SECTION A

Question 1

General remark

Section A was answered reasonably well – provided the candidates had the basic knowledge. They did not do well in higher order quesions where knowledge and understanding of protein synthesis and meiosis were required.

Problematic areas

1.2 Candidates did not know the difference between *seed* and *fruit* or the meaning of *umbilical cord* and *bloodvessels*. Terminology needs to be given more attention in class.

1.3 Candidates must be taught to follow instructions. They must give letters when asked to do so, and not words.

1.4 Application of knowledge and interpretation of data – higher level of skills tested. Candidates did not know the structure of RNA – that urasil replaces thiamine. They must be taught how to write base triplets in sequence – from left to right. Marks are forfeited if instructions are not followed. In view of the general poor performance of candidates in this question it is questionable whether protein synthesis is being taught properly in the classroom.

1.4.3 Candidates have to read questions carefully before answering them. Candidates mentioned "mutation" in (a) and did not give it where it was asked (b).

1.5 In general, meiosis needs more attention.
1.5.1 Candidates had to add Anaphase II when refering to the phases.
1.5.2 Candidates could not distinguish between *chromatids* and *chromosomes.*
1.5.3 Terminology must be drilled in class. Candidates wrote *nuclear membrane* and not *cell membrane* as a label. *Membrane* alone was not acceptable.
1.5.4 Not well answered. Candidates seemed to have misunderstood the question and often wrote "Yes" instead of "No".
1.5.6 & 1.5.7
Candidates had the misconception that *human* is not *animal*. Many thought the cell was that of a human cell. Candidates must be taught that they will be given examples that need to be interpreted and analysed with the knowledge that they have been taught, to make deductions or draw conclusions. Here they needed prior knowledge on how many chromosomes there are in a human cell that has undergone meiosis.

1.5.8 Candidates must understand the difference between *mitosis* and *meiosis*. Candidates did not know the functions of meiosis.

1.6 Generally it seems that plant reproduction did not get much attention in the classroom. Once again, the ability to apply knowledge was being tested. Candidates must be told that any scenario of an investigation can be sketched to test their ability to do an investigation.
Answers must be numbered correctly.
1.6.3 Knowledge of the scientific method is not enough. Candidates must be taught how to apply this knowledge.

SECTION B

Question 2

General remark

The interpretation of diagrams and graphs must be taught. Merely indicating that a graphs goes *up* or *down* is not acceptable. Alternatives are *increasing* and *decreasing*. Terminology was poorly answered. Candidates must be able to interpret a graph or diagram with the help of knowledge acquired. When a correlation or tendency is asked, or a specific answer is asked that must be read from the graph that has been studied, the candidate will not get marks when he or she merely writes "textbook" knowledge learnt off by heart.
Questions 2.2.1, 2.2.2, 2.2.4, 2.2.5 and 2.2.7 were examples of such questions.

Candidates must be taught how to interpret graphs and to identify or interpret correlations between the different graphs and illustrations involved in the menstrual cycle.

2.2.5 When a relationship is asked, then both (i.e. *oestrogen* and *endometrium*) should be mentioned and the relationship clearly indicated.
2.2.6 Candidates could not distinguish between *implantation* and *fertilization* or *uterus* and *uterus lining*.

Once again knowledge of terminology was lacking.

Question 3

General remark

Pedigree diagrams need much more attention in the teaching proses.

3.1 It seems as it blood groups are not taught in detail. Candidates did not understand *haemophilia* as an example of a genetic disorder. It is a sex-linked chromosomal disorder.

3.2 Candidates expected to get Down's syndrome. Teachers should deal with examples of different syndromes even though they are not in the syllabus.
This will help candidates to develop the skill to interpret any karyotype – not only Down's syndrome. Candidates had to refer to the data given to answer the question.

3.3 Mainly well answered. There where however many centres where candidate could not calculate %. Teachers must ensure that all candidates have the right tools (calculator, protractor, etc.) available when writing the exam paper.

3.4 Teachers must teach candidates that a specific "recipe" must be followed when doing genetic crossings.
Teachers should use the following steps when teaching a genetic cross:
Step 1: Write down the genotype and phenotype of both parents and indicate the crossing by means of an X.
Step 2: Write down the gametes formed as a result of meiosis for each parent. Preferably indicate the gametes within a circle.
[Mendel's law of segregation]
Step 3: Show fertilization by using either a line diagram or the Punnet square.
Step 4: Write down the genotype(s) and the phenotype(s) of the offspring.
All steps and processes must be labelled.

Terminology should be taught and understood to be able to answer any unfamiliar crossing given. Examples: *genotype, fenotype, gametes, P1*and *F1generations, meiosis and fertilization*. Candidates must also know the difference between *heterozygous* and *homozygous dominant* and *recessive*.

Teachers must emphasise that all information must be read thoroughly before attempting to answer the question. Many candidates only read the first question and started the crossing using the genotypes of the homozygous mice as mentioned in the first paragraph.

3.5 Candidates answered this question well. Some did not read it properly and therefore gave answers on planned pregnancies. The manner in which this question was answered gave an indication of what many candidates are experiencing in their communities.

SECTION C

Question 4

General remark

Candidates did not know how to write a ratio (1:2:1). Instructions were not read properly.

4.1 In the graph the *genotype* was asked, but the *phenotype* was given. Many candidates did not know how to formulate a caption for a graph – both variables must be included. Teachers should give candidates as many examples as possible to practise this skill. Accuracy is very important. Protractors must be used to get accurate proportions of slices, and circles must not be drawn free-hand. Most candidates could draw the pie graph.

4.2 Candidates did not know which steps to follow when doing a scientific investigation. Many just gave the general steps. They were expected to be able to apply the knowledge taught. Candidates did not read instructions properly. The *planning* of an investigation was required and not the *method*. Candidates were expected to show how they would plan the specific investigation, i.e. the identifying of *finger prints* and not just general planning.

Candidates confused *finger printing* with *DNA fingerprinting*.

4.3 Candidates did not know what GMO foods are. When writing an essay, candidates are expected to give facts, but they should also be able to elaborate (explain) to obtain full marks.
Candidates should be encouraged to expand their general knowledge on these topics. Many candidates did not link their answers to the value of GMO as *food source,* but gave general advantages of GMOs. Where language was a problem, candidates could not express themselves.
Some candidates had clearly not been taught how to write/plan an essay.