General Certificate of Education (Adv. Level) Examination, August 2007
Biology II

Three hours

Important

* *This question paper comprises* ***Part A and Part B****. The time allotted for* ***both parts*** *is* ***three hours.***

PART A - Structured Essay:
Answer all questions on this paper itself. Write your answers in the space provided for each question. Please note that the space provided is sufficient for your answer and extensive answers are not expected.

PART B - Essay:
Answer four questions only. Use the papers supplied for this purpose. At the end of the time allotted for this paper, tie the two parts together so that Part A is on the top of Part B before handing over to the supervisor.

You are permitted to remove only Part B of the question paper from the Examination Hall.

Part A - Structured Essay

Answer all questions on this paper itself
(Each question carries 10 marks)

1. (A) (i) What is meant by classification of organisms?

.....

.....

(ii) What is the main difference between natural classification and artificial classification?

.....

.....

(iii) What is the taxon that is naturally recognizable?

.....

(iv) What are the three criteria used to classify organisms into five kingdoms?

.....

.....

.....

(v) Name the kingdom, in the five kingdom classification, to which each of the following organisms belong.

	Organism	Kingdom
(a)	*Plasmodium*	.....
(b)	*Saccharomyces*	.....
(c)	*Ulva*	.....
(d)	*Oscillatoria*	.....

(B) (i) Name an animal living in Sri Lanka today which has changed only slightly from its ancestor that lived about 500 million years ago.

.....

(ii) What is the term used to indicate the species that are living today with slight changes from their ancestors?

.....

(iii) A student observed a legless animal with external segmentation and cylindrical body in his home garden. Name the phylum and the class to which this animal belongs.

Phylum .....

Class .....

(iv) Name two other classes of the phylum stated in (B) (iii) above. State a unique external feature of the animals of each of these classes and give one example of animals for each of them.

	Class	Unique external feature	Example
(a)	.....	.....	.....
(b)	.....	.....	.....

(C) (i) What is a food chain?

.....

.....

(ii) State the trophic levels seen in a food chain.

.....

(iii) What is an ecological pyramid?

.....

.....

(iv) (a) What is the type of ecological pyramid that is **never** inverted?

.....

(b) What is the reason for this?

.....

.....

(D) (i) State what activities of primitive man began to change his immediate environment significantly.

.....

.....

(ii) Approximately how many years ago did man start significantly influencing the environment?

.....

(iii) What is the forest cover in Sri Lanka today as an approximate percentage of land area?

.....

(iv) State **five** types of natural forest ecosystems found in Sri Lanka.

.....

.....

.....

.....

.....

(v) State **three** important environmental benefits of forests.

.....

.....

.....

(A) (i) What is meant by nutrition?

.....

.....

(ii) State the main processes of the holozoic mode of nutrition.

.....

.....

(iii) What is a balanced diet?

.....

.....

(iv) What is the dental formula of an adult person?

.....

.....

(v) What is the function of ptyalin present in human saliva?

.....

(B) (i) In which part of the human alimentary canal are the smooth muscle layers most developed?

.....

(ii) Name the main type of tissue found in the submucosa of the human alimentary canal.

.....

(iii) How are the contents in the stomach prevented from entering the oesophagus in man?

.....

.....

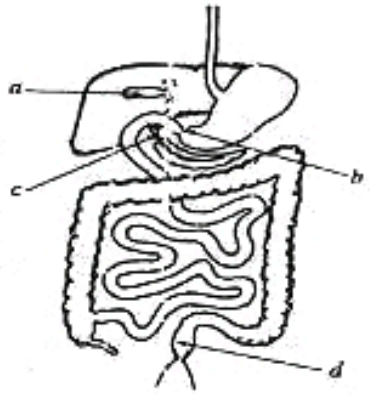
(iv) State **three** functions of the human gastric juice other than digestion.

1. .....
2. .....
3. .....

(v) What is the function of the Brunner's glands?.

.....

(C)



(i) Name the parts labelled as *a*, *b*, *c* and d in the above diagram and state the main function of each of these parts.

	Part	Main function
a.	.....	.....
b.	.....	.....
c.	.....	.....
d.	.....	.....

(ii) How is the surface area for absorption increased in the small intestine of man?

.....

.....

.....

(iii) What is peristalsis?

.....

.....

(iv) What is the effect of stimulation of parasympathetic nervous system on peristalsis?

.....

(D) (i) What is meant by essential amino acids?

.....

.....

(ii) Name three proteolytic enzymes in the pancreatic juice of man.

.....

(iii) What are the functions of enterokinase?

.....

.....

(iv) What are the functions of aminopeptidases in the intestinal juice?

.....

.....

(v) Name **two** substances found in bile which are **not** found in other secretions of human alimentary canal.

.....

3. (A) (i) State two biological significances of meiosis.

.....

.....

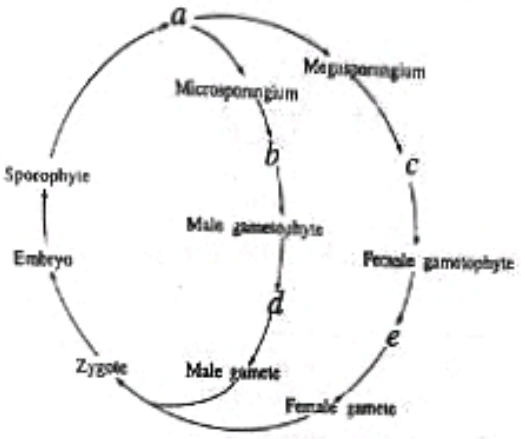
(ii) Indicate the stages of the life cycle in which meiosis takes place in the following organisms.

(a) *Mucor* :.....

(b) *Agaricus* :.....

(c) *Pogonatum* :.....

(iii) The following diagram represents the life cycle of *Selaginella*.



Name the structures/stages labelled as *a*, *b*, *c*, *d* and *e*.

a. .....

b. .....

c. .....

d. .....

e. .....

(iv) What are the names of structures/stages of angiosperm life cycle which correspond to the following structures/stages in the above diagram?

(i) a .....

(ii) b .....

(iii) Female gametophyte .....

(B) (i) Given below are five terms used to describe floral features of angiosperms and names of five plants. Select the correct example of plant for each of the floral features.

Psidium (Guava)
Helianthus (Sur. flower)
Phaseolus (Bean)
Cocos (Coconut),
Ixora

Floral features		Plant
(a)	Gamopetalous flower	.....
(b)	Epigynous flower	.....
(c)	Unilocular ovary	.....
(d)	Capitulum	.....
(e)	Spadix	.....

(ii) Indicate a plant growth substance which can be used for each of the following.

(a) Induce flowering .....

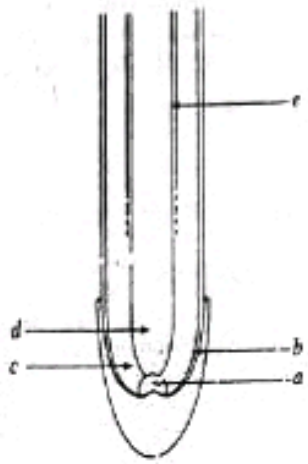
(b) Keeping flowers fresh for a long time .....

(c) Induce fruiting .....

(d) Maintaining seed dormancy .....

(e) Breaking seed dormancy .....

(C)



(i) The diagram represents longitudinal section of a dicotyledonous root apex. Name the parts labelled as a, b, c, d and e.

a. .....

b. .....

c. .....

d. .....

e. .....

(ii) From which of the above parts do the following structures originate?

Xylem .....

Interfascicular cambium .....

Lateral roots .....

(iii) Give **one** function of each of the parts labelled as a, b and c in the diagram.

Part	Function
a	.....
b	.....
c	.....

(D) (i) Name the types of cells present in the xylem tissue and give one function of each type of cell

Type of cell	Function
.....	.....
.....	.....
.....	.....
.....	.....

(ii) Name the types of cells present in phloem tissue and give **one** function of each type of cell

Type of cell	Function
.....	.....
.....	.....
.....	.....
.....	.....

(iii) Name **three** substances other than water, transported in phloem tissue.

.....

4. (A) (i) Draw a fully labelled diagram to show the main structural features of a typical bacterial cell as seen in an electron micrograph

(ii) State **five** structures found in a typical animal cell which are **not** found in a bacterial cell.

.....

(iii) Name the structures of an animal cell which carry out the following functions.

(a) Detoxification of toxins formed during cellular metabolism.

.....

(b) Digestion of worn-out cellular components.

.....

(iv) State the sequence of steps that are taken to examine cells of an epidermal peel of onion under microscope.

.....

.....

.....

.....

(B) (i) What are biological polymers?

.....

(ii) Name **two** major biological polymers found in cells which contain only C, H, O and indicate one function of each of them.

Biological polymer	**Function**
.....	.....
.....	.....

(iii) Name two major biological polymers found in cells which contain only C, H, O, N, P and indicate one function of each of them.

Biological polymer	**Function**
.....	.....
.....	.....

(iv) Describe a simple experiment to distinguish sucrose and maltose.

.....

.....

.....

.....

(C) (i) What is the basic function of an enzyme in the catalysis of biological reactions?

.....

(ii) Some enzymes require co-factors for their efficient activity. Name **three** such co-factors and indicate **one** function of each of them.

Co-factor	Function
.....	.....
.....	.....
.....	.....

(iii) State **five** factors affecting rate of enzyme reactions.

.....

.....

(iv) Explain the term "specificity" in relation to enzymes.

.....

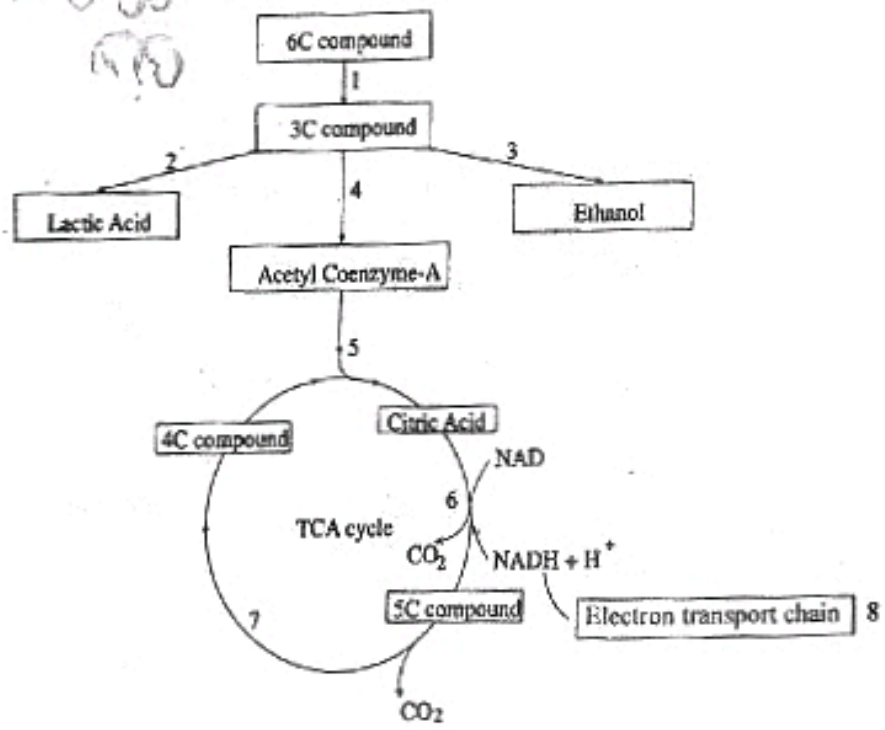
.....

.....

(v) Name the substrate and the products of the reactions catalysed by the following enzymes.

Enzyme	Substrate	Product
Catalase	.....	.....
Lipase	.....	.....
Invertase	.....	.....

(D) Some of the processes of cellular respiration are given in the diagram below, labelled 1 - 8.



(i) What is the 6C compound usually used in process 1?

.....

(ii) Name the 3C compound formed by process 1.

.....

(iii) Which of the above processes take place only under anaerobic conditions?

.....

(iv) What is the 4C compound regenerated in the TCA cycle which combines with Acetyl Coenzyme-A to form citric acid?

.....

(v) Name the sites in an eucaryotic cell at which the following processes take place.

(a) Glycolysis .....

(b) TCA cycle .....

(c) Electron transport chain.....

***

Part B - Essay

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

1. (a) Explain how plants obtain their nitrogen requirements.
   (b) Indicate the role of nitrogen in plant metabolism.
   (c) Describe with he help of a labelled diagram how nitrogen is cycled in nature.

2. (a) What are the basic characteristics of microorganisms used in Biotechnology?
   (b) Give an account of the applications of microorganism in food and beverage industry, agriculture and environmental management.

3. Describe the gross structure of human cerebrum and state its functions.

4. (a) Name the **three** systems of aquaculture and describe the main features of each of them.
   (b) Describe the environmental problems caused in Sri Lanka by shrimp farming.

5. (a) State the global environmental issues concerning the atmosphere and describe their causes and consequences.
   (b) Explain the measures that are taken to manage these environmental issues.

6. Write short notes on the following.
   (a) Importance of breast feeding
   (b) Tropic movements of plants
   (c) Theory of natural selection

***