VCE BIOLOGY 2008

YEAR 12 TRIAL EXAM UNIT 4

Time allowed: 90 minutes
Total marks: 75

Multiple Choice Questions
Short Answer Questions

An Answer Sheet is provided for Section A.
Answer all questions in Section B in the space provided.

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Student Name....…….....

VCE Biology 2008 Year 12 Trial Exam Unit 4

Student Answer Sheet

Instructions for completing test. Use only a 2B pencil. If you make a mistake erase and enter the correct answer. Marks will not be deducted for incorrect answers.

Write your answers to the Short Answer Section in the space provided directly below the question. There are 25 Multiple Choice questions to be answered by circling the correct letter in the table below.

Question 1	A	B	C	D	*Question 2*	A	B	C	D
Question 3	A	B	C	D	*Question 4*	A	B	C	D
Question 5	A	B	C	D	*Question 6*	A	B	C	D
Question 7	A	B	C	D	*Question 8*	A	B	C	D
Question 9	A	B	C	D	*Question 10*	A	B	C	D
Question 11	A	B	C	D	*Question 12*	A	B	C	D
Question 13	A	B	C	D	*Question 14*	A	B	C	D
Question 15	A	B	C	D	*Question 16*	A	B	C	D
Question 17	A	B	C	D	*Question 18*	A	B	C	D
Question 19	A	B	C	D	*Question 20*	A	B	C	D
Question 21	A	B	C	D	*Question 22*	A	B	C	D
Question 23	A	B	C	D	*Question 24*	A	B	C	D
Question 25	A	B	C	D					

VCE Biology 2008 Year 12 Trial Exam Unit 4

Multiple Choice Questions – Section A

Use the following information to answer Questions 1 and 2.
Figure 1 below is a pedigree that shows a pattern of inheritance for a particular genetic disorder which is not common in humans. Shaded individuals have the genetic disorder.

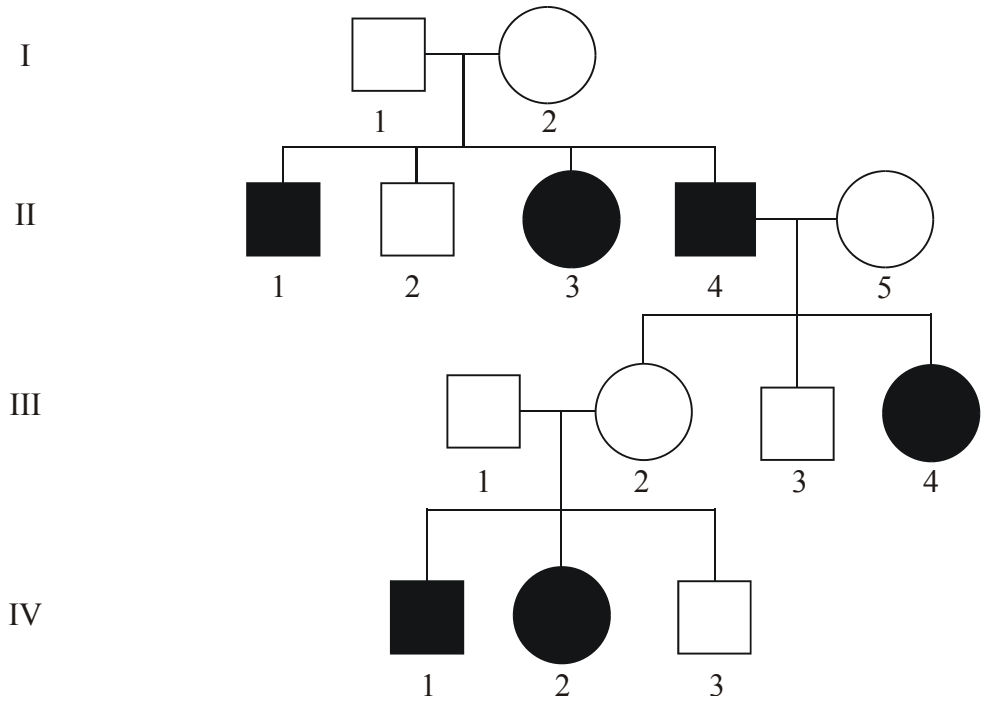


Figure 1

Question 1
Which one of the following best describes the pattern of inheritance in **Figure 1** above?
A. Sex-linked dominant.
B. Autosomal dominant.
C. Autosomal recessive.
D. Sex- linked recessive.

Question 2
If individual IV-3 who is heterozygous has children with a female partner whose father had the genetic disorder but she doesn't, what is the chance that any one of their children could have the genetic disorder?
A. 1.
B. ½.
C. ¼.
D. 0.

Question 3
Chromosomes are composed of a substance called chromatin. Chromatin chemically consists mainly of
A. nucleotides, sugars and phosphates.
B. DNA and histones.
C. sugars, DNA and RNA.
D. chromatids and RNA.

Question 4
Gregory Mendel described the physical traits in pea plants as being controlled by two "factors". What term is now used to describe the factors Mendel identified?
A. Chromosomes.
B. Hybrids.
C. Genes.
D. Homologous.

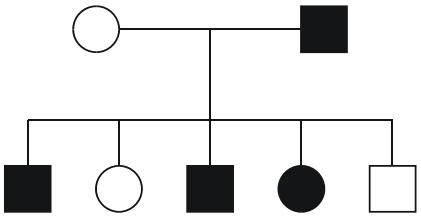
Question 5
In foxes red (R) coat colour is dominant to silver-grey (r) coat colour. What phenotypic ratio would one expect in the offspring of a cross between a male fox that is heterozygous for coat colour and a silver-grey female fox?
A. 1 red coat fox : 1 silver-grey fox.
B. 3 red coat foxes : 1 silver-grey fox.
C. 1 red coat fox : 2 silver-grey foxes.
D. Cannot be determined from the information provided.

Question 6
In some cattle a gene that controls coat colour has two alleles. When homozygous black coat cattle are crossed with homozygous white coat cattle all offspring have a third phenotype for coat colour which is grey. From the information provided one could conclude that for this gene
A. the black allele dominates the white allele.
B. this is an example of co-dominance.
C. this is an example of complete dominance.
D. this is an example of incomplete dominance.

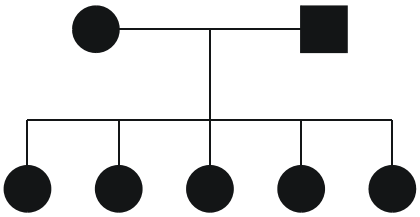
Question 7
In protein synthesis which one of the following shows the correct sequence of events?
A. DNA, ribosome, m-RNA, polypeptide, t-RNA.
B. m-RNA, DNA, polypeptide, ribosome, t-RNA.
C. DNA, m-RNA, ribosome, t-RNA, polypeptide.
D. ribosome, DNA, m-RNA, t-RNA, polypeptide.

Question 8
Which one of the following pedigrees illustrates that non-tasters for the substance phenyl thiocarbamide (PTC) are recessive? Shaded individuals are non-tasters.

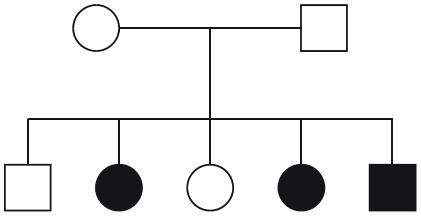
A.



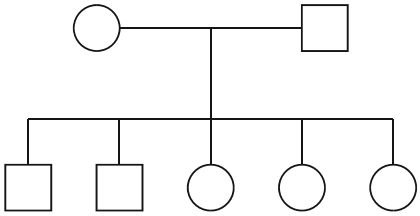
B.



C.



D.



Question 9
Which one of the following statements best describes a major function of meiosis in sexually reproducing organisms? Meiotic divisions

A. are needed so that homologous chromosomes will always separate during cell division.
B. enable the number of chromosomes to remain constant between generations.
C. mean that gametes always have exactly half the diploid number of chromosomes.
D. in humans always result in the production of four sperm and four egg cells.

Figure 2 below is a diagrammatic representation of a pair of homologous chromosomes during meiosis showing three genes in a particular individual.

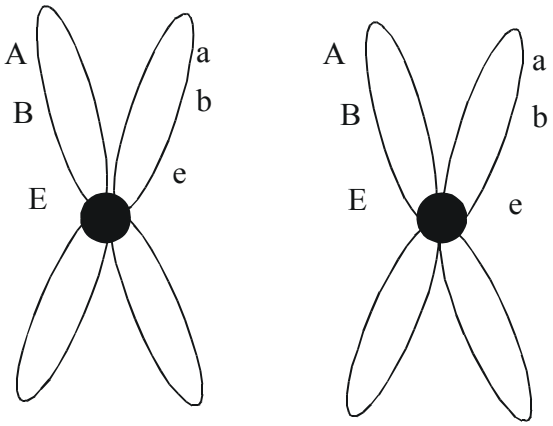


Figure 2

Question 10
From the information provided in **Figure 2** one could conclude that for these three genes this individual is
A. homozygous dominant for all three genes.
B. homozygous recessive for all three genes.
C. heterozygous for all three genes.
D. heterozygous for locus A and E but not B.

Use the following information to answer Questions 11 and 12.
Figure 3 below is a family pedigree showing the inheritance of phenylketonuria (PKU), which is a metabolic disorder that if left undetected in the individual leads to mental retardation. Individuals with this disorder are shaded and lack the enzyme which converts the amino acid phenylalanine to the amino acid tyrosine.

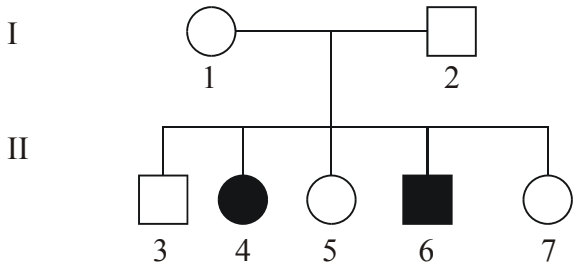


Figure 3

Question 11
In normal individuals, the enzyme which converts phenylalanine to tyrosine is formed
A. during transcription.
B. after translation.
C. by messenger RNA.
D. at transformation.

Question 12
From the information presented in **Figure 3** above one can conclude that individual
A. I-2 might have phenylketonuria.
B. II-4 has the dominant gene for phenylketonuria.
C. II-5 is definitely heterozygous.
D. I-1 has contributed an allele for phenylketonuria to individual II-6.

Question 13
Electrophoresis is a technique used to separate DNA fragments according to their
A. nucleotide sequence.
B. gene structure.
C. size.
D. charge.

Question 14
Which one of the following pairs is an example of a point mutation?
A. Inversion and duplication of chromosomes.
B. Non-disjunction and trisomy.
C. Deletion and substitution.
D. The action of high temperature and radiation on genes.

Question 15
Which one of the following statements is correct with regard to messenger RNA?
A. All codons on messenger RNA code for amino acids.
B. There may be more than one codon on messenger RNA that codes for a particular amino acid.
C. The nucleotide thymine in a codon will match up with its complementary nucleotide adenine in an anticodon.
D. The codons on messenger RNA result in the RNA becoming momentarily double stranded.

Question 16
With the advent of technology which allows for the transfer of genetic material not only within but also between species, which one of the following processes involves just the transfer of the nucleus?
A. Gene therapy.
B. Artificial selection.
C. Cloning.
D. Transgenesis.

Question 17
Which one of the following contributes to variation between members of a particular species that is genetically determined? The
A. linkage of genes on the X and Y chromosomes.
B. availability of enough food and nutrition during the development of an individual.
C. crossing-over that occurs between homologous chromosomes.
D. different habitats that individuals find to escape predators.

Question 18
After scientists formulated a hypothesis they carried out an experiment on how different breeds of cattle might survive in a drier environment due to climate change. The relationship between the hypothesis and the experiment that they carried out is one where the
A. hypothesis should have been formulated after the experiment had been carried out.
B. experiment will prove that the hypothesis was correct.
C. results from the experiment may or may not support the hypothesis.
D. hypothesis that has been formulated is very unlikely to be supported by the results of the experiment.

Question 19
In Central Australia scientists discovered fossils that appeared to have both mammalian and reptilian features. Which one of the following dating methods are the scientists most likely to use to find the age of the fossils? The scientists would use
A. relative dating by comparing them with similar fossils found elsewhere.
B. radioactive isotopes with half lives measured in hundreds of million years.
C. a combination of relative dating and index fossils.
D. carbon-14 dating to determine the amount of carbon present.

Question 20
Structures that are found in two similar looking organisms that have evolved independently of each other with no common ancestor are said to be
A. transitional.
B. analogous.
C. vestigial.
D. the result of a bottleneck in the species.

Question 21
Which one of the following statements best describes how new species could arise?
A. By different species interbreeding over many thousands of years.
B. Through the use of biotechnology and the ability to manipulate genes.
C. Cross-breeding and the development of new breeds under natural conditions.
D. The geographical isolation of populations of the same species over many generations.

Question 22
Mutations can occur in all cells of an organism. From an evolutionary point of view, in which cells of an organism could a mutation have the greatest impact?
A. Muscle cells.
B. Reproductive cells.
C. Skeletal cells.
D. Blood cells.

Question 23
Which one of the following pairs of primates associated with human evolution is the most closely related?
A. Human and chimpanzee.
B. *Homo sapiens* and *Australopithecus afarensis*.
C. Gorilla and human.
D. Chimpanzee and orangutan.

Question 24
The most probable explanation why the fossil record is incomplete is that
A. many sedimentary rocks and their fossil content have been lost due to erosion.
B. scientists are unable to classify some fossils because there are no living organisms similar in structure to them.
C. there was not enough sediment present in the past to form sedimentary rocks and therefore preserve fossils.
D. organisms did not evolve enough hard parts to allow for fossilisation.

Figure 4 below is a cladogram that shows the evolutionary relationship between eight species of monkeys and an ancestral form.

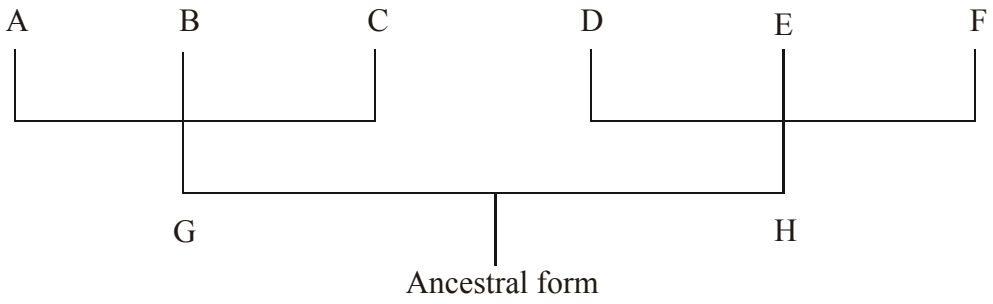


Figure 4

Question 25
From the cladogram in **Figure 4** above one could conclude that this is an example of
A. divergent evolution.
B. adaptive convergence.
C. hybridization.
D. selective breeding.

End of Section A

VCE Biology 2008 Year 12 Trial Exam Unit 4

Short Answer Questions – Section B

Question 1

Figure 5 below is a table which shows the percentage of a particular base found in a piece of DNA.

Bases	Percentage (%)
T	15

Figure 5

a. Complete the table above in **Figure 5** by writing down the full name of the other bases and also calculating the percentage of the other bases found in this particular piece of DNA.

(2 marks)

Figure 6 below is a diagrammatic representation of an important process that occurs within living organisms.

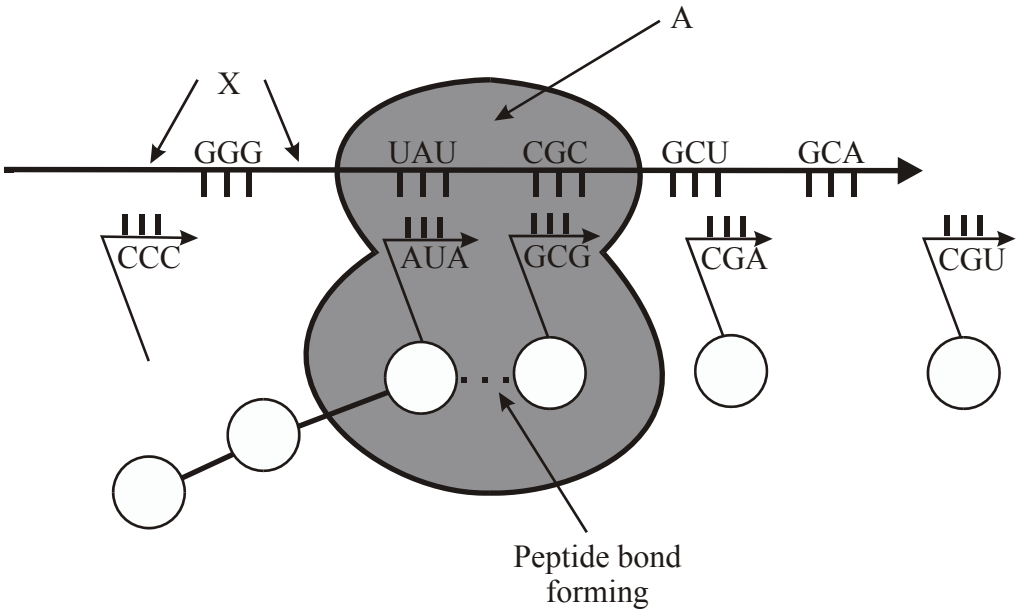


Figure 6

b. What does the structure labeled **A** mainly consist of chemically?

_____

_____

(1 mark)

c. Name the product that is formed at the end of the process represented in **Figure 6?**

_____

(1 mark)

d. Briefly explain why the component labeled **X** in **Figure 6** is smaller in size when it attached to structure **A**, than when it was first made in the nucleus?

_____

_____

_____

_____

_____

(2 marks)

e. What name is given to the DNA strand that results in the component labeled **X** in **Figure 6** being made?

_____

(1 mark)

*Use the table below to answer parts **f** and **g** of **Question 1**.*

m-RNA that code for particular amino acids							
CUU	Leucine	CAU	Histidine	CGU	Arginine	UAU	Tyrosine
CUC	Leucine	CAC	Histidine	CGC	Arginine	UAC	Tyrosine
CUA	Leucine	CAA	Glutamine (gln)	CGA	Arginine	UAA	Stop
CUG	Leucine	CAG	Glutamine (gln)	CGG	Arginine	UAG	Stop
AUU	Isoleucine	ACU	Threonine	AAU	Asparagine	UGU	Cysteine
AUC	Isoleucine	ACC	Threonine	AAC	Asparagine	UGC	Cysteine
AUA	Isoleucine	ACA	Threonine	AAA	Lysine	UGA	Stop
AUG	Methionine	ACG	Threonine	AAG	Lysine	UGG	Tryptophan
GUG	Valine	GCU	Alanine	GAU	Aspartic acid	GGU	Glycine (gly)
GUC	Valine	GCC	Alanine	GAC	Aspartic acid	GGC	Glycine (gly)

A particular section of DNA is made up of the following nucleotide sequence:

-GTATGATTTGCGATGACCCACGAG-

f. Write down in the correct order the sequence of amino acids that can be joined together from the instructions on this particular section of DNA.

_____

_____

_____

(1 mark)

g. Starting on the left hand side of the DNA section mentioned in question **1f** above with the nucleotide G being 1, count to the 15th nucleotide on the DNA molecule which is also G. Then briefly explain what will happen if the 15th nucleotide is changed from G to T or C.

_____

_____

_____

_____

_____

(1 mark)

Total marks = 9 marks

Question 2

The pedigree below in **Figure 7** shows a family with a particular characteristic that is genetically inherited and is only present in individuals that are shaded.

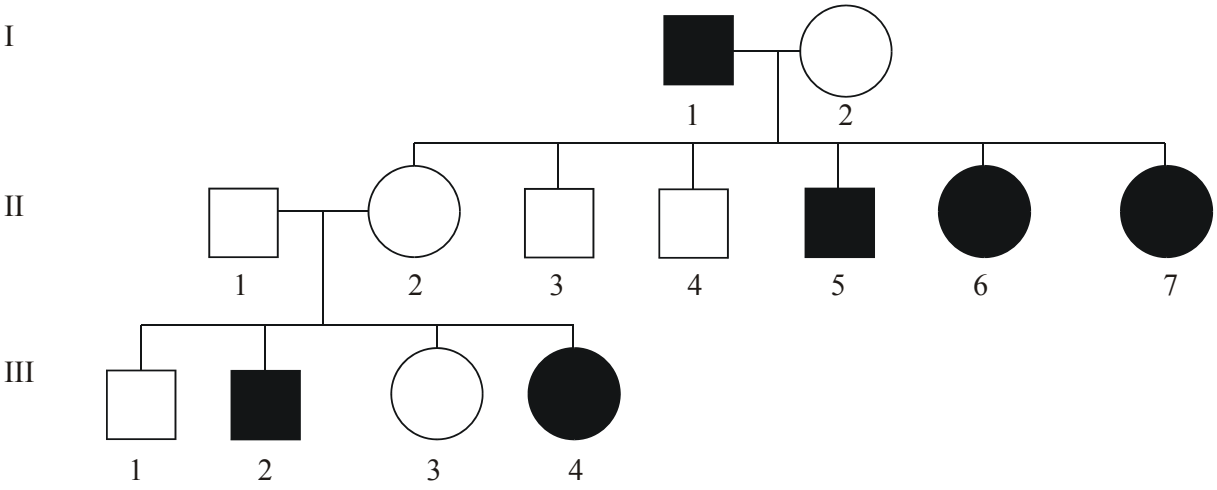


Figure 7

a. What is the probability if individuals II-1 and II-2 have another child that the child will have this particular characteristic.

_____

(1 mark)

b. Explain your answer to **2a** above, and also indicate how this characteristic is most likely inherited.

_____

_____

_____

_____

_____

_____

(2 marks)

The characteristic in this pedigree that is inherited and shows up in individuals that are shaded in **Figure 7** is the inability to synthesise a certain enzyme.

c. A student looking at the pedigree suggested that if individual II-4 has a female partner with the characteristic, any children they might have would always have the ability to make this enzyme. Explain whether you agree or disagree with the student.

_____

_____

_____

_____

_____

(2 marks)

d. How would you explain the findings of geneticists, who after studying this characteristic discovered that homozygous individuals without the characteristic produced twice the amount of enzyme that heterozygous individuals did?

_____

_____

_____

_____

_____

(1 mark)

e. Using the letters **A** and/or **a** write down the correct genotype/s for individual III-3.

_____

_____

(1 mark)

Total = 7 marks

Question 3

Over the years new techniques have been developed in genetics, one of which is used to separate DNA according to its length. DNA profiling is also used in a number of areas like criminal investigations, animal breeding programs and paternity disputes.

a. Name the technique that is used to separate DNA fragments of different lengths.

_____

(1 mark)

b. Briefly explain why DNA fragments of different lengths are placed at the negative end of an electric field in the technique used in **3a** above.

_____

_____

_____

_____

(1 mark)

Figure 8 below shows the DNA profile results of a paternity dispute.

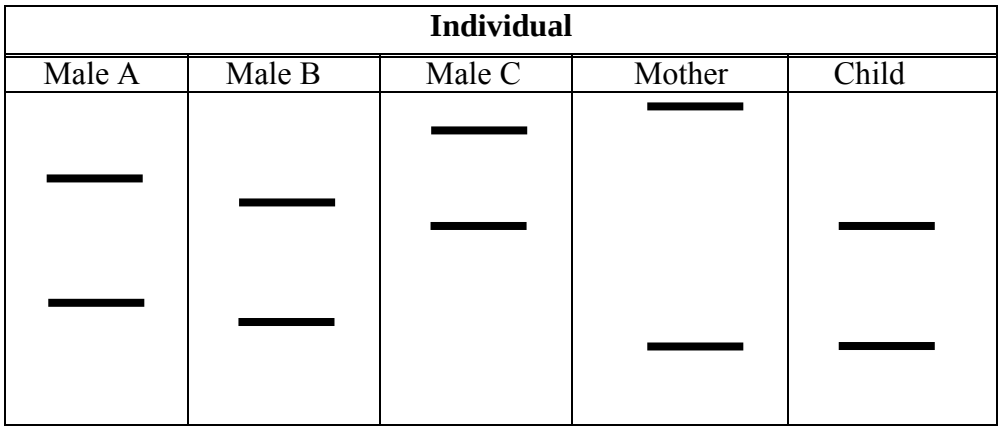


Figure 8

c. From the results in **Figure 8** above, briefly explain who is the most likely father of the child.

_____

_____

_____

_____

(1 mark)

d. When DNA molecules are cut a "sticky end" can be the result. Explain how DNA molecules can be cut and how this can result in "sticky ends"?

_____

_____

_____

_____

_____

_____

(2 marks)

e. Explain if it is possible to make a double stranded DNA molecule from a single strand of RNA.

_____

_____

_____

_____

_____

_____

(2 marks)

Total marks = 7 marks

Question 4

While it is possible to isolate DNA and cut DNA into various sized fragments as well as separating these fragments, scientists also have to single out, from a large number of DNA fragments that have identical lengths, a particular or specific DNA fragment.

a. Explain how scientists can find a specific DNA fragment amongst many DNA fragments of identical lengths?

_____

_____

_____

_____

_____

_____

_____

(2 marks)

b. Briefly explain the role that vectors play in genetic engineering.

_____

_____

_____

_____

(1 mark)

Sometimes only a single piece of DNA is found at a crime scene by forensic scientists.

c. Explain what technique forensic scientists can use to amplify this single piece of DNA?

_____

_____

_____

_____

_____

_____

_____

(2 marks)

Total marks = 5 marks

Question 5

Fossils provide paleontologists with evidence to support the theory of evolution. Many fossils are found in sedimentary rocks and not many fossils that are found are all in one piece.

a. Briefly explain why many fossils are found in sedimentary rocks?

_____

_____

_____

_____

_____

(1 mark)

b. Explain why fossils regarded as transitional or intermediate forms are important in our understanding of how organisms might have evolved?

_____

_____

_____

_____

_____

_____

_____

(2 marks)

When paleontologists examine fossils that are a hundred million years old in a particular location they can get a very good idea how the fossils might have lived and what the fossils might have eaten.

c. Explain why paleontologists looking at fossils that are a hundred million years old can be reasonably sure how the fossils lived and what they might have once eaten, even though there are no longer any living specimens.

_____

_____

_____

_____

_____

_____

_____

(2 marks)

d. If carbon-14 has a half-life of 5500 years and a fossil specimen has ⅛ of the original carbon-14 present, calculate the age of the fossil?

_____

_____

(1 mark)

e. Briefly explain why is it difficult for paleontologists to decide if two similar looking fossils belong to the same species?

_____

_____

_____

_____

_____

(1 mark)

Total marks = 7 marks

Question 6

As more and more fossils from our ancestral past are found, a better and clearer picture is starting to emerge on how humans could have evolved over the last 5 million years.

a. Name the scientific term that is used to describe how humans walk and is used to distinguish us from apes.

_____

(1 mark)

Humans and apes have many homologous structures in common.

b. Briefly explain the meaning of the term homologous structures.

_____

_____

_____

_____

(1 mark)

c. Explain the changes that occurred in the hind limbs and forelimbs during the evolution of *Homo sapiens*.

_____

_____

_____

_____

_____

_____

(2 marks)

d. What term is used to describe the type of evolution associated with *Homo sapiens* that has been very rapid and diverse over the last 5000 years?

_____

(1 mark)

Total marks = 5 marks

Question 7
The cladogram in **Figure 9** below shows the possible relationship between a number of species in the cat family.

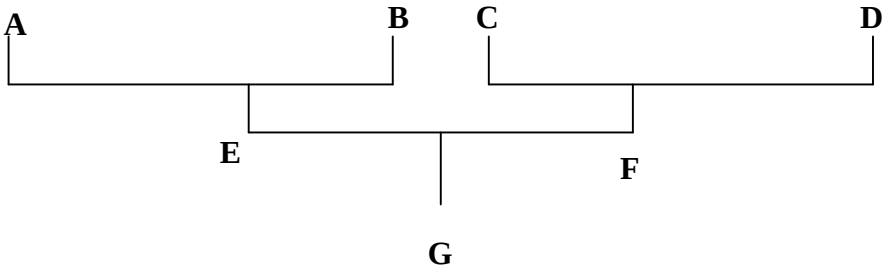


Figure 9

a. Which species in the above cladogram most likely evolved first?

_____

(1 mark)

b. Explain how species **A** and **B** could have possibly evolved from species **E**.

_____

_____

_____

_____

_____

_____

_____

(2 marks)

c. What term is used to describe how species **A** and **B** possibly evolved from species **E** in question **7a** above?

_____

(1 mark)

d. How does genetic variation mainly arise in asexually reproducing species? Explain.

_____

_____

_____

_____

_____

_____

(2 marks)

Total marks = 6 marks

Question 8

Charles Darwin and Alfred Wallace were the first to put forward the idea that natural selection was the mechanism by which species could evolve. Today there is a great deal of evidence to support the theory of evolution. As well, there is evidence to suggest that some species evolve faster than other species.

a. Explain why evolutionary changes in some species like bacteria can occur quite quickly, but evolutionary changes in species like mammals is a good deal slower.

_____

_____

_____

_____

_____

_____

_____

(2 marks)

b. What are scientists referring to when evolutionary changes within small populations are due to random changes in allele frequencies and not necessarily natural selection?

_____

(1 mark)

c. Briefly explain what scientists mean if they say "this particular species is extinct".

_____

_____

_____

_____

(1 mark)

Total marks = 4 marks

End of Section B

End of Trial Exam

Suggested Answers VCE Biology 2008 Year 12 Trial Exam Unit 4

Multiple Choice Answers – Section A

1C	2C	3B	4C	5A	6D	7C
8C	9B	10C	11B	12D	13C	14C
15B	16C	17C	18C	19B	20B	21D
22B	23A	24A	25A			

Short Answer (Answers) – Section B

Question 1

a.

Bases	Percentage (%)
T	15
Adenine	15
Guanine	35
Cytosine	35

a. (**1 mark)** if all bases are correct and (**1 mark)** if all percentages are correct.

b. Ribosomal RNA and protein **(1 mark)**. Both have to be correct to get 1 mark.

c. Polypeptide or protein **(1 mark)**.

d. When the DNA is first being transcribed the messenger RNA is referred to as pre-mRNA and has nucleotides complimentary to both introns and exons in DNA **(1 mark)**. However, before messenger RNA leaves the nucleus the nucleotides complimentary to DNA introns in the pre-mRNA are removed with the result that the mRNA (component X) attached to a ribosome (structure A) is smaller than the original mRNA (pre-mRNA) in the nucleus **(1 mark)**.

e. Template strand or transcribing strand **(1 mark)**.

f. Histidine-threonine-lysine-arginine-tyrosine-tryptophan-valine-leucine **(1 mark)**. All amino acids have to be correct and in the correct order to get 1 mark.

g. If the 15th nucleotide G on the original DNA is replaced by T or C, this means that the codon that is formed on the mRNA will either be UAA or UAC respectively. Since both these codons are stop codons it means that no amino acids will be joined after tyrosine joins to arginine and the synthesis of the polypeptide will not continue **(1 mark)**.

Question 2

a. ¼ or 25% **(1 mark)**.

b. Since individuals II-1and II-2 do not have the characteristic and two of their children (male and female) do, then it is most likely inherited as an autosomal recessive **(1 mark)**.

Parental genotype: both heterozygous individuals, therefore each will produce two different types of gametes. This means there are four possible combinations in the genotype of the offspring with three of the offspring having the dominant allele. Therefore the probability that another child will have the characteristic is ¼ **(1 mark)**.

c. Disagree with student **(1 mark)**. Although individual II-4 can produce the enzyme we know from the information provided in the pedigree that he must be heterozygous since his father has this characteristic. Knowing that his female partner has the characteristic means there is a 50% chance that any children they have will be unable to make this enzyme **(1 mark)**.

d. Individuals who are heterozygous only have the information to make the enzyme on one chromosome, while homozygous dominant individuals have this information on both chromosomes. Therefore, as a result homozygous dominant individuals can produce twice the amount of the enzyme that a heterozygous individual can **(1 mark)**.

e. AA or Aa **(1 mark)**.

Question 3

a. Gel Electrophoresis **(1 mark)**.

b. DNA fragments are placed at the negative end because DNA itself is negatively charged. When DNA is subjected to an electric current it results in any DNA fragments present moving from the negative end to the positive end; with the shorter fragments of DNA moving further than the longer fragments in a given period of time. **(1 mark)**.

c. Male C most likely is the father of the child. The results from DNA profiling clearly show that male C is the only male who shares a particular band of DNA with the child. The mother shares the other DNA band **(1 mark)**.

d. Sticky ends are the result of restriction endonuclease enzymes cutting one strand of a double stranded DNA molecule at one point; but then cutting the second strand at a different point that is not directly opposite the point on the first strand **(1 mark)**. Therefore there are exposed nucleotide bases at each end of the two DNA strands and the overhang between these two strands of DNA are called "sticky ends"**(1 mark)**.

e. It is possible to make a double stranded DNA molecule from a single strand of RNA. Firstly, a complementary strand of DNA from a single strand of RNA is made with the use of the enzyme reverse transcriptase. The resultant single strand of DNA is known as copy DNA and it is separated from the original RNA **(1 mark)**. The single stranded copy DNA then makes a complementary DNA strand and becomes a double stranded DNA molecule **(1 mark)**.

Question 4

a. Scientists can find a specific DNA fragment amongst many DNA fragments of identical length by using a gene probe. Firstly, the DNA fragments of identical lengths are denatured into two separate single strands **(1 mark)**.The gene probe is a single strand of DNA that has a radioactive or fluorescent marker. Also, its base sequence must be complementary to the specific DNA fragment that it will pair up with. The specific DNA fragment is then located after the gene probe binds with it because of the radioactive or fluorescent marker on the gene probe **(1 mark)**.

b. The role vectors play in genetic engineering is that they are used as a means of transporting DNA from one species into the cells of a different species. Both plasmids and viruses can have foreign DNA inserted into them and then used to transport this foreign DNA into the cells of a different species **(1 mark)**.

c. When scientists find only a single piece of DNA and they want to amplify this DNA they use the technique known as polymerase chain reaction **(1 mark)**. During this technique the original DNA is heated and separated into two strands. Short DNA primers are attached to opposite ends of each single strand of DNA, and these are used as starting points for the enzyme DNA polymerase to make copies of each DNA strand. This process can be repeated many times to make multiple copies of the original single piece of DNA **(1 mark)**.

Question 5

a. Many fossils are found in sedimentary rocks because when an organism dies and is quickly covered by sediments such as silt and sand, the organism does not decompose quickly and/or is not eaten by scavengers. Therefore the organism or part of it is more likely to be preserved as a fossil, as the layers of silt and sand are compressed and form sedimentary rocks **(1 mark)**.

b. If species evolve from pre-existing species then one would also expect to find fossils that show features that are common to two different major groups of organisms such as birds and reptiles. If birds evolved from reptiles then one would expect in the fossil record to find fossils that show both reptilian and bird features **(1 mark)**. These transitional or intermediate fossils provide evidence that show how species belonging to one major group could have evolved into a different major group of species **(1 mark)**.

c. Paleontologists can be reasonably sure how fossils might have lived by comparing these fossils to similar present day living organisms. From these comparisons the assumption that these fossils had similar requirements in order to survive as present day organisms do can be made **(1 mark)**. Similarly with what type of food these fossils might have once eaten. Paleontologists would look at their teeth and jaw structure and compare their teeth and jaw structure with similar living organisms, whose diets and food intake is well known **(1 mark)**.

d. 16500 years old **(1 mark)**.

e. It is difficult for paleontologists to decide if similar looking fossils belong to the same species because no interbreeding tests can be done to see if fertile offspring result. Paleontologists can only decide by looking at the structures on the fossils. These structural features are not necessarily a definitive indicator on whether two similar looking fossils are members of the same species or not **(1 mark)**.

Question 6

a. Bipedalism **(1 mark)**.

b. Homologous structures are structures that appear in different species which have the same basic structure (pentadactyl limb) but which may perform a different function. This suggests that species with homologous structures all descended from a common ancestor **(1 mark)**.

c. As *Homo sapiens* evolved from our ape-like ancestors the forelimbs became shorter relative to the hind limbs, and there was the development of an opposable thumb which allows humans to have a precision grip **(1 mark)**. The hind limbs increased in length relative to the forelimbs, and the hind limbs also became straighter as a result of *Homo sapiens* developing an upright stance and using only their hind limbs for walking and getting around **(1 mark)**.

d. Cultural **(1 mark)**.

Question 7

a. Species G **(1 mark)**.

b. Species **A** and **B** could have evolved from species **E** in the past when two populations of species **E** were separated or isolated by a particular geographic barrier. This would have prevented gene flow or interbreeding between the two populations **(1 mark)**. Each population would have then developed their own particular characteristics due to different mutations and selection pressures on the two populations. These genetic differences would eventually have been large enough for the two populations to be regarded as different species **A** and **B (1 mark)**.

c. Speciation **(1 mark)**.

d. In asexually reproducing species genetic variation arises mainly due to mutations **(1 mark)**. Since this form of reproduction arises without the process of meiosis and therefore no formation of gametes, there is also no crossing-over or independent assortment of chromosomes which contribute to genetic variation. Furthermore there is no fertilization, so genetic variation in asexually reproducing species is due mainly to mutations **(1 mark)**.

Question 8

a. Evolutionary change in species like bacteria can occur quite quickly because they reproduce very rapidly and any favourable traits can spread through the species quickly. For example, resistance to antibiotics **(1 mark)**. Mammals on the other hand do not reproduce quickly and generation time, that is, the time for offspring to reach sexual maturity, can be measured in years. Therefore favourable traits will also spread through the species but this will take a good deal longer, with the result that evolutionary change will proceed much more slowly **(1 mark)**.

b. Genetic drift **(1 mark)**.

c. When a particular species becomes extinct it means that there are no longer any individuals or populations left either in the wild or in captivity, and no new offspring can be produced. The genetic lineage of the species ends and there are no future descendents of that particular species **(1 mark)**.

End of Suggested Answers