2 • Provides some relevant information 1
(b) *For example:* The increased thawing of the permafrost may reveal more organisms that have bacterial spores. The release of these spores could result in many more diseases spreading through human populations. *Note: Responses could refer to other environmental factors and transmissions of disease, such as the expansion of tropical regions and the increase of mosquitoes as vectors of disease.*	Mod 7 Causes of Infectious Disease BIO12–14 Band 4 • Links a feature of global warming to the transmission of disease . . . . . .2 • Describes a feature of global warming that has the potential to result in the transmission of disease 1
Question 31	
(a) Chemicals such as histamines and prostaglandins were released. The chemicals caused blood vessels to dilate, allowing more blood to flow to the site, resulting in redness. The chemicals caused the tissue to become swollen and hot as the lymph moves from the blood vessels into the interstitial tissue, carrying white blood cells.	Mod 7 Responses to Pathogens BIO12–14 Band 3 • Describes TWO features of the nonspecific immune response in relation to tissue . . . . . .2 • Describes ONE feature of the nonspecific immune response in relation to tissue. 1

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Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(b) Increased blood flow brought phagocytes to the site to carry out phagocytosis, destroying the pathogen. Increased temperature at the site limits the growth of pathogens. *Note: Consequential on answer to **Question 31(a)**.*	Mod 7 Responses to Pathogens BIO12–14 Bands 4–5 • Explains the role of BOTH changes from part (a) in destroying the pathogen . . . . . .2 • Explains the role of ONE change from part (a) in destroying the pathogen 1
(c) In the first few hours, the nonspecific immune response was triggered quickly, causing inflammation. Over the first 1–2 days, the pathogen would trigger the specific immune response. This takes longer but targets the specific pathogen.	Mod 7 Responses to Pathogens BIO12–14 Band 3 • Provides the difference between the second and third lines of defence . . . . . .2 • Provides the difference without linking it to the first or second lines of defence 1
Question 32	
For example: As the students aged 10 to 14 would include both primary school and secondary school students, the epidemiologist should ensure they have an equal distribution of students across primary and secondary school.	Mod 8 Epidemiology BIO12–15 Band 4 • Describes ONE way to avoid bias . . . . . .2 • States ONE form of bias 1
Question 33	
(a) *Any one of:* • removing toxins from blood • regulating the concentration of salt in the body • regulating water balance	Mod 8 Technologies and Disorders BIO12–15 Band 2 • Identifies ONE function of the kidney 1
(b) The technology is called dialysis. Dialysis involves passing blood from a patient through a membrane filter where toxins are removed and then returning the blood to the patient. It also regulates the balance of salts and fluids. Dialysis is conducted using sterile techniques to reduce the risk of infection.	Mod 8 Technologies and Disorders BIO12–15 Band 3 • Names AND describes the technology . . . . . .3 • Names AND states ONE feature of the technology . . . . . .2 • Names the technology 1

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Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(c) *For example:* Dialysis is time-consuming. Treatment must be done every day and a session takes several hours, limiting the dialysis patient's activities.	Mod 8 Technologies and Disorders BIO12–15 Band 4 • Describes ONE disadvantage . . . . .2 • Provides ONE detail of ONE disadvantage. 1
Question 34	
(a) The central nervous system interprets the stimulus and determines a response.	Mod 8 Homeostasis BIO12–16 Band 3 • States that the relevant tissue interprets and determines a response 1
(b) The effector will release a hormone.	Mod 8 Homeostasis BIO12–16 Band 2 • Provides the correct response 1
(c) *For example:* If the stimulus is an increase in temperature in the environment, thermoreceptors detect the change and send a message to the central nervous system. The central nervous system determines that vasodilation must occur to allow heat to be released. This is achieved by releasing a hormone that delivers corticotropin from a gland.	Mod 8 Homeostasis BIO12–16 Band 4 • Describes changes from the stimulus to the response. AND • Clearly shows the negative response to achieve homeostasis . . .3 • Describes changes from the stimulus to the response. . . . . .2 • States ONE part of the response . . .1
Question 35	
(a) The information provided by the friend is secondary as it is not supported by any first-hand investigation. It cannot be validated on its own, so it is of little value unless further research is done.	Mod 8 Causes and Effects BIO12–2, 12–15 Band 3 • Makes a statement evaluating the information AND supports it with evidence . . . . . .2 • Makes a statement evaluating the information 1

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	Sample answer	Syllabus content, outcomes, targeted performance bands and marking guide
(b)	*For example:* The student could conduct a survey of their class to find whether there is a relationship between the amount of soft drink consumed by each student and the number of dental fillings they have.	Mod 8 Causes and Effects BIO12–2, 12–14, 12–15 Band 4 • Describes a method of how the student could collect primary data . . . . . .2 • Provides some details on how the student could collect primary data 1
(c)	*For example:* The student could present the data as a scatterplot, with 'the amount of soft drink consumed' on the *x*-axis and 'the number of dental fillings' on the *y*-axis. This would be an effective communication strategy as each student is represented and it would show whether a relationship between the two variables were present, which is the purpose of the investigation. *Note: Responses may differ depending on the strategy selected in part (b).*	Mod 8 Causes and Effects BIO12–4, 12–6, 12–7, 12–15 Bands 4–5 • States ONE method to present results. AND • Justifies the method with supporting evidence . . . . . .3 • States ONE method to present results. AND • Justifies the method . . . . . .2 • States ONE method to present results 1

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