KWAZULU-NATAL PROVINCE

EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

LIFE SCIENCES

PROVINCIAL STANDARDISED ASSESSMENT

MARCH 2026

MARKS: 100

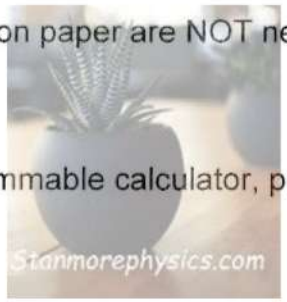
TIME: 2 hours

This question paper consists of 13 pages.

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. Answer ALL the questions.
2. Write ALL the answers in the ANSWER BOOK.
3. Start the answers to each question at the top of a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Present your answers according to the instructions of each question.
6. Do ALL drawings in pencil and label them in blue or black ink.
7. Draw diagrams, tables or flow charts only when asked to do so.
8. The diagrams in this question paper are NOT necessarily drawn to scale.
9. Do NOT use graph paper.
10. You may use a non-programmable calculator, protractor and a compass.
11. Write neatly and legibly.



SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A - D) next to the question number (1.1.1 to 1.1.6) in the ANSWER BOOK, for example 1.1.7 D.

1.1.1 Which ONE of the following is found only in RNA molecules?

A Guanine
B Uracil
C Thymine
D Adenine

1.1.2 Meiosis is significant for the …

A production of haploid gametes.
B production of four diploid gametes.
C production of genetically identical gametes.
D doubling of the chromosome number.

1.1.3 The following is a list of parts in a male reproductive system:

(i) Seminal vesicle
(ii) Vas deferens
(iii) Prostate gland
(iv) Urethra

Which ONE of the following combinations is responsible for producing alkaline fluids and nutrients?

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

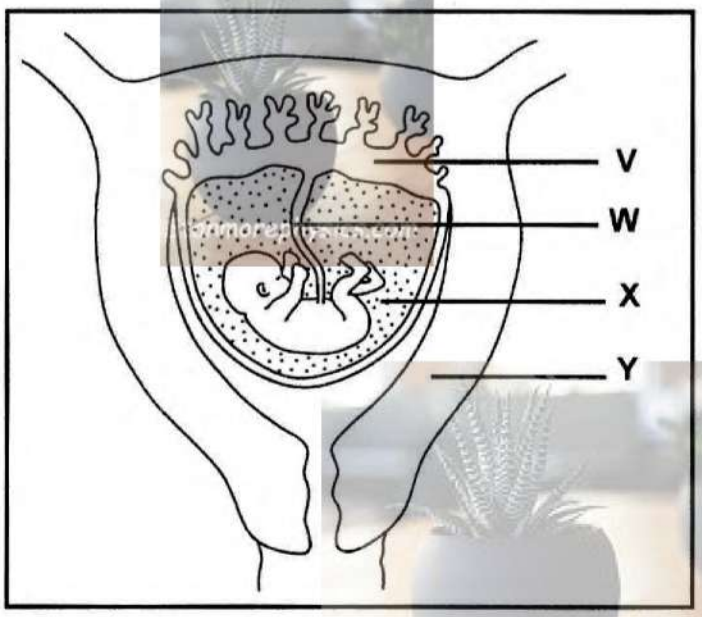
1.1.4 The table below shows amino acids coded for by different mRNA codons.

mRNA CODONS	AMINO ACIDS
GCG	Alanine
AUG	Methionine
AUA	Isoleucine
AGG	Arginine

Which amino acid is coded by the DNA base triplet TAC?

A Arginine
B Alanine
C Methionine
D Isoleucine

QUESTION 1.1.5 AND 1.1.6 ARE BASED ON THE DIAGRAM SHOWING A DEVELOPING FOETUS.



1.1.5 Which ONE of the following combinations is the CORRECT structure for each function?

	ALLOWS DIFFUSION OF NUTRIENTS TO THE FOETUS	ALLOWS FREE FOETAL MOVEMENT
A	X	W
B	V	Y
C	V	X
D	X	V

1.1.6 Which ONE of the following structures produces the hormone that thickens the endometrium?

A **V**
B **W**
C **X**
D **Y**

(6 × 2) **(12)**

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 to 1.2.5) in the ANSWER BOOK.

1.2.1 The natural shape of the DNA molecule

1.2.2 The point where adjacent chromatids of homologous chromosomes overlap during crossing over

1.2.3 The release of an ovum from the ovary

1.2.4 Division of the cytoplasm

1.2.5 A blood vessel that transports deoxygenated blood from the foetus to the mother

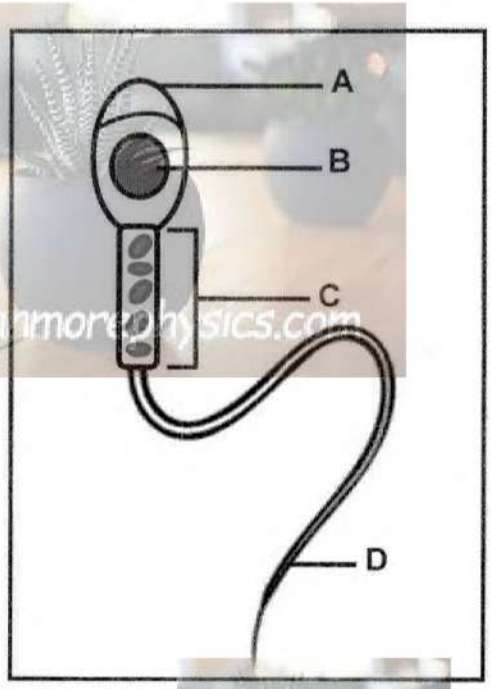
(5 x 1) **(5)**

1.3 Indicate whether each of the descriptions in COLUMN I applies to **A ONLY**, **B ONLY**, **BOTH A AND B or NONE** of the items in COLUMN II. Write **A only**, **B only**, **both A and B,** or **none** next to the question number (1.3.1 to 1.3.3) in the ANSWER BOOK.

	COLUMN I	**COLUMN II**
1.3.1	The structure where testosterone is produced	A: Epididymis B: Cowper's gland
1.3.2	A hollow ball of cells that implants in the endometrium	A: Blastocyst B: Morula
1.3.3	Location of a DNA molecule in the plant cell	A: Mitochondria B: Chloroplast

(3 x 2) **(6)**

1.4 The diagram below shows a sperm cell.



1.4.1 Identify part:

(a) **C** (1)

(b) **D** (1)

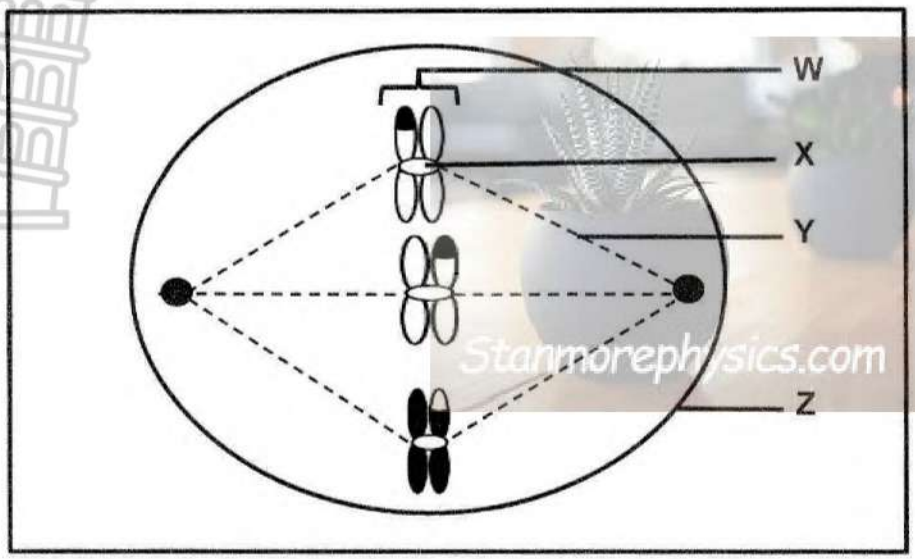
1.4.2 Give the LETTER and NAME of the part that contains the:

(a) Genetic material (2)

(b) Enzymes to penetrate the egg layers (2)

(c) Organelle that provides energy for sperm motility (2)
(8)

1.5 The diagram below represents a cell in a phase of meiosis.



1.5.1 Identify part:

(a) **W** (1)

(b) **Y** (1)

(c) **Z** (1)

1.5.2 Give the LETTER and NAME for the part responsible for joining two chromatids together. (2)

1.5.3 Name the part in a flower where meiosis occurs to produce male gametes. (1)

1.5.4 How many chromosomes:

(a) Were there in this cell at the beginning of meiosis (1)

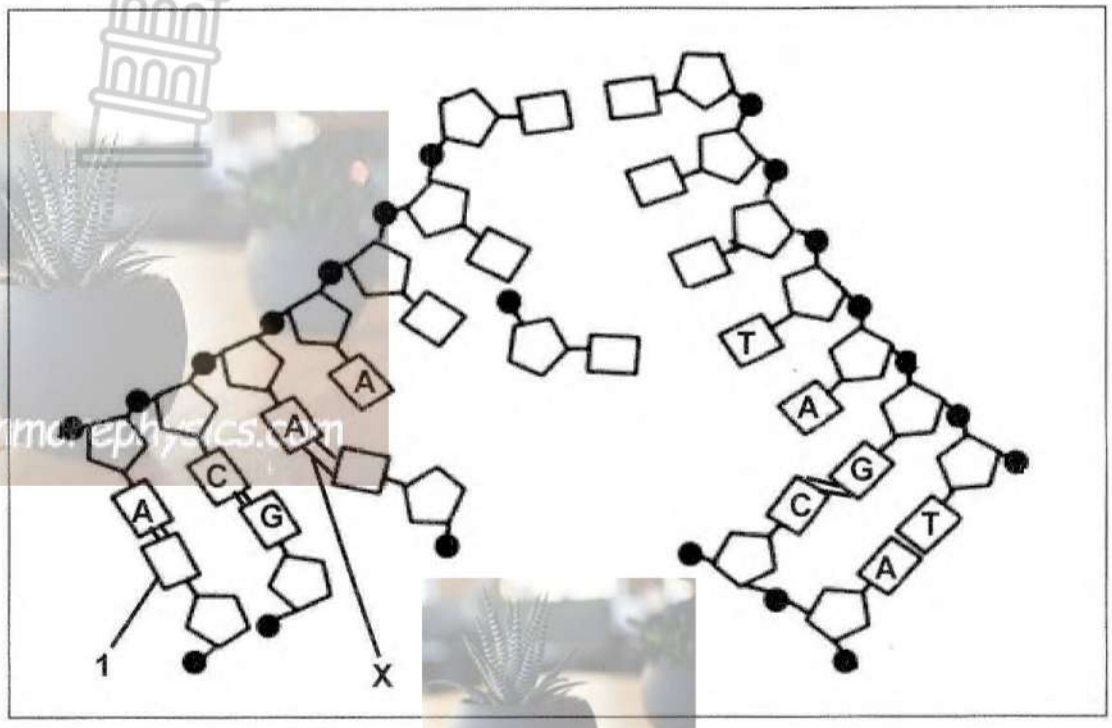
(b) Will be found in this cell at the end of meiosis (1)

1.5.5 Identify the phase of cell division represented in the diagram. (1)
(9)

TOTAL SECTION A: 40

QUESTION 2

2.1 The diagram below represents a process in a cell.



2.1.1 Identify:

(a) Bond **X** (1)

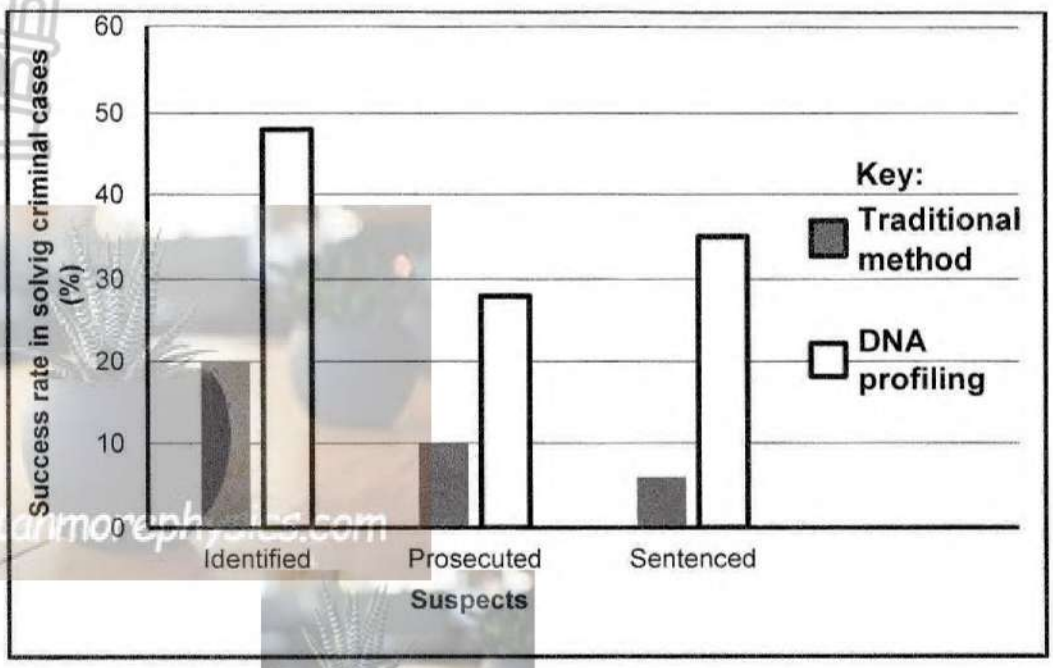
(b) Nitrogenous base **1** (1)

2.1.2 Name the process shown in the diagram. (1)

2.1.3 State ONE importance of the process named in QUESTION 2.1.2. (1)

2.1.4 Tabulate TWO differences between transcription and the process named in QUESTION 2.1.2. (5)
(9)

2.2 The graph below shows the percentage success rate in solving criminal cases using traditional method and DNA profiling.



2.2.1 Give TWO other uses of DNA profiling other than the one shown in the graph. (2)

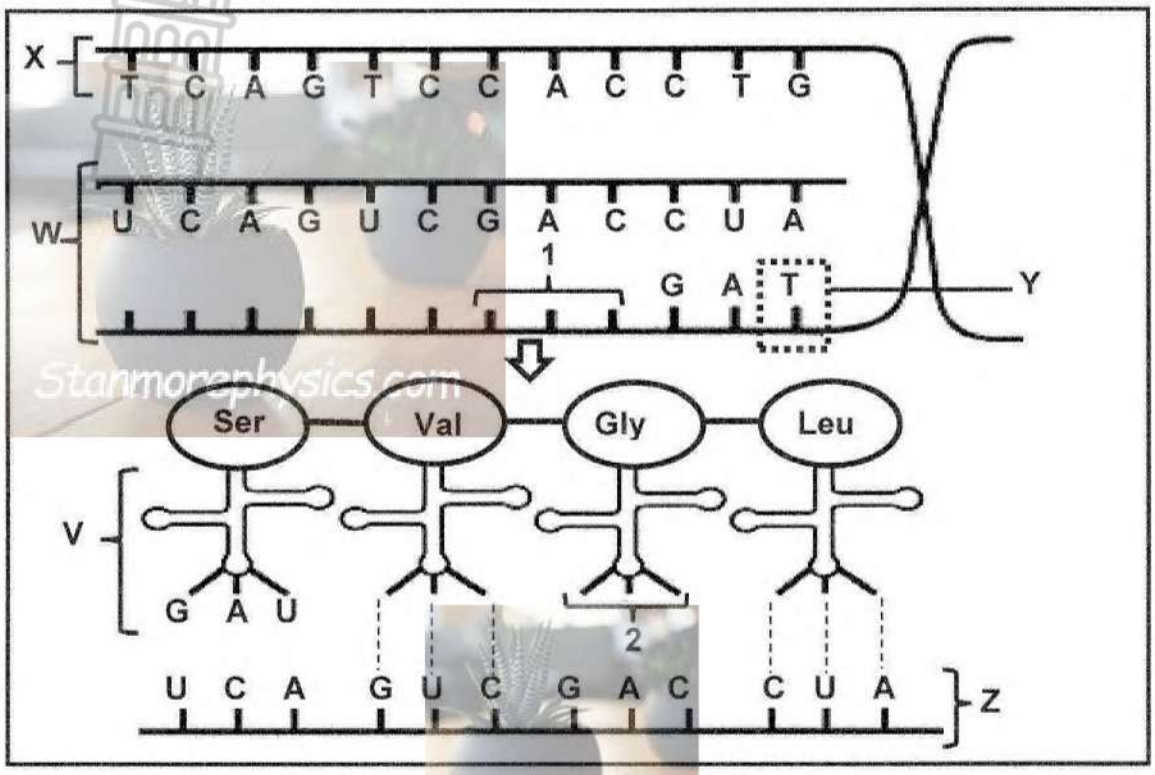
2.2.2 State the percentage of suspects:

(a) Sentenced using DNA profiling (1)

(b) Prosecuted using traditional method (1)

2.2.3 Explain how the DNA profiling is used in identifying criminals. (3)
(7)

2.3 The diagram below represents a part of protein synthesis.



2.3.1 Identify:

(a) The stage of protein synthesis represented by **W** (1)

(b) The amino acid coded by DNA base triplet CAG (1)

2.3.2 State ONE structural difference between molecule **X** and molecule **Z**. (2)

2.3.3 Give the sequence of nitrogenous bases at triplet:

(a) **1** (1)

(b) **2** (1)

2.3.4 Cytosine **(C)** in point **Y** is replaced by thymine **(T)** as a result of a mutation.

Explain how this mutation affected the protein formed. (3)

2.3.5 Describe the process of translation. (5)
(14)
[30]

QUESTION 3

3.1 Down syndrome is a condition caused by non-disjunction in humans during cell division.

The table below shows the effect of maternal age on the incidence of Down syndrome babies per 1 000 mothers.

MATERNAL AGE (YEARS)	INCIDENCE OF DOWN SYNDROME BABIES PER 1 000 MOTHERS
25	0.8
30	1
35	2.5
40	10
45	25

3.1.1 Name the phase of meiosis where non-disjunction occurs. (1)

3.1.2 Describe the relationship between the maternal age and incidence of Down syndrome babies per 1 000 mothers. (2)

3.1.3 Calculate the percentage increase in the incidence of Down syndrome babies between the maternal ages 35 and 45. Show ALL working. (3)

3.1.4 Draw a bar graph to show the results in the table. (6)
(12)

3.2 Frogs, birds and other fish have different survival rate of offspring.

The survival rate of offspring per eggs produced in some fish, chicken and frog was determined.

The table below shows the survival rate in different organisms.

ORGANISM	SURVIVAL RATE IN DIFFERENT ORGANISMS
Fish	1 – 5 per 1 000 eggs
Chicken	100 – 150 per 250 eggs
Frog	6 – 10 per 1 000 eggs

3.2.1 Define the term *Ovipary*. (2)

3.2.2 Using the table, name the organism that has the:

(a) Lowest survival rate (1)

(b) Highest survival rate (1)

3.2.3 Explain:

(a) Why frogs are expected to produce a large number of gametes (2)

(b) The advantage of internal fertilisation in chickens (2)
(8)

3.3 Clomid (a certain type of drug that stimulates ovulation) is a treatment for women struggling with infertility.

Scientists investigated the effect of clomid treatment on the FSH level in women with infertility.

The procedure was as follows:

- 16 females of the same age who were struggling with the same form of infertility were asked to participate in the investigation.
- The females were divided into two groups of 8 each.
- The FSH level of participants was measured before the use of clomid treatment.
- The participants in Group **A** received clomid treatment at a daily dosage of 50 mg for 5 consecutive days from day 5 – 9 of the menstrual cycle.
- The participants in Group **B** did not receive the clomid treatment.
- The level of FSH was measured and recorded daily.
- This procedure was done over a period of 5 months.
- The average level of FSH was calculated for each group at the end of the investigation.

The average FSH level in Group **A** was 14 mIU/mL more than that in Group **B**.

3.3.1 State the independent variable of this investigation. (1)

3.3.2 List TWO variables that were kept constant and which contributed to the validity of the investigation. (2)

3.3.3 Give ONE reason why the FSH level of participants was measured before the use of clomid treatment. (1)

3.3.4 State TWO ways in which the scientists ensured the reliability of the investigation. (2)

3.3.5 Explain the:

(a) Purpose of Group **B** in this investigation (2)

(b) Effect of clomid treatment in females struggling with infertility (2)

(10)
[30]

TOTAL SECTION B: 60
GRAND TOTAL: 100

FINAL

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GRADE 12

LIFE SCIENCES

PROVINCIAL STANDARDISED ASSESSMENT

MARCH 2026

MARKING GUIDELINE

MARKS: 100

This marking guideline consists of 9 pages.

PRINCIPLES RELATED TO MARKING LIFE SCIENCES MARCH 2026

1. **If more information than marks allocated is given**
   Stop marking when maximum marks are reached and put a wavy line and 'max' in the right-hand margin.

2. **If, for example, three reasons are required and five are given**
   Mark the first three irrespective of whether all or some are correct/incorrect.

3. **If whole process is given when only part of it is required**
   Read all and credit relevant part.

4. **If comparisons are asked for and descriptions are given**
   Accept if differences / similarities are clear.

5. **If tabulation is required but paragraphs are given**
   Candidates will lose marks for not tabulating.

6. **If diagrams are given with annotations when descriptions are required**
   Candidates will lose marks

7. **If flow charts are given instead of descriptions**
   Candidates will lose marks.

8. **If sequence is muddled and links do not make sense**
   Where sequence and links are correct, credit. Where sequence and links is incorrect, do not credit. If sequence and links becomes correct again, resume credit.

9. **Non-recognised abbreviations**
   Accept if first defined in answer. If not defined, do not credit the unrecognized abbreviation but credit the rest of answer if correct.

10. **Wrong numbering**
    If answer fits into the correct sequence of questions but the wrong number is given, it is acceptable.

11. **If language used changes the intended meaning**
    Do not accept.

12. **Spelling errors**
    If recognizable accept provided it does not mean something else in Life Sciences or if it is out of context.

13. **If common names given in terminology**
    Accept provided it was accepted at the National memo discussion meeting.

14. **If only letter is asked for and only name is given (and vice versa)**
    No credit

15. **If units are not given in measurements**
Candidates will lose marks. Memorandum will allocate marks for units separately

16. Be sensitive to the **sense of an answer, which may be stated in a different way**.

17. **Caption**
All illustrations (diagrams, graphs, tables, etc.) must have a caption

18. **Code-switching of official languages (terms and concepts)**
A single word or two that appears in any official language other than the learners' assessment language used to the greatest extent in his/her answers should be credited, if it is correct. A marker that is proficient in the relevant official language should be consulted. This is applicable to all official languages.

SECTION A

QUESTION 1

1.1 1.1.1 B✓✓
1.1.2 A✓✓
1.1.3 D✓✓
1.1.4 C✓✓
1.1.5 C✓✓
1.1.6 A✓✓

(5 x 2) **(12)**

1.2 1.2.1 Double helix✓
1.2.2 Chiasma✓
1.2.3 Ovulation✓
1.2.4 Cytokinesis✓
1.2.5 Umbilical artery✓

(5 x 1) **(5)**

1.3 1.3.1 None✓✓
1.3.2 A only✓✓
1.3.3 Both A and B✓✓

(3 x 2) **(6)**

1.4 1.4.1 (a) Middle piece✓/neck (1)

(b) Tail✓ (1)

1.4.2 (a) B✓ Nucleus✓ (2)

(b) A✓ Acrosome✓ (2)

(c) C✓ Middle piece✓/ neck (2)
(8)

1.5 1.5.1 (a) Chromosome✓ (1)

(b) Spindle fibre✓ (1)

(c) Cell membrane✓ (1)

1.5.2 X✓ Centromere✓ (2)

1.5.3 Anther✓ (1)

1.5.4 (a) 6✓ (1)

(b) 3✓ (1)

1.5.5 Metaphase II✓ (1)
(9)

TOTAL SECTION A: 40

SECTION B

QUESTION 2

2.1 2.1.1 (a) Hydrogen✓ bond (1)

(b) Thymine✓ (1)

2.1.2 DNA replication✓ (1)

2.1.3 - Doubles genetic material✓/ DNA
- Ensures that daughter cells are genetically identical✓ Any (1)
(Mark the first ONE only)

2.1.4

Transcription	DNA Replication
One strand is used as a template✓	Both strands are used as templates✓
mRNA is formed✓	Identical DNA molecules are formed✓
RNA nucleotides are used✓	DNA nucleotides are used✓
Adenine pairs with uracil✓	Adenine pairs with thymine✓
Short section of DNA molecule is used✓ / unzips	The whole DNA molecule is used✓ / unzips

(Mark the first TWO only) Any (2 x 2) + (1) table✓ (5)
(9)

2.2 2.2.1
- Identifying relatives✓
- Paternity testing✓
- Identifying genetic disorders✓
- Identifying dead persons✓
- Trace missing persons✓
- Matching tissues for organ transplants✓ Any (2)

(Mark the first TWO only)

2.2.2 (a) 35✓% (1)

(b) 10✓% (1)

2.2.3
- DNA samples from the crime scene and suspect are used✓
- to form a DNA profile✓
- If the DNA profile of the suspect matches the one found at the crime scene, then the suspect was at the crime scene✓

OR

- DNA samples from the crime scene and suspect are used✓
- to form a DNA profile✓
- If the DNA profile of the suspect does not match the one found at the crime scene, then the suspect was not at the crime scene✓ (3)

(7)

2.3 2.3.1 (a) Transcription✓ (1)

(b) Val✓ (1)

2.3.2
- Molecule X has thymine✓
- Molecule Z has uracil✓

- Molecule X is double stranded✓
- Molecule Z is single stranded✓

- Molecule X is long✓
- Molecule Z is short✓

- Molecule X is double stranded✓
- Molecule Z is single stranded✓

- Molecule X has deoxyribose sugar✓
- Molecule Z has ribose sugar✓ Any (2)

(Mark the first ONE only)

2.3.3 (a) CTG✓ (1)

(b) CUG✓ (1)

2.3.4
- Different protein is formed✓
- since codon CUG changed to CUA✓
- that matches anticodon GAU✓
- Bringing leu instead of a different amino acid✓ Any (3)

2.3.5
- Each tRNA carries a specific amino acid✓
- When the anticodon on the tRNA✓
- matches the codon on the mRNA✓
- then tRNA brings the required amino acid to the ribosome✓
- Amino acids become attached to each other by peptide bonds✓
- to form the required protein✓ Any (5)

(12)
[30]

QUESTION 3

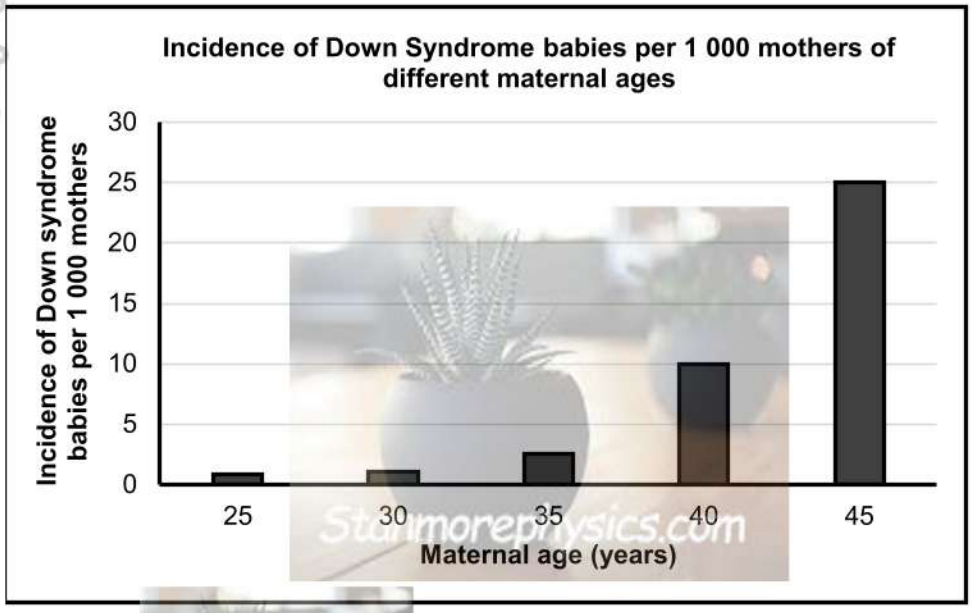
3.1 3.1.1 Anaphase I✓ / II (1)

3.1.2 As the maternal age increases, the incidence of down syndrome babies per 1 000 mothers increases✓✓ (2)

3.1.3 $\frac{(25 - 2.5)}{2.5}$ ✓ x 100✓

= 900✓ % (3)

3.1.4



Guideline for assessing the graph

CRITERIA	ELABORATION	MARK
Correct type of graph **(T)**	Bar graph drawn	1
Caption of graph **(C)**	Both variables included	1
Axes labels **(L)**	X and Y-axis correctly labelled with units	1
Scale for X and Y axes **(S)**	- Equal space and width of bars for X-axis and - Correct scale for Y-axis	1
Plotting of co-ordinates **(P)**	- 1 to 4 co-ordinates plotted correctly - ALL 5 co-ordinates plotted correctly	1 2

(6)
(12)

Histogram or line graph drawn
- Lose marks for type of graph and for scale

Transposed axes:
- Can get full credit, if axes labels are swapped and bars are horizontal
- If labels are not corresponding, then lose marks for labels and scale
- Check that the plotting is correct for the given labels

3.2 3.2.1 Fertilised eggs develop outside the mother's body until birth✓✓

OR

Eggs are fertilised internally and develop outside the mother's body until birth✓✓ (2)

3.2.2 (a) Fish✓ (1)

(b) Chicken✓ (1)

3.2.3 (a) - Increases the chances of fertilisation✓
- to compensate for the loss of gametes✓/ protection of gametes (2)

(b) - Ova are fertilised inside the mother's body✓to ensure that
- gametes are protected from predators✓ / harsh environmental conditions
- and allows high survival rate✓ Any (2)
(8)

3.3 3.3.1 Clomid✓treatment (1)

3.3.2 - Age✓
- Female with the same form of infertility✓
- Dosage of 50 mg in group A✓
- Measurements taken from days 5 - 9 of the menstrual cycle✓ Any (2)
(Mark the first TWO only)

3.3.3 To obtain a baseline measurement✓ (1)

3.3.4 - 8 females in each group participated✓
- Procedure was done over a period of 5 months✓/ 5 consecutive days from day 5 – 9 of the menstrual cycle (2)
(Mark the first TWO only)

3.3.5 (a) To show that the changes in FSH levels are due to clomid treatment only✓✓ (2)

(b) Clomid treatment increases the level of FSH in women with infertility✓✓ (2)
(10)
[30]

TOTAL SECTION B: 60
GRAND TOTAL: 100