General Certificate of Education (A/L) Examination
2004 - April
Biology II - Three hours

PART A - Structured Essay
Answer all question on this paper itself
(Each question carries 10 marks)

1 *(A)* (i) What are the four major concepts included in the cell theory?

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(ii) List **five** major organelles found in an eucaryotic cell and indicate the presence or absence of protein, lipid, RNA, DNA, (Use + sign for presence and - sign for absence in the relevant column) and one function of each of the organelles.

Organelle	Protein	Lipid	RNA	DNA	Function
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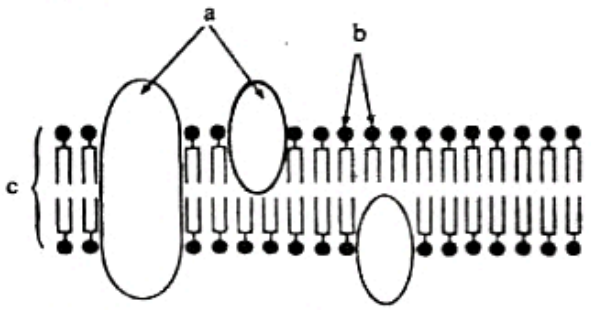
(B) Given below is a diagram of the fluid mosaic model of cell membrane.



(i) Label the parts indicated by a, b, and c, in the above diagram.

a. .....

b. .....

c. .....

(ii) **State three** major functions of the cell membrane in eucaryotic cells.

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(iii) Why is the above model known as the fluid mosaic model?

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(C) (i) **Name the five** phases of mitosis and indicate a major change taking place in the cell at each phase during cell division.

Phase of mitosis	**A major change taking place in the cell**
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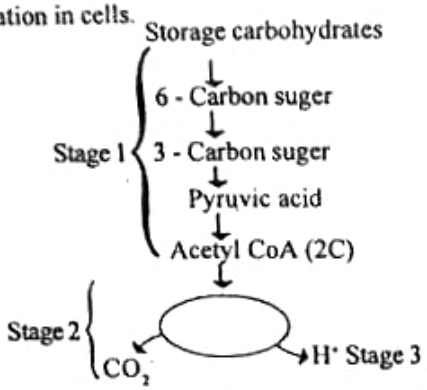
(ii) State the differences between mitosis and meiosis.

Mitosis	Meiosis

(D) The following diagram outlines the major stages of aerobic respiration in cells.



(i) Name the processes labelled as stages 1, 2 and 3 in the above diagram and indicate the sites they occur in the cell and the number of ATP molecules produced at each stage.

	Process	Site	Number of ATP molecules produced
Stage 1			
Stage 2			
Stage 3			

(ii) Name the storage carbohydrate commonly found in each of the following.
(a) seeds - .....
(b) Liver - .....

(iii) Name an enzyme which converts the storage carbohydrates into 6C suger in plants.

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2. (A) (i) What is the overall function of the circulatory system of animals?

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(ii) What are the most importaant features of the circulatory system in animals?

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(iii) What is a closed blood circulatory system?

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(iv) How does a closed blood circulation differs from an open blood circulation?

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(v) Name a phylum having multicellular animals without a blood circulatory system

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(B) (i) Briefly describe the location and the gross structure of the heart of cockroach

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(ii) State **one** structural difference between the hearts of cockroach and earthworm

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(iii) State **two** physiological differences between cardiac muscle fibres and skeletal muscle fibres of man

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(iv) State **one** physiological similarity between cardiac muscle fibres and smooth muscle fibres of man.

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(C) (i) What is blood plasma?

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(ii) What is the main component of blood plasma?

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(iii) How is carbon dioxide transported in the blood of man?

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(iv) Why is carbon monoxide considered as a strong respiratory inhibitor?

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(v) What are the two respiratory pigments found in annelids?

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(D) (i) Name the **two** major tissues involved in the transport of materials in plants and indicate their constituent cell types and the substances transported.

Tissue	Constituent cell types	Substances transported

(ii) What are the major methods of movement of water in plants?

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(iii) Explain using water potential concept how soil water moves throgh a root hair cell into cortical cells of the plant root.

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(iv) Outline the major steps of a simple experiment carried out in the laboratory to determine the water potential of a plant tissue

3 (A) (i) State the most important features of reproduction

(ii) What are the main differences between sexual reproduction and asexual reproduction?

(iii) What is the importance of sexual reproduction?

(iv) What is parthenogenesis?

(v) Name an animal that shows parthenogenesis.

(B) (i) What are the major types of asexual reproduction seen among animals?

(ii) Give an example of an animal for each of the types of asexual reproduction stated in B (i).

(iii) Some of the types of asexual reproduction stated in B (i) can be seen in organisms other than animals. State these types and give one example of an organism other than animals for each of these types.

(C) (i) State the diagnostic features of phylum Chordata

(ii) State **one** major external feature that can be used to distinguish the animals that belong to each of the following Classes.

Chondrichthyes .....
Osteichthyes .....
Amphibia .....
Reptilia .....
Aves .....
Mammalia .....

(D) A list of organisms and a table of importat characteristics of those organisms are given below. Select the organism that shows any one of the characteristics given in the table and write the number of that organism in the column labelled as 'organism number' against the relevant characteristic. The first line of the table is completed as an example. Use one organism number only once.

List of Organisms

1 *Selaginella*	9 Earthworm
2. *Saccharomyces*	10. Paddy
3. Starfish	11. *Pogonatum*
4 *Cycas*	12. *Mucor*
5. *Ulva*	13. Spider
6. *Nephroleps*	14. Liver fluke
7. Sea anemone	15. *Necator*
8. *Chlamydomonas*	16. *Clostridium*

Characteristic	Organism Number
a. Seeds produced by self-pollination	.....
b. Presence of haploid endosperm	.....
c. Presence of mouth with cutting plates	.....
d. Unicellular flagellated organism	.....
e. Penta-radially symmetrical body	.....
f. Presence of morphologically similar gametangia	.....
g. Heterophyllous plants	.....
h. Facultative anaerobic organism	.....
i. Presence of book lungs	.....
j. Presence of a diploblastic body	.....
k. Obligatory anaerobic organism	.....
l. Presence of a flat thalloid body	.....
m. Presence of free living male and female gametophytes	.....
n. Excretion by flame cells	.....
o. Presence of antheridia and archegonia on the ventral surface of a gametophyte	.....
p. Body cavity is the coelom	.....

4. (A) (i) What is meant by the term natural resources?

(ii) What is a renewable resource?

(iii) Give **two** examples for renewable resources.

(iv) Give **two** examples for non-renewable resources

(v) What is meant by sustainsble use of natural resources?

(B) (i) Explain why a home garden could be considered as an ecosystem

(ii) Write a food chain with **four** links that can be commonly seen in a home garden ecosystem.

(C) (i) State the environmental impacts of shrimp farming industry.

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(ii) Give the common names of the **two** major species of shrimps used for aquaculture in Sri Lanka.

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(iii) Name the **two** viruses that caused heavy losses to the shrimp farming industry in Sri Lanka in the recent past.

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(iv) State how disease outbreaks in shrimp farms could be controlled.

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(v) What are the major differences between extensive and intensive aquaculture systems?

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(D) (i) In agircultural pest control, what are known as economic injury level and economic threshold?

Economic injury level

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Economic threshold

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(ii) What are the major factors that affect economic threshold?

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(iii) What are the major groups of synthetic insecticides that are used in insect pest control?

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Part B - Essay

Answer four questions only.
Give clearly labelled diagrams where necessary.
(Each question carries 15 marks)

1. Explain how a molecule of carbon dioxide in the atmosphere gets converted into a molecule of starch in the chloroplast of a leaf cell in a C_3 plant during photosythesis.

2. (i) Explain what is meant by the term biodiversity.
   (ii) What are the human activities which can lead to the loss of biodiversity?
   (iii) Explain why the conservation of biodiversity is important.
   (iv) State the major biodiversity conservation methods with suitable examples.

3. (i) What are mutations?
   (ii) What are the major causes of mutations?
   (iii) Explain giving suitable examples the different types of mutations occurring in living organisms.
   (iv) What is the evolutionary significance of mutations?

4. (i) What are the major physical changes and chemical changes that take place in food during microbial spoilage?
   (ii) What are the internal factors of food and external environmental factors that influence food spoilage by micro-organisms?
   (iii) Explain how these internal factors of food affect food spoilage.

5. (i) Describe the gross structure of the human kidney.
   (ii) Briefly explain the process of urine formation in man.

6. White short notes on the following :
   (i) Control of weeds
   (ii) Human cerebellum
   (iii) Role of micro-organisms in the extraction of metals.