



Province of the
EASTERN CAPE
EDUCATION

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REPUBLIC OF SOUTH AFRICA

CHIEF DIRECTORATE – CURRICULUM MANAGEMENT

**GRADE 12 LEARNER SUPPORT
PROGRAMME**

**REVISION AND REMEDIAL TEACHING
INSTRUMENT:
QUESTIONS AND ANSWERS**

SUBJECT: LIFE SCIENCES – FIRST PAPER

June 2009

This document consists of 16 pages.

Strictly not for test/examination purposes

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

- 1 Answer ALL questions.
- 2 Write ALL the answers in the ANSWER BOOK.
- 3 Start EACH QUESTION on a NEW page.
- 4 Number the answers correctly according to the numbering system used in this question paper.
- 5 If answers are NOT presented according to the instructions of each question, candidates will lose marks.
- 6 All drawings should be done in pencil and labelled in blue or black ink.
- 7 Draw diagrams and flow charts ONLY when requested to do so.
- 8 The diagrams in this question paper may NOT necessarily be drawn to scale.
- 9 Graph paper must not be used.
- 10 Non-programmable calculators, protractors and compasses may be used.
- 11 Write neatly and legibly.

SECTION A**QUESTION 1**

1.1 Various possible options are provided as answers to the following questions. Choose the correct answer and write only the letter (A – D) next to the question number (1.1.1 – 1.1.5) in the ANSWER BOOK, for example 1.1.6 D.

1.1.1 The period during which the embryo develops within the uterus of the mother until the baby is born, is termed ...

- A implantation.
- B gestation.
- C contraception.
- D conception.

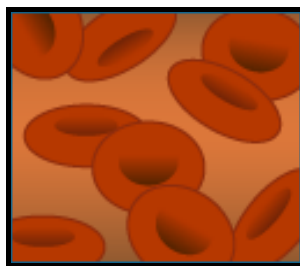
1.1.2 The position of a gene on a chromosome is called ...

- A a locus.
- B an allele.
- C genetics.
- D homologous.

1.1.3 Fraternal twins are formed when ...

- A one egg cell is fertilized by two sperm cells.
- B two egg cells are fertilized at the same time.
- C a zygote separates into two individuals.
- D an unfertilized egg cell divides into two.

1.1.4 Which genetic disease is demonstrated by the cells in diagram B below?

**A****B**

- A Sickle Cell Anaemia
- B Haemophilia
- C Progeria
- D Albinism

1.1.5 The offspring of a homozygous white guinea-pig which was crossed with a homozygous black guinea-pig were all grey. What percentage of the F₂ generation will be grey if two grey guinea-pigs were mated?

- A 75%
- B 50%
- C 34%
- D 5%

(5 x 2) (10)

1.2 Give the correct BIOLOGICAL TERM for each of the following descriptions. Write only the term next to the question number (1.2.1 – 1.2.8) in ANSWER BOOK.

1.2.1 The period when a women stops having menstrual cycles.

1.2.2 A sudden random change in the genetic code of an organism that can be inherited.

1.2.3 A genetic cross involving two characteristics at a time.

1.2.4 A blood clotting disorder, occurring mainly in males that is linked to a recessive gene on the X-chromosome.

1.2.5 A full set of chromosomes with all the genes of an organism.

1.2.6 The delivery of a baby through the abdomen by means of a surgical procedure.

1.2.7 A portion or segment of DNA which carries the genetic code for the formation of a particular protein by specifying its amino acid sequence.

1.2.8 A condition which occurs when a normal gamete fertilizes a gamete with an extra chromosome number 21, resulting in the formation of a zygote with 47 chromosomes instead of 46 chromosomes.

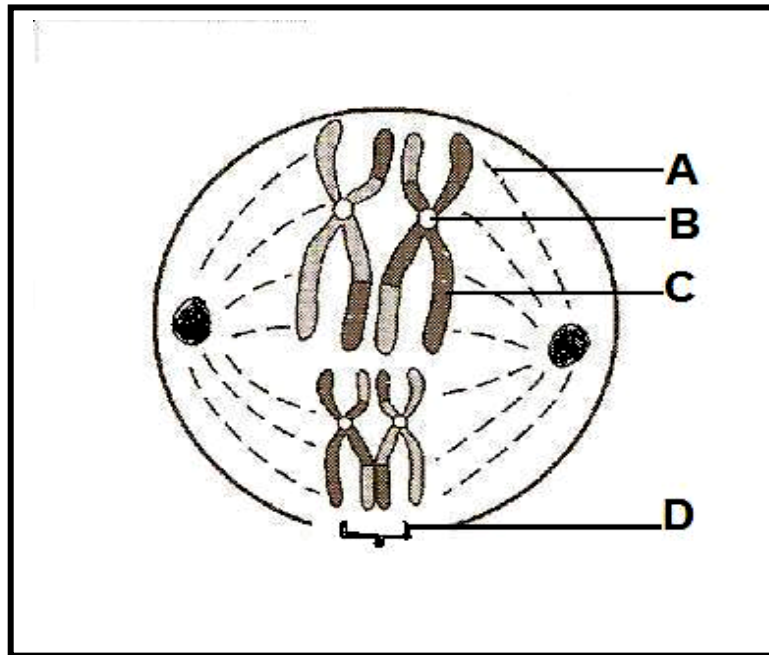
(8 x 1) (8)

- 1.3 Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A – F) next to the question number (1.3.1 – 1.3.6) in the ANSWER BOOK, for example 1.3.6 M.

COLUMN A	COLUMN B
1.3.1 Attachment of the embryo to the endometrium	A Recombinant DNA
1.3.2 DNA formed by combining a segment of DNA from one source to the DNA of a vector	B Oestrogen
1.3.3 The point at which crossing over of chromosomes occurs during meiosis	C Transcriptase
1.3.4 A hormone which maintains pregnancy and is secreted by the <i>corpus luteum</i>	D Implantation
1.3.5 The enzyme responsible for transcription of mRNA from DNA	E Chiasmata
1.3.6 The law which states that alleles arrange themselves independently and each gamete receives one member of each pair	F Lactase
	G Progesterone
	H Law of independent Assortment
	I Conception
	J Law of segregation
	K Mitochondrial DNA
	L Centromere

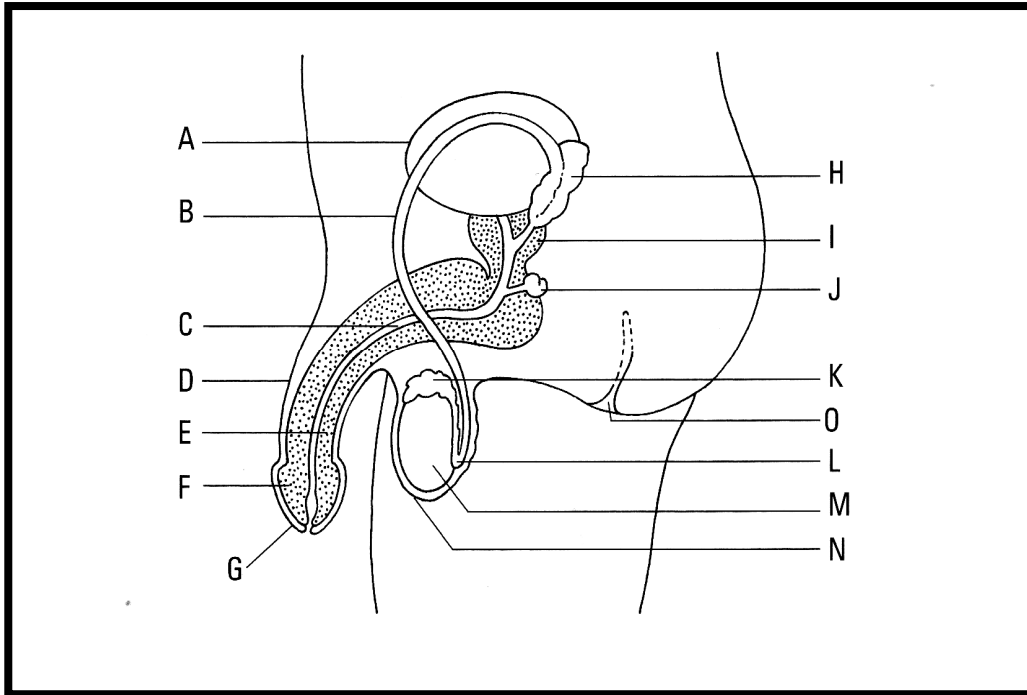
(6 x 2) (12)

- 1.4 The following diagram represents meiotic division in the cell of a female organism. Study the diagram and answer questions that follow:



- 1.4.1 Identify the parts labelled A, B and C. (3)
- 1.4.2 Supply ONE word that describes the paired chromosomes indicated by D. (1)
- 1.4.3 Which phase of meiosis is represented by the above diagram? (1)
- 1.4.4 Give ONE reason for your answer in QUESTION 1.4.3. (2)
- 1.4.5 At the end of this cell division, how many chromosomes will there be in each daughter cell? (2)
- 1.4.6 In which female organ does this process occur? (1)

1.5 Study the diagram of the human male reproductive organ and answer the questions that follow:



- 1.5.1 Supply the LETTER which indicates the part that is surgically removed during circumcision. (1)
- 1.5.2 Give the NAME of the parts labelled I and M respectively. (2)
- 1.5.3 Name the hormone produced in part M. (1)
- 1.5.4 Write down the LETTER of the structure that:
 - (a) provides nourishment for sperm.
 - (b) stores sperm.
 - (c) provides an alkaline medium for sperm.
 - (d) consists of erectile tissue.
 - (e) undergoes surgery during vasectomy.
 - (f) is a pathway for semen and urine. (6)

TOTAL SECTION A: 50

SECTION B**QUESTION 2**

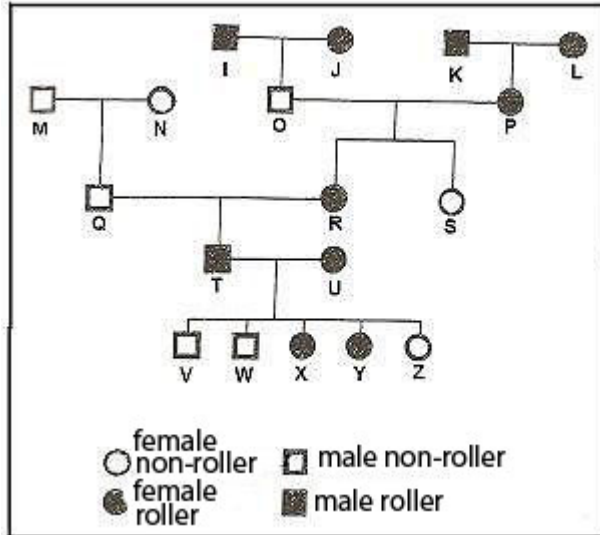
- 2.1 The table below shows part of the daily food requirements of a woman before and during pregnancy. Study the table below and answer the questions that follow:

Nutrient	Before pregnancy	During pregnancy
Iron	15 mg	25 mg
Energy	9 000 kJ	10 000 kJ
Calcium	0,5 g	1 g
Vitamin C	25 mg	25 mg
Vitamin A	650 µg	650 µg
Vitamin D	1,5 µg	9 µg
Protein	27 g	36 g

- 2.1.1 Which nutrient(s) are needed in the same quantities by the body before and during pregnancy? (1)
- 2.1.2 Calculate the percentage increase in the amount of protein from before to during pregnancy. SHOW ALL YOUR CALCULATIONS. (3)
- 2.1.3 Which nutrient's intake has to be increased more than double during pregnancy? (1)
- 2.1.4 Suggest ONE reason why a pregnant woman needs to eat a healthy balanced diet. (1)

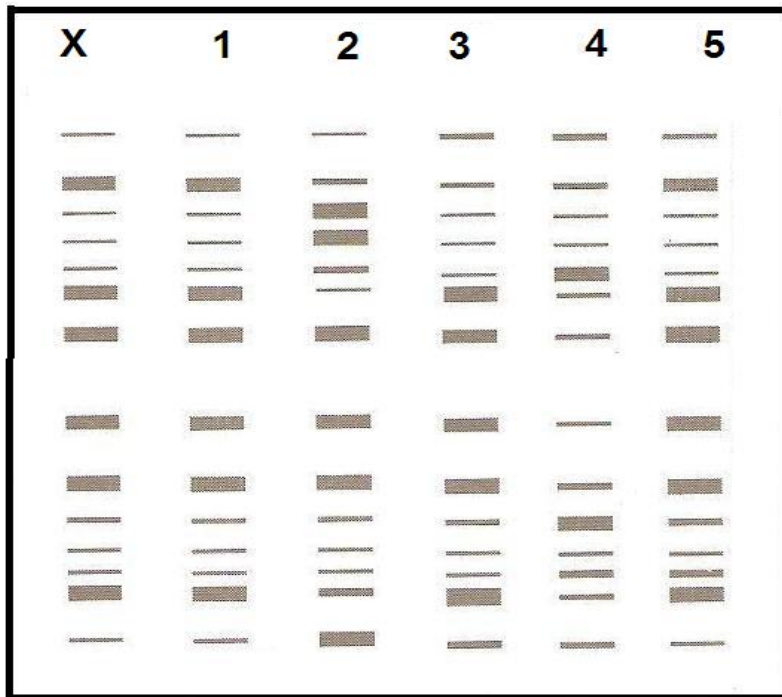
2.2 The ability to curl the tongue is passed from parents to their children. The diagram below shows the inheritance of the ability of tongue rolling in a particular family. Study the diagram and answer questions that follow.

NOTE: The capital letter **T** is for tongue-rolling and **t** for inability to roll.



- 2.2.1 Give the genotypes of I and P respectively. (4)
- 2.2.2 What are the chances of Q and R's first child being able to roll his/her tongue? (2)
- 2.2.3 Why is the characteristic for tongue rolling indicated by a capital letter and not the characteristic for inability to roll tongues? (2)
- 2.2.4 T and U had five children. How many daughters are tongue rollers? (1)
- 2.2.5 Is Q homozygous or heterozygous? (2)

- 2.3 The following presentation shows results of a DNA fingerprinting analysis from a crime scene. X represents evidence found at the crime scene. The numbers 1 to 5 represent the DNA fingerprints of 5 individuals. Individual 3 is the suspect.

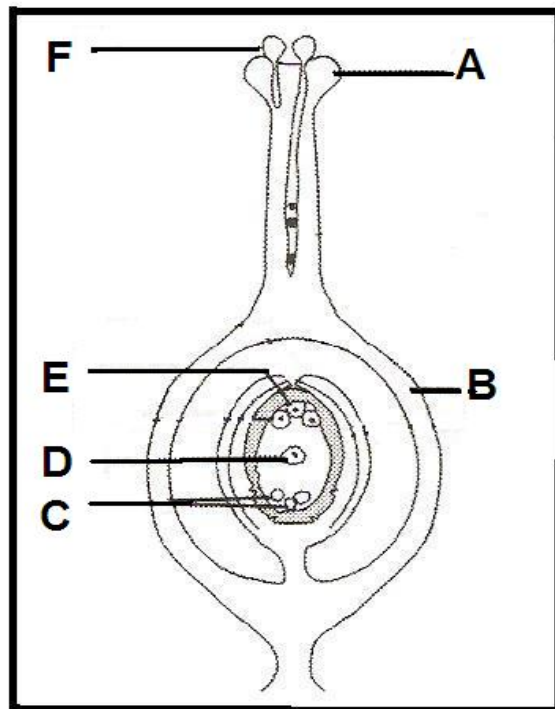


- 2.3.1 Determine which individual's pattern matches the pattern of DNA obtained from the evidence. (2)
- 2.3.2 Would you convict individual 3 for the crime? (2)
- 2.3.3 Explain your answer in QUESTION 2.3.2 above. (2)
- 2.3.4 Which of the DNA fingerprints in the chart serves as a control? (1)
- 2.4 Name FOUR uses of DNA fingerprinting. (4)
- 2.5 Mention TWO samples that can be taken as evidence from a crime scene for DNA analysis. (2)

[30]

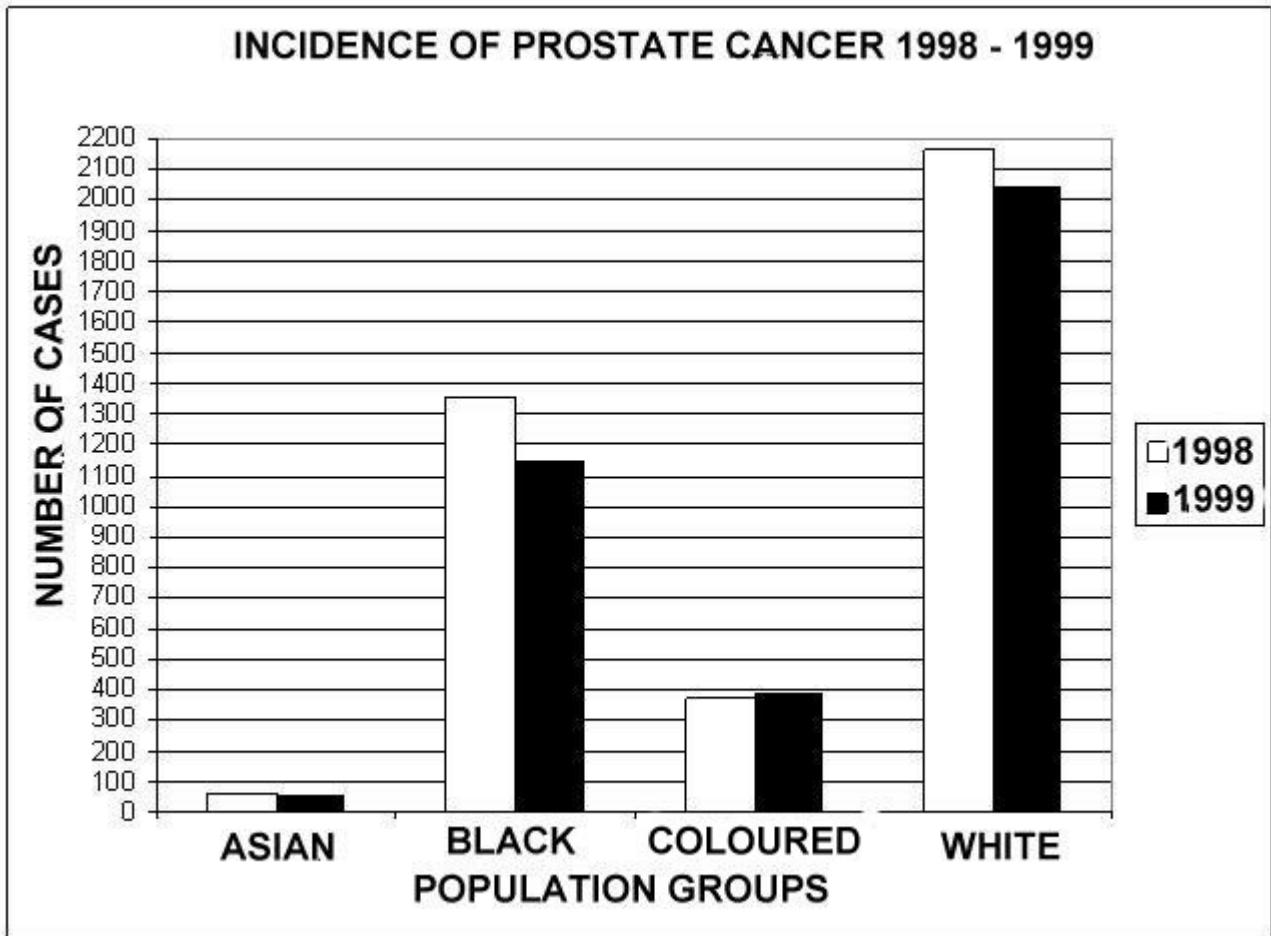
QUESTION 3

3.1 Study the following diagram on plant reproduction and answer questions that follow:



- 3.1.1 Identify the parts labelled A and C. (2)
- 3.1.2 What happens to parts numbered D and E respectively after fertilisation? (2)
- 3.1.3 The structure labelled B develops to an important organ in a plant. Name this organ. (1)

3.2 Study the graph below and answer the questions that follow:

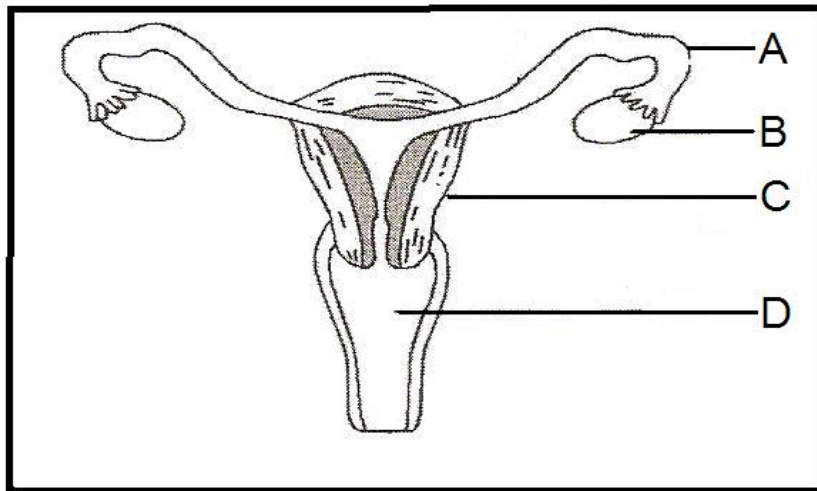


- 3.2.1 Which population group has recorded the highest incidence of prostate cancer? (1)
- 3.2.2 Which population group has recorded a slight increase in the same period? (1)
- 3.2.3 What is the trend observed in the incidence of prostate cancer among the black community? (1)
- 3.2.4 What is the main source of data available to the Cancer Association of South Africa? (1)

3.3 The possibility of human cloning is a very controversial issue.

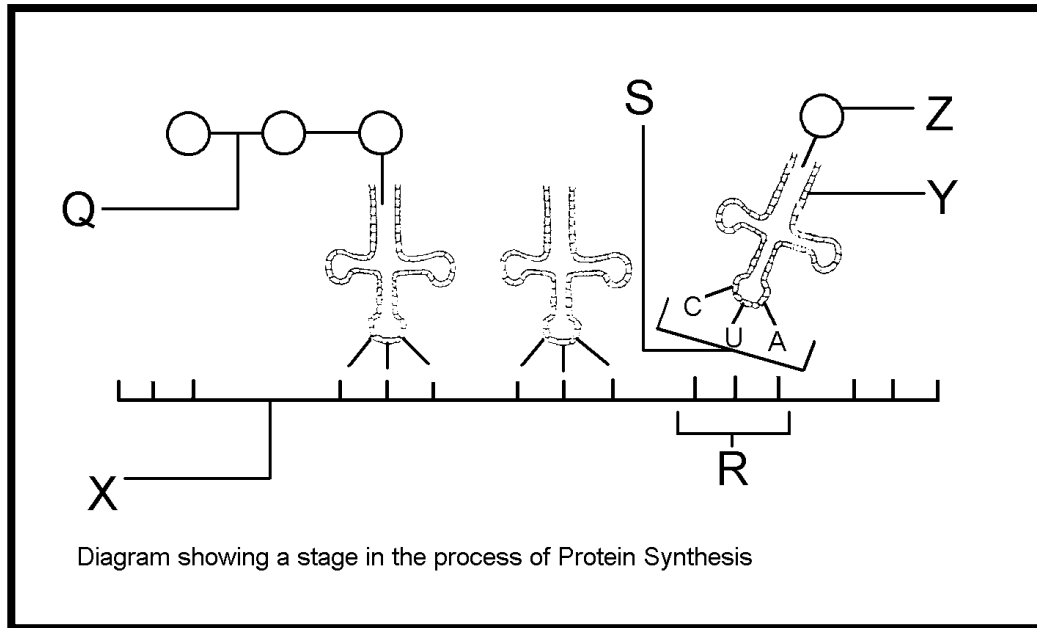
- 3.3.1 Do you agree or disagree with human cloning? (1)
- 3.3.2 Motivate your answer to QUESTION 3.3.1 by giving THREE reasons. (6)

3.4 Study the diagram of the female reproductive system below and answer the questions that follow.



- 3.4.1 Write down the LETTER of the organ in which egg cells are produced. (1)
- 3.4.2 Write down the NAME of the organ in which fertilisation occurs. (1)
- 3.4.3 Name the part of the structure labelled C which disintegrates once a month. (1)
- 3.4.4 Name the surgical procedure during which the part labelled A is cut, or tied. (1)

3.5 The diagram below shows a stage in the process of protein synthesis. Study the diagram carefully and answer the questions that follow.



- 3.5.1 Which stage of protein synthesis is shown in the diagram? (1)
- 3.5.2 Give the correct order of the three bases at point R. (3)
- 3.5.3 Supply the labels for parts labelled X, Q, Z, R and S. (5)
- 3.5.4 Where exactly in the cell does this process occur? (1)

[30]

QUESTION 4

- 4.1 The table below shows the results of an investigation amongst a number of couples on the reliability of different contraceptive methods. Study the table and answer the questions that follow.

CONTRACEPTIVE METHOD	PERCENTAGE OF PREGNANCIES
None	53
Rhythm	18
Diaphragm with spermicide	11
Condom	8
IUD (Internal uterine device) loop	2
The pill	0

- 4.1.1 Draw a bar graph to show the reliability of the different contraceptive methods. (11)
- 4.1.2 Why is a diaphragm used with spermicide? (2)
- 4.1.3 Which method is the most reliable? (1)
- 4.1.4 What does “NONE” on the table mean? (1)
- 4.1.5 In which way is the IUD different from all other methods of contraception? (2)
- 4.1.6 Discuss, from your point of view, the moral and ethical aspects regarding contraceptive methods. (3)
- 4.2 Some of the poverty stricken African countries have refused to accept food assistance in recent years. Some of them even refused or totally banned the import of genetically modified food from South Africa. Write a short essay under the following headings:
- 4.2.1 The possible disadvantages of genetically modified foods. (6)
- 4.2.2 Ethical issues regarding the sale of food material without the GM labels. (5)
- 4.2.3 Reasons to convince foreign countries to buy or import South African genetically modified food products. (6)

Synthesis: (3)
[40]

TOTAL SECTION C: 40

GRAND TOTAL: 150

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	2	4	6
Learner's ability to comprehend the reasons why some of the poor nations prefer to remain starved rather than accepting GM food as food aid.	1-2 reasons given	3-4 reasons given	5 or more reasons given
	2	5	
Ethical issues regarding the sale and distribution of GM foods without GM labels on the food packages.	1-2 issues discussed	3 or more issues discussed	
	2	4	6
Learner's ability to put forward convincing and logical reasons to those nations to import South African genetically modified agricultural products.	1-2 reasons given	2-4 reasons given	5 or more reasons given
Synthesis	3		