UNIVERSITY OF MALTA

**THE MATRICULATION CERTIFICATE EXAMINATION
INTERMEDIATE LEVEL**

BIOLOGY

May 2008

EXAMINERS' REPORT

**MATRICULATION AND SECONDARY EDUCATION
CERTIFICATE EXAMINATIONS BOARD**

IM Biology
May 2008 Session
Examiners' Report

1.0 : Statistical Information

Table 1 shows the distribution of grades for the May 2008 session.

Table 1: Distribution of Grades awarded in May 2008

GRADE	A	B	C	D	E	F	Abs	Total
Number	18	48	41	24	39	36	12	218
% of Total	8.26	22.02	18.81	11.01	17.89	16.51	5.50	100

2.0 : General Comments regarding candidates' performance

The following report has been compiled from separate documents submitted by members of the Board of Examination and by markers of the examination scripts in question. It represents an appraisal of the performance of candidates taking the Matriculation Certificate examination in biology (Intermediate Level) in May 2008.

Comments on each of the questions set are given below. On a more general level, a number of recurring observations should be stressed:

The level of English (both in terms of grammar and spelling) was poor and hardly up to the standard of an examination at this level. In a number of cases, the inability of candidates to express themselves made their answers unintelligible. This also tends to lead to poor understanding of questions; candidates frequently did not understand the questions, and gave answers of little relevance to the question asked.

Many candidates, judging from their answer to Question 6 in Section A, did not seem to have covered the prescribed matter concerning the nervous system.

Answers to questions in Section B generally lacked detail. In some cases, answers were out of point, giving details of unrelated answers. Presentation and organization of answers to questions in Section B was generally satisfactory although some candidates presented chaotic answers. A number of candidates submitted a single answer to the structured questions in Section B, with no indication of where answers to each separate sub-question started and ended.

3.0 : Comments regarding candidates' performance in each question

Question 1: Respiration

1.1 Most candidates correctly distinguished between aerobic and anaerobic respiration. Incorrect answers generally identified a 'greater need of energy' in one of the types of respiration or 'production of a greater amount of oxygen'.

1.2 Most candidates correctly identified two by-products of anaerobic respiration.

1.3 A substantial number of candidates answered the question correctly. Others failed to stress that anaerobic respiration occurs during heavy / strenuous exercise and just suggested during exercise. Others incorrectly suggested that anaerobic respiration occurred after exercise.

1.4 the majority of candidates described the process of glycolysis correctly.

1.5 Performance in this question was extremely poor. Most candidates omitted the question or suggested that oxidative phosphorylation is 'a reaction between oxygen and phosphorus.' Some candidates confused it with the link reaction. Practically no one referred to production of ATP.

1.6 Some candidates answered this question correctly. Others omitted it or confused the whole process. In general candidates seem unaware that the acetyl group is broken down into 2 molecules of carbon dioxide. On the other hand however most referred to reduction of FAD and NAD as well as production of ATP.

Question 2: Enzymes

2.1 Vast majority answered this question correctly. Some failed to identify that the enzyme is a biological catalyst, thus not distinguishing it from other chemical catalysts.

2.2 Candidates generally named an enzyme correctly but less mentioned the substrate of the particular enzyme chosen.

2.3. Responses indicated that candidates know the concept behind the 'lock and key' hypothesis. Yet they rarely suggested that the active site of the enzyme and the substrate are complimentary in shape. Some candidates suggested that the substrate acts as the lock rather than the enzyme. Others misinterpreted the term lock often suggesting that the enzyme locks itself around the substrate.

Question 3: Biomolecules

Candidates generally seemed confused when answering this question often confusing which elements are present in the biological molecules identified.

Question 4: Food webs

4.1 Majority of candidates correctly defined a food-web.

4.2 Candidates generally defined producers correctly. Although some suggested that it is the producers that 'produce energy'.

4.3 Candidates generally define the term consumers correctly.

4.4 Most candidates were unable to mention that decomposers recycle nutrients back into the soil. Generally they were unable to suggest that decomposers are micro-organisms.

4.5 Some candidates gave excellent answers, but others were confused. The latter often focused on the number of organisms represented, clearly misreading the question which clearly stated that the pyramids represented were pyramids of energy.

Question 5: Insulin/genetics

5.1 Surprisingly several candidates misread the question. Thus they described the role of insulin in controlling level of glucose in blood without stating that insulin is a protein / or a hormone. Others incorrectly suggested that insulin is an enzyme.

5.2 The majority of candidates correctly stated one function of insulin in the body. Some however confused it with glucagon and suggested that it increases level of glucose in blood.

5.3 Very few candidates answered this question correctly. Only a handful linked individual genetic make up to different immune responses in different individuals. A substantial number of candidates omitted this question.

5.4 A minority of candidates answered this question correctly. Several suggested that insulin is injected in the bacterium so that it is protected from the immune system of the human. This implies that bacteria are injected into humans rather than pure insulin.

5.5 Several candidates answered this question correctly. Others often seemed to have an idea of the process but failed to describe all steps involved.

Question 6: Nervous system

6.1 Performance in this question was extremely poor. One must question whether the candidates had heard of the nervous system at all.

6.1 A small minority of candidates defined the autonomic nervous system correctly. Yet practically none of the candidates suggested that it is part of the peripheral nervous system.

6.2 Candidates sometimes answered correctly, often identifying at least one process that is controlled by the nervous system. Yet majority was unable to do so often giving confusing answers such as passage of nerve impulses. Others mentioned parts of the nervous system e.g. brain or nerves rather than processes.

6.3 Most candidates answered this question well. A substantial number however omitted the question.

6.4 Most candidates answered this question well. A substantial number however omitted the question.

6.5 Practically none of the candidates answered this question well. Most indeed focused on the general effects of nicotine on the body rather than on its affect on the autonomic nervous system. Once again a substantial number of candidates did not answer this question.

Question 7: Hormones

7.1 Most candidates correctly identified the role of FSH in the female. Few mentioned its role in the male. Incorrect responses often showed confusion between the ovary and the ovum (indeed this was also reflected in 7.2 and 7.3 as well). Some candidates suggested that FSH affects growth of hair by affecting hair follicles.

7.2 Several candidates correctly identified the role of LH in the female. Others gave confusing responses or did not answer.

7.3 Most candidates correctly identified the role of progesterone in females. Some however confused it with testosterone.

7.4 Vast majority of candidates correctly identified the role of oestrogen in females.

7.5 Vast majority of candidates correctly identified the role of testosterone in males.

Question 8: Circulatory system

8.1 Generally candidates correctly identified the main functions of the circulatory system in vertebrates as being transport of materials (eg: Oxygen is transported from the lungs to the cells; CO_2 transported from the cells to the lungs); transport of nutrients (for example, glucose, a simple sugar used to produce ATP, is transported throughout the body by the circulatory system). Candidates also elaborated on the fact that the circulatory system helps maintain body temperature by transporting heat. Candidates also mentioned that the circulatory system includes cells that fight infection. Few candidates mentioned that the circulatory system helps to stabilize the pH and ionic concentration of the body fluids.

8.2 Most candidates correctly identified the various components of human blood as being Plasma, RBCs, White Blood Cells and Blood Platelets. Different levels of details were given by various candidates in the descriptions of each component. Some candidates were able to provide very detailed descriptions especially on the different white blood cells.

8.3 The most common problem of the circulatory system mentioned by candidates was Coronary heart disease, with most candidates properly describing that Coronary heart disease is the term that describes what happens when your heart's blood supply is blocked, or interrupted, by a buildup of fatty substances in the coronary arteries. Few candidates wrongly associated Coronary heart disease with the buildup of fatty deposits in the aorta or pulmonary artery. A small number of candidates mentioned congenital heart defects (abnormalities in the heart's structure that are present at birth and involve abnormal or incomplete development of the heart).

Question 9: Resources

9.1 Candidates generally defined 'resource' correctly. Most candidates further explained the term by describing Renewable and Non Renewable resources correctly using proper examples to compare the two.

9.2 The most common environmental problems arising from overuse of resources mentioned by candidates were depletion of minerals like oil, loss of biodiversity, mainly through deforestation. Most of the descriptions were of accurate and included a description of the problem and is causes. Candidates were less successful in suggesting ways in which the problem can be mitigated and the negative impact reduced. The answers were generally weak when considering the socioeconomic implications of such issues.

Question 10: Cells

10.1 Generally candidates obtained average marks in this question. The majority of candidates correctly answered the first part by defining the cell as being the structural and functional unit of all living organisms, and the smallest unit of life capable of performing vital functions.

10.2 Candidates had more difficulty in comparing and contrasting the structures and functions of a prokaryotic cell and a eukaryotic cell. Generally, candidates were able to distinguish prokaryotes from eukaryotes on the basis of nuclear organization, specifically through the lack of a nuclear membrane. Nonetheless, some candidates mixed up a number of characteristics of eukaryotic cells and prokaryotic cells, while other candidates confused the two cells with the animal and plant cells. Few candidates mixed up the two cells altogether. On the whole, the diagrams were not of a very good standard and better labeled diagrams are expected.

Question 11: Photosynthesis

11.1 Most candidates were able to give a basic account of photosynthetic processes in green plants. Candidates were mostly successful in describing the relation of leaf structure to its function in photosynthesis. Candidates correctly described the role of the palisade layer, the spongy mesophyll and the stomata in relation to photosynthesis. Proper labelled diagrams where used to illustrate the leaf structure, the palisade layer, the spongy mesophyll, the stomata and the epidermis & waxy cuticle.

11.2 Candidates were less successful in describing the roles of chlorophylls and other photosynthetic pigments during photosynthesis. Even though candidates described the ability of pigments to absorb certain wavelengths of light, fewer candidates properly explained that since each pigment reacts with only a narrow range of the spectrum, there is usually a need to produce several kinds of pigments, each of a different colour, to capture more of the sun's energy. Most candidates at least identified the broad groups of chlorophylls and carotenoids.

11.3 Very few candidates described the light-dependent and light-independent reactions of photosynthesis accurately. Diagrams were not generally used and those that were presented were often confusing.

Question 12: DNA

12.1 Generally candidates correctly described the organisation and structure of genetic material in organisms and most used appropriate diagrams to illustrate their answers.

12.2 Candidates were less successful in explaining mutations in genetic material, with some candidates providing a list of causes of mutations (such as copying errors in the genetic material during cell division, by exposure to ionizing radiation, chemical mutagens, or viruses), without actually describing and explaining them.

12.3 The descriptions on the role of genetic material in the synthesis of protein were generally of a lower standard than the descriptions of the structure of genetic material. Some candidates actually confused the processes of transcription and translation. A few candidates included charts and diagrams to explain the process and these were generally of a good standard and helped in the explanation

Chairperson
Board of Examiners
July 2008