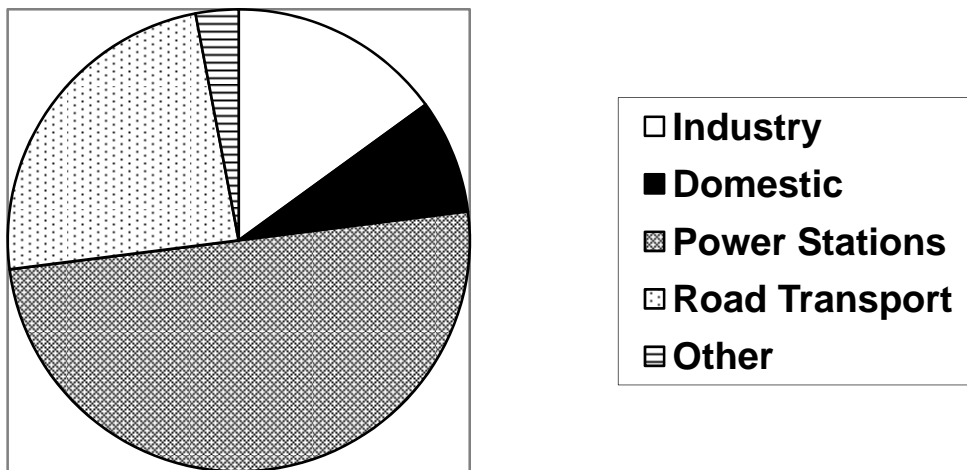


POSSIBLE ANSWERS

1.
 - 1.1 decreases (1)
 - 1.2 increases
The bacteria have more nutrients available in the sewage and hence flourish through increased reproduction (3)
 - 1.3 Oxygen levels increase as the bacterial levels decrease and vice versa (2)
 - 1.4 The high bacterial population decreases the oxygen level hence making less oxygen available to the water animals causing many of them to die. (3)
 - 1.5 The sewage in the river would be dispersed as the river flows whereas it would accumulate in the lake. In the lake the increased bacterial population would deplete the oxygen available and hence no further life can be supported. (3) **(12)**
2.
 - 2.1

Sources of sulphur dioxide in South Africa



Checklist for assessment of the pie-chart

| | |
|----------------------------|-----------|
| Correct type of graph | 1 |
| Correct proportions | 5 x 1 = 5 |
| Label / key for each slice | 5 x 1 = 5 |
| Title | 1 |

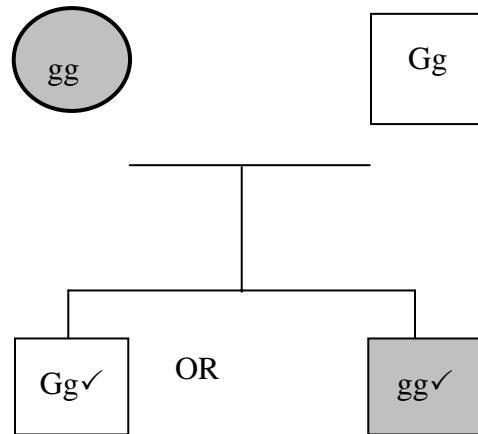
NOTE: If the wrong type of graph is drawn: marks will be lost for "correct type of graph" as well as for drawing the slices in correct proportions. (12)

- 2.2 (a) It would reduce pollution but create unemployment. (2)
 (b) It would reduce pollution in the city but increase pollution out of the city
OR
 It will still increase the sulphur dioxide produced by road transport since more people will have to travel to the out of city location. (2)
 (c) The sulphur dioxide would be taken higher into the atmosphere but it still contributes to the formation of acid rain. (2) **(18)**
- 3.
- 3.1 aluminium, copper and plastics (3)
- 3.2 - reduces waste in the environment
 - source of income
 - prevents over-utilisation of resources to form new materials any 2 (2)
- 3.3 It takes more energy to reprocess recycled material (2)
- 3.4 The materials cannot be broken down/decomposed into inorganic substances (2)
- 3.5 Fruit, vegetable, paper (or any other organic substance) any 2 (2) **(11)**
- 4**
- 4.1 A - Ovary✓
 E - Fallopian tube✓
 G- Endometrium✓ (3)
- 4.2 Ovulation✓ (1)
- 4.3 day 14/middle of menstrual cycle✓ (1)
- 4.4 Fertilisation✓ take place.
 The sperm✓ (n) fuses with the ovum✓(n) to form a zygote✓ (2n) any 3 (3)
- 4.5 (a) 23✓ (1)
 (b) 46✓ (1)
 (c) 23✓ (1) **(11)**
- 5**
- 5.1 1 - Gg✓
 3 - Gg✓ (2)

5.2 gg✓ (1)

5.3 Yes✓ (1)

5.4



✓ (correct clear shape) ✓ (correct shaded shape)

(4)

- 5.5 - Understand that there will be a 50% chance of having a normal child and 50% having a child with cystic fibrosis ✓
 - Go for genetic counselling ✓
 - Accept responsibility for their decision ✓ / make an informed decision

(3)

(11)

6

6.1 B✓ (1)

6.2 XX✓ chromosomes ✓ / Two identical sex chromosomes (2)

6.3 A✓ (1)

6.4 Down's syndrome ✓ (1)

6.5 Caused by a faulty meiotic division ✓ / oogenesis during production of the ovum / spermatogenesis during sperm production

The chromosomes of chromosome pair 21 fail to separate ✓ (2)

(7)

POSSIBLE ANSWERS

7.1

- 7.1.1 Homologous✓ (1)
- 7.1.2 Spindle thread✓/spindle fibre (1)
- 7.1.3 Metaphase✓ 1✓ (2)
- 7.1.4 4✓ (1)
- 7.1.5 2✓/half (1)
- (6)**

7.2

- 7.2.1 Scientific knowledge can change✓ according to the availability of new evidence✓ (2)
- 7.2.2 Scientists of the seventeenth century only had simple magnifying equipment✓ and therefore could not see what was contained inside a sperm✓/ egg cell (2)
- 7.2.3 The development of advanced microscopic equipment✓ allowed scientists to see the nucleus of the egg and sperm cell✓
There was no evidence of a completely formed miniature human being in them✓ any 2 (2)
- 7.2.4 - In meiosis the number of chromosomes is reduced to half✓ of the original number (2n).
- The new cells formed are the gametes(n) ✓
- With fertilisation gametes fuse to form a zygote✓
OR any other acceptable answer any 2 (2)
- (8)**

7.3

- 7.3.1 When the genetic code of food is changed✓ by introducing a foreign/new gene✓ into food (2)
- 7.3.2 To enable an organism to become resistant to a disease✓/pathogen/
weed killers
In order to produce a very high yield of a particular food type✓ (2)
(Mark first TWO only)
- 7.3.3 40✓ (1)
- 7.3.4 Table showing the results of the survey on GM food

| | Number of people | |
|------------|------------------|----|
| | Yes | No |
| Question 1 | 5 | 35 |
| Question 2 | 10 | 30 |

Header✓

Labelled columns correctly ✓

Labelled rows correctly✓

Data in table: 3 or 4 correct✓✓

1 or 2 correct✓

Draw table✓

(6)

7.3.5 Increase✓ the number of people✓ participating in the survey

The people✓ in the survey must be randomly✓ selected

Ensure that people are selected✓ from all sections of society✓ any 2 x 2

(4)

(Mark first TWO only)

7.3.6 - Most of the people sampled do not consider GM food to be better than normal food

- Most of the people sampled are not aware of the dangers ✓in using GM food

- Even though most people sampled are not aware of the dangers of GM foods, the majority of them do not consider GM food to be better than normal food✓ any (1) (16)

Total Question 7: [30]

8.1

8.1.1 DNA✓

(1)

8.1.2 1 – Hydrogen bond✓
5 – Cytosine✓

(2)

8.1.3 Nucleotide✓

(1)

8.1.4 - DNA produces two exact copies of itself. ✓

- During interphase/before cell division ✓.

- Two chromatids that are identical are formed✓

- The two chromatids are identical to that of the parent✓ any 2 (2)

(6)

8.2

8.2.1 (a) The synthesis of mRNA✓ from a DNA template✓/by complementary matching of the nitrogenous bases in DNA (2)

(b) The process of converting the information carried by mRNA✓ to the correct sequence of amino acids ✓to form a particular protein✓ any 2 (2)

8.2.2 CAA✓ UAC✓ ACC✓ (in sequence) (3)

8.2.3 Phenylalanine✓ Valine✓ Methionine✓ (in sequence) (3) **(10)**

8.3 (i) Add *S. aureus* into the petri dishes✓
 (ii) Allow a few hours for bacterial growth ✓(incubation)
 (iii) Add the antibiotic✓ in a specific area
 (iv) Observe the effect of the antibiotic after several hours✓
 (v) Set up a control where no antibiotic is added✓ **(4)**
(Mark any FOUR in the correct order)

9.1

(a) **Possible answers for Anti-abortion**

- The unborn foetus is a living being✓ from conception✓ (fertilisation has taken place)
- The foetus has a brain✓, heart and other organs early in its development✓ (by 10 weeks) and can therefore feel pain
- Abortion is legalised killing/murder✓ since you are taking away a life✓
- Many religions and cultures do not condone abortion✓ – this goes against their morality/ethics✓ that could lead to conflict in the family
- The mother-to-be also experiences deep emotional trauma and depression✓ long after she has aborted her child – even if she has made the choice to abort✓
- Why should abortion be condoned✓ when there are many contraceptive methods available✓
- Couples that have sexual relations must be responsible/ if a baby is conceived✓ it should be accepted and loved - no matter what✓
- Any other acceptable reason

Any 4 x 2 (8)

OR

Possible answers for Pro-abortion

- Abortion is legal in South Africa✓ – it is enshrined in our constitution – women have a choice✓
- The foetus does not have the status of a child✓ in South Africa✓
- Abortion is better✓ than bringing an unwanted child into the world and abandoning it✓
- The abandoned child could possibly have anti-social behaviour✓ and become a problem✓
- Sometimes women do not have a choice about the use of contraceptives/ it is male controlled✓ – she falls pregnant not out

- of choice – abortion is the only option in this case✓
- Any other acceptable reason

Any 4 x 2 (8)

(b) Methods of birth control

Natural methods

- Abstinence✓ simply means not having sexual intercourse✓
- Rhythm method✓ – the couple engages in sexual intercourse but only during times when fertilisation is not likely to occur i.e. no sexual intercourse 3 - 4 days before and after ovulation✓

Chemical methods

- Spermicidal – creams or foams that destroys sperm in the vagina✓
- Contraceptive pill✓ – hormonal control that prevents ovulation and therefore conception✓

Mechanical/barrier methods

- Condom✓ – sheath that traps sperm and prevents it from entering the vagina✓
- Femidom✓ – used by a female – also traps sperm and prevents it from entering the uterus✓
- Diaphragm✓ – a cap that fits over the cervix – stops the passage of sperm✓
- Intra-uterine-device (IUD) ✓ – small piece of metal or plastic which is retained inside uterus and which prevents implantation of the embryo✓

Surgical methods

- Vasectomy✓ – small cuts are made into the scrotum and the sperm ducts are tied/cut – prevents sperm from entering the urethra✓
- Ligation/female sterilisation✓ – two Fallopian tubes are cut/tied so that no ova enters the uterus – also sperm can swim up to fertilise the ovum✓

Any 2 x 2 (4)

ASSESSING THE PRESENTATION OF THE ESSAY

| Marks | Descriptions |
|----------|---|
| 3 | Well structured – demonstrates insight and understanding of question |
| 2 | Minor gaps in the logic and flow of the answer |
| 1 | Attempted but with significant gaps in the logic and flow of the answer |
| 0 | Not attempted/nothing written other than question number |

(3) **15**