



eduresourceza.com



Penryn College

Grade 12 Life Sciences Preliminary Examination

August 2020

Paper I Answer Booklet

Exam #:

Class: Yellow / Green

There are 12 pages in this Answer Booklet.

Please write your examination number and circle your class in the spaces provided above.

QUESTION 1

- 1.1 Select the term in **COLUMN B** that best matches a description in **COLUMN A**. Write the letter of the term in the corresponding space provided between the brackets. Each letter may be used only once.

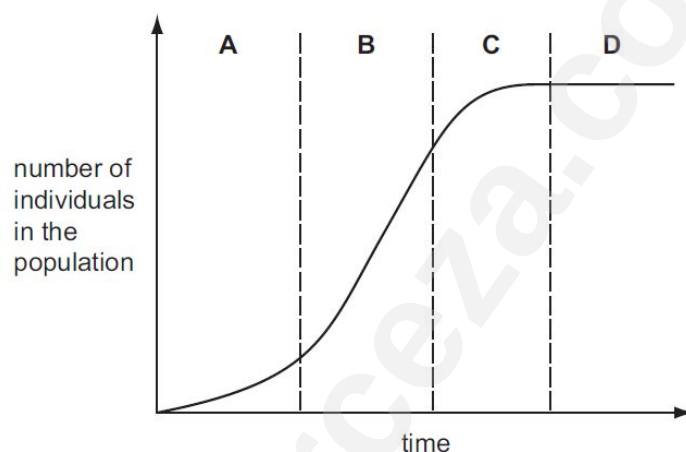
		COLUMN A		COLUMN B
[]	1.1.1	Chromosomes of similar size and structure.	A	<i>Homo erectus</i>
[]	1.1.2	An example of infertile hybrid offspring.	B	Colour-blindness
[]	1.1.3	An individual having a pair of homologous chromosomes, both with a recessive characteristic.	C	Locus
[]	1.1.4	A technique used to make multiple copies of a DNA segment	D	Allele
[]	1.1.5	A position that an organism occupies in the food chain	E	Homozygous
[]	1.1.6	The first <i>Homo</i> species to have migrated out of Africa.	F	Stratification
[]	1.1.7	Bacteria and fungi	G	Trophic level
[]	1.1.8	A specific position on a chromosome where a certain gene is located.	H	Homologous
[]	1.1.9	The inability to perceive certain colours due to a gene mutation.	I	<i>Homo neanderthalensis</i>
[]	1.1.10	Layering in a forest ecosystem.	J	Mule
			K	Polymerase Chain Reaction
			L	Decomposers
			M	Cloning

[10]

1.2 Ten multiple choice questions are given below. Choose the most correct option for each question and write the letter of your choice in the space provided in the table below.

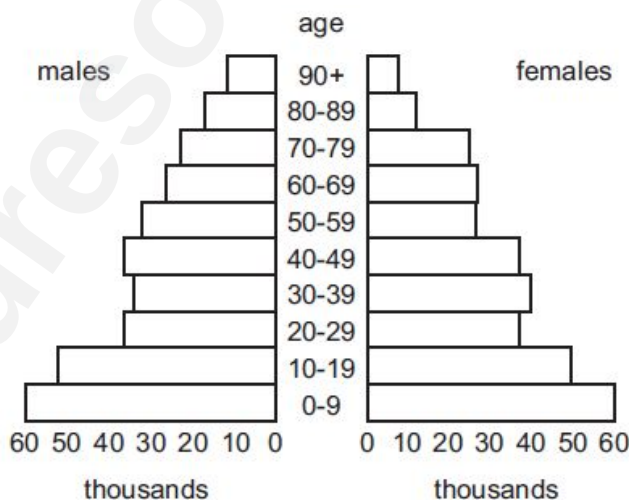
Question	1.2.1	1.2.2	1.2.3	1.2.4	1.2.5	1.2.6	1.2.7	1.2.8	1.2.9	1.2.10
Answer										

1.2.1 Which letter represents the lag phase in the population graph shown?



(1)

1.2.2 The diagram shows a population pyramid for a city.

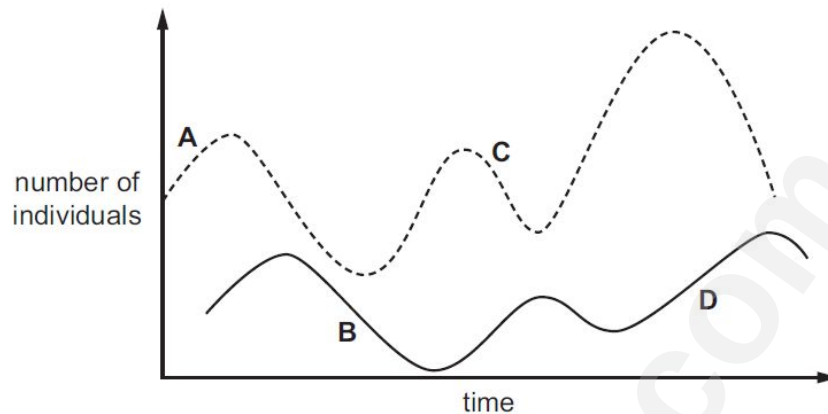


Which feature of the population is shown in the diagram?

- A A quarter or the population is aged above 70.
- B There are more females over 80 than males over 80.
- C There is a low birth rate.
- D The greater proportion of the population is aged below 40.

(1)

- 1.2.3 The graph shows the changes in the populations of predator and prey over a period of time. Which point on the graph shows a decrease in predator population?



(1)

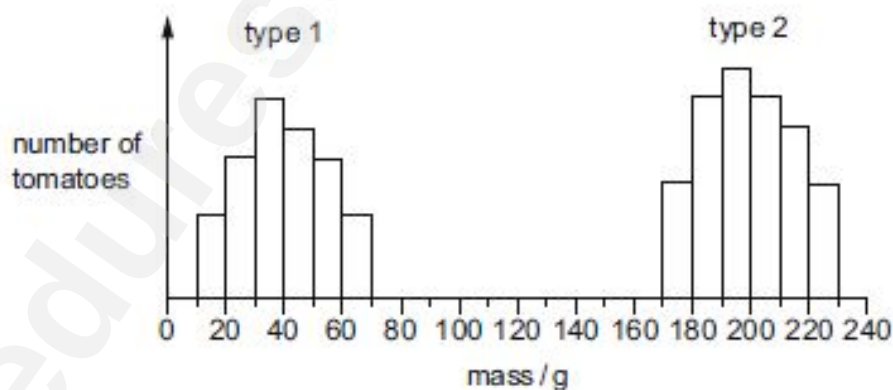
- 1.2.4 A female fruit fly with short wings mates with a male with long wings. All of the offspring are long-winged. Two of these offspring mate with each other.

What percentage of their offspring will have long wings?

- A 25 %
- B 50 %
- C 75 %
- D 100 %

(2)

- 1.2.5 The graph shows the masses of two different types of tomatoes.



What can be concluded from the graph?

- A Genes do not affect the mass of tomatoes.
- B Type 2 tomatoes show discontinuous variation.
- C Type 2 tomatoes are sometimes smaller than type 1 tomatoes.
- D Type 1 tomatoes show continuous variation.

(2)

1.2.6 Which is an example of genetic engineering?

- A only breeding from crop plants that are resistant to insect pests
 - B altering the DNA in crop plants so they are resistant to herbicides
 - C production of insulin in the pancreas
 - D using yeast to produce ethanol for biofuels
- (1)

1.2.7 Which statement about the sex chromosomes is correct?

- A Men and women can inherit characteristics from genes carried on the X chromosome.
 - B Men and women can inherit characteristics from genes carried on the Y chromosome.
 - C Only men can inherit characteristics from genes carried on the X chromosome.
 - D Only women can inherit characteristics from genes carried on the Y chromosome.
- (1)

1.2.8 Gene flow is best defined as..

- A the transmission of genetic information from the cytoplasm to the nucleus
 - B the transmission of alleles from parents to offspring
 - C the movement of genes from one chromosome to another
 - D the spread of alleles through a population over many generations
- (1)

1.2.9 The following conditions are proposed as being most favourable for fossil formation:

- (i) organisms should have a hard skeleton or shell
- (ii) micro-organisms must be present
- (iii) the dead body must be covered by sediment fairly quickly
- (iv) little or no oxygen must be present

Which of the following combinations is correct?

- A (i), (ii) and (iii)
 - B (ii), (iii) and (iv)
 - C (i), (iii) and (iv)
 - D (ii) and (iv)
- (1)

1.2.10 The wings of experimental fruit flies were clipped short in each generation for fifty generations. The fifty-first generation emerged with normal-length wings. This observation would tend to disprove the idea that evolution is based on...

- A natural selection.
 - B inheritance of acquired characteristics.
 - C survival of the fittest.
 - D inheritance of natural variations.
- (1)

[12]

- 1.3 Trilobites are an extinct group of marine arthropods. Many of their fossils have been discovered. They had a tough exoskeleton and they are thought to be closely related to three other phyla of extinct arthropods, namely helmetids, tegopeltids and naraoids. The tegopeltids and helmetids are the two most closely related phyla and are more closely related to trilobites than to naraoids.

Study Figure 1.1 below, which illustrates the possible evolutionary relationships among phyla, represented by the letters, **M**, **N**, **O** and **P**.

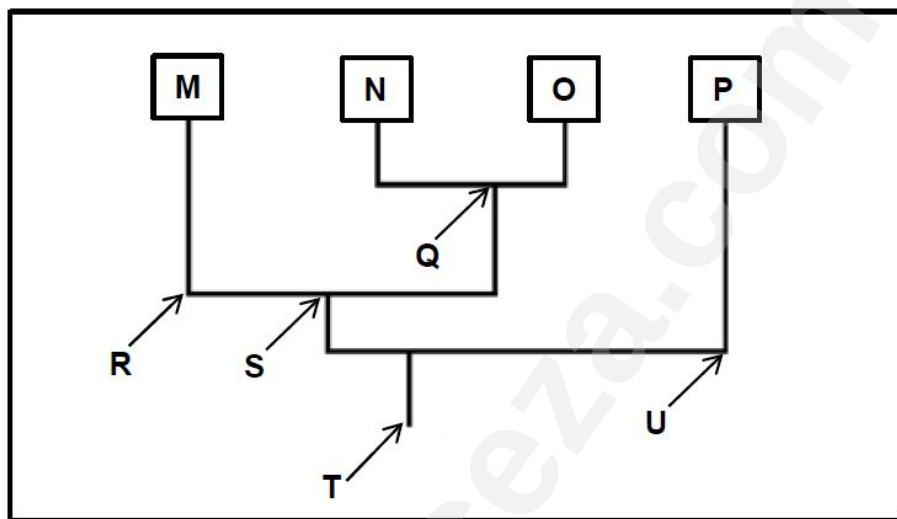


Figure 1.1

- 1.3.1 Name the type of diagram illustrated.

_____ (1)

- 1.3.2 Give only the letter of the most recent common ancestor of phyla:

a. **M** and **O** _____ (1)

b. **M**, **N**, **O** and **P** _____ (1)

- 1.3.3 Which of the extinct arthropods (trilobites, helmetids, tegopeltids and naraoids) are represented by phylum:

a. **M**? _____ (1)

b. **N**? _____ (1)

c. **O**? _____ (1)

d. **P**? _____ (1)

[7]

- 1.4 Figure 1.2 shows the evolutionary connection between various species over the past 50 million years. The species are given numbers rather than names. The species shown are either living or extinct, and may have reached “**dead-end**” extinction. Study the diagram and answer the questions that follow. Use the numbers to name species in the question.

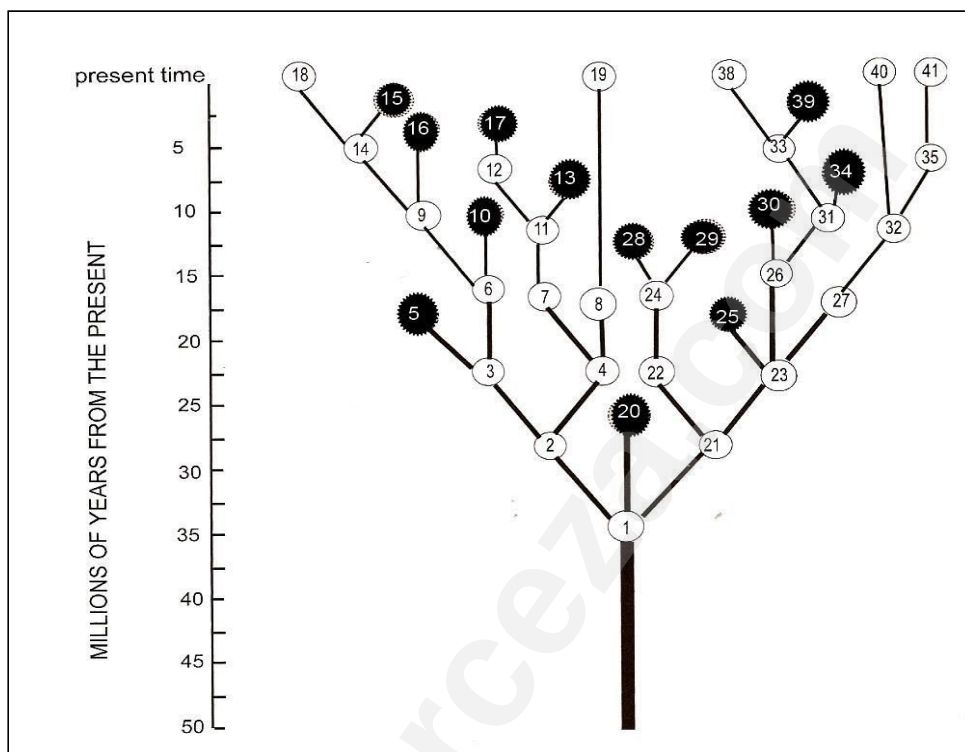


Figure 1.2

- 1.4.1 What does the dark shaped circles indicate on Figure 1.2?

(1)

- 1.4.2 Which two living species are most closely related?

(2)

- 1.4.3 Which species could be called a “living fossil”? Explain your answer.

(2)

- 1.4.4 Is species 14 alive or extinct?

(1)

[6]

- 1.5 Three populations of butterflies, **A**, **B** and **C** live separately on three oceanic islands. The butterflies on Island 2 and Island 3 originated from Island 1.

The islands experience strong prevailing winds from the north-west throughout the year.

Populations **A** and **B** can interbreed and produce fertile offspring. Population **B** can mate with Population **C**, but the offspring are infertile. Mating does not occur between Populations **A** and **C** at all.

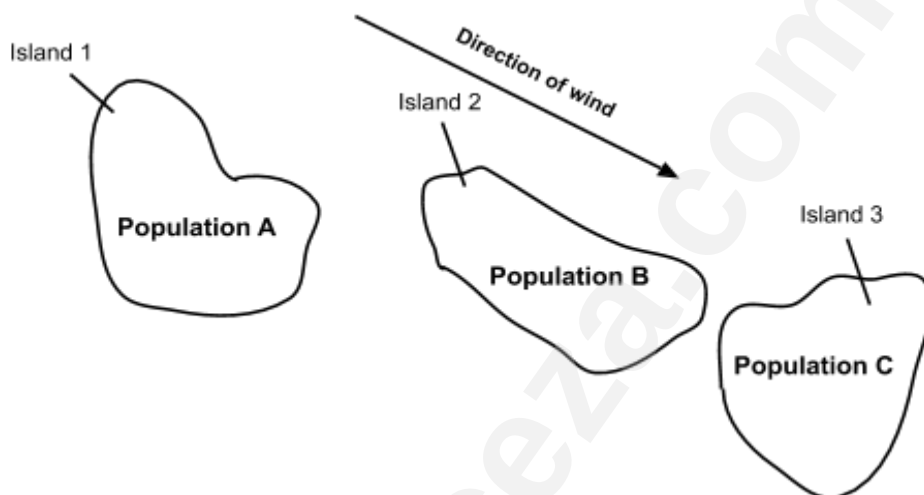


Figure 1.3: Three populations of butterflies living on different islands

Adapted from Advanced Biology, M Kent, 2000

- 1.5.1 How many species are represented by the three populations?

(1)

- 1.5.2 Explain your answer to Question 1.5.1.

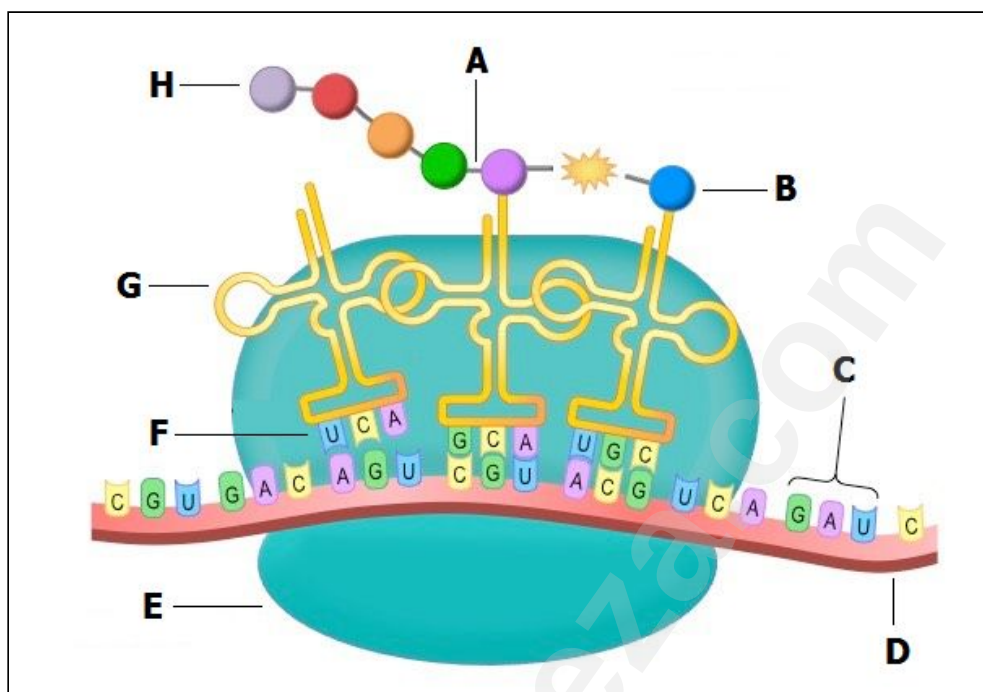
(2)

- 1.5.3 Name the type of mechanism that is being displayed in Figure 1.3 and explain how it took place.

(5)

[8]

- 1.6 Figure 1.4 shows a process that takes place inside of a cell. Use the image and your own knowledge to answer the questions that follow.



Source: Bioninja - topic 2/molecular biology

Figure 1.4

- 1.6.1 Identify the process shown in Fig. 1.4.

(1)

- 1.6.2 Provide the correct labels for the following structures:

A:

C:

D:

E:

H:

(5)

- 1.6.3 In the space below, write out the correct sequence for the first 9 nucleotide bases of the ORIGINAL DNA strand. (Starting from the left hand side of the strand)

--

(3)

- 1.6.4 The table below shows the tRNA anticodons for four amino acids. Use the information to determine which one of the amino acids shown below, will be coded for by the first 9 nucleotides of the mRNA in the diagram.

Amino Acid	Anticodon
Asparagine	UUA
Glutamic acid	CUU
Proline	GGA
Serine	UCA

Amino acid: _____

(1)

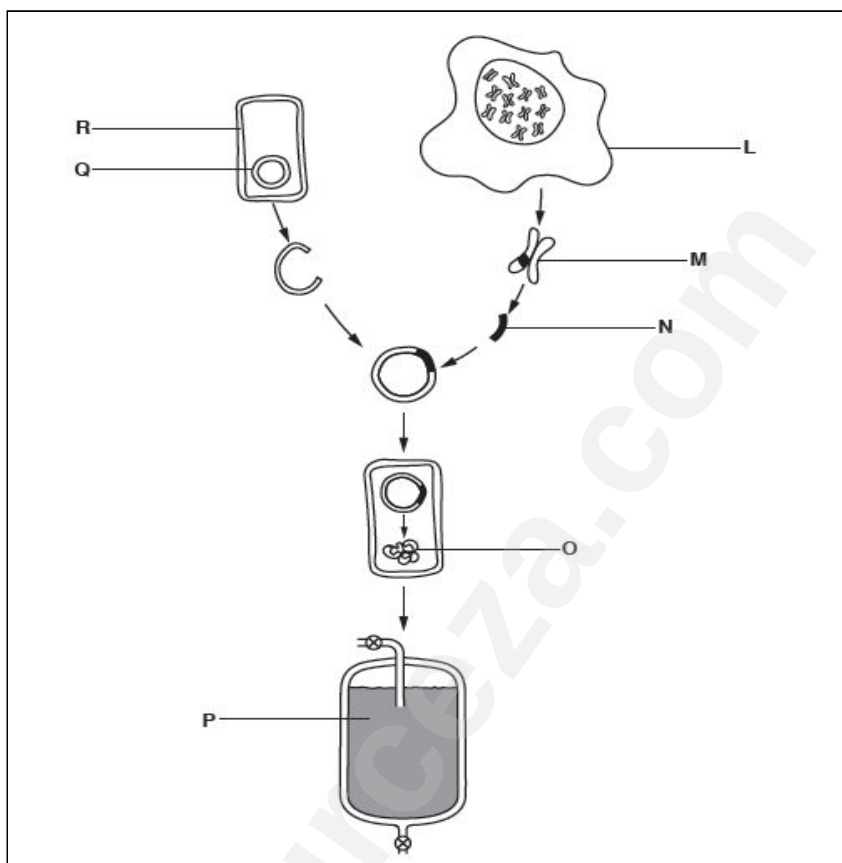
- 1.6.5 Complete the following table by comparing the differences between the two processes of Protein Synthesis.

Criteria:		
Description of the process.		
Location in the cell where the process takes place.		
Type of RNA involved.		
Products formed.		

(9)

[19]

- 1.7 Figure 1.5 is a flow diagram that shows how Growth hormone can be produced using genetic engineering.



Source: IGCSE Paper 3, Oct/Nov 2015

Figure 1.5

- 1.7.1 Complete the table below by filling in the missing blocks. The table is based on the stages shown in Fig. 1.5. (Row one has been completed for you)

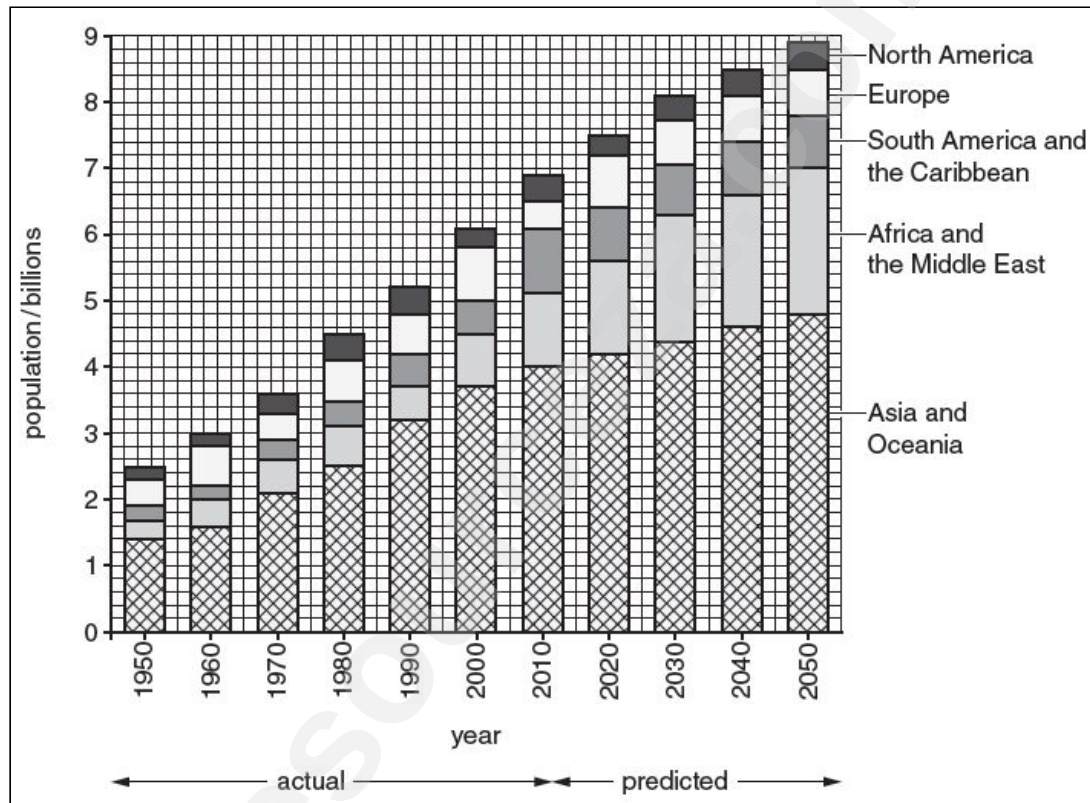
Letter from Fig. 1.5	Name	Description
M	Chromosomes	threads of DNA found in the nucleus
		section of DNA removed from human cell
	plasmid	
		type of cell that is genetically engineered
		specific chain of amino acids coded by the section of DNA removed from the human cell
	fermentor	

(5)

- 1.7.2 Instead of using the cell as shown in Fig. 1.5, yeast can also be used. What would the benefit of using yeast cells, rather than these cells, be?

(1)
[6]

- 1.8 Study the graph in Figure 1.5 which shows world human population by world region from 1950 to 2050.



Source: IGCSE Paper 2, May/June 2015 (0680/21)

Figure 1.5

- 1.8.1 State the world population in 1950.

(1)

- 1.8.2 State the predicted world population in 2050.

(1)

- 1.8.3 Identify the world region which has had the largest population since 1950.

(1)

- 1.8.4 Give ONE reason for the difference in human population size of Africa and the Middle East in comparison to that of Europe.

(2)

- 1.8.5 Calculate the difference in human population size for Europe in 2000 and in 1960. Show your working.

(2)

- 1.8.6 Provide THREE reasons why you think there was such a rapid increase in world population since 1950.

(3)

- 1.8.7 Explain TWO negative impacts that the increasing human population can have on the environment.

(2)

[12]**SECTION A : TOTAL [80] MARKS**