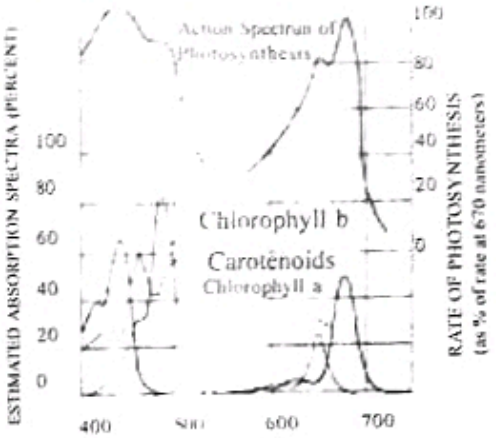
General Certificate of Education (A/L) Examination
2005 - April
Biology II - Three hours

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

1 *(A)* The graphs below show the absorption spectrum of photosynthetic pigments and action spectrum of photosynthesis



(i) What major conclusions can be drawn regarding photosynthesis based no the above graphs?

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(B) (i) Indicate in the table given below the two major stages of photosynthesis, sites in the chloroplast at which the two stages take place and **three** major events taking place at each stage.

Major stage of Photosynthesis	**Site at which it takes place in the choroplast**	**Major events taking Place at each stage**
.....	.....	.....
		.....
		.....
.....	.....	.....
		.....
		.....

(ii) Write **two** physiological and **two** anatomical characteristic features of leaves which can be considered as adaptations to maximize the rate of photosynthesis

Physiological	**Anatomical**
.....	.....
.....	.....

(C) (i) Draw below **three** separate **labelled** graphs to indicate how (a) pH, (b) temperature, (c) substrate concentration affect the of enzyme reaction.

(a) (b) (c)

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(ii) Explain why an enzyme loses its activity at high temperature

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(D) (i) Name the **four** major types of organic compounds that are found in living matter, indicating their elemental composition and **two** major functions in the following table.

Organic compound	Elemental compositon	Major functions
.....	.....	.....
.....	.....	.....
.....	.....	.....

(ii) You are provided with three solutions, *A*, *B* and *C*, one of them contain amylase enzyme, and the other two contain 0.1% and 0.5% of starch solutions. If you are given the following materials, explain how you would identify the solutions containing (a) amylass solution (b) 0.5% starch solution.

Materials given: white tile, measuring cylinder, stopwatch, water, dilute iodine, test tubes in a rack, glass rods and glass tubes.

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2 (A) (i) What is the central role of the nervous system?

.....

(ii) What is the functional unit of the vertebrate nervous system?

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(iii) Name a phylum whose members have a nerve net

.....

(iv) State **two** structural differences between the nerve cord of a typical invertebrate and a typical chordate

(a) .....

(b) .....

(v) State the effect of stimulation of the sympathetic nervous system on each of the following

	Effect
(a) heart beat	.....
(b) gut contraction	.....
(c) sweat secretion	.....
(d) size of iris	.....

(B) (i) In the diagram given below indicate the following parts (a-g) by drawing arrows and labelling them

(a) Cerebellum
(b) Pons varolii
(c) Pituitary gland
(d) Hypothalamus
(e) Occipital lobe of cerebral cortex
(f) Corpus callosum
(g) Frontal lobe of cerebral cortex



(ii) Give **one** main function for each of the following

	Function
(a) Occipital lobe of cerebral cortex	.....
(b) Pons varolii	.....
(a) Cerebellum	.....

(iii) What are neurotransmitters?

.....

.....

(iv) Name **two** neurotransmitters?

(a) ..... (b) .....

(v) Why is a neurotransmitter not considered as a hormone?

.....

(C) (i) What is a nerve action potential?

.....

(ii) What ion is responsible for the depolarization phase of the action potential?

.....

(iii) Define a nerve impulse

.....

(iv) What is the role of myelin in the conduction of nerve impulses?

.....

(v) Name the cells which secrete myelin

.....

2 (D) (i) Write the names used to indicate each of the plant movements given below

Movement	Name of the movement
(a) Turning of Sunflower towards the sun	.....
(b) Leaf folding of *Mimosa* when plant in touched	.....

(c) Folding of leaves of *Sesbania* in the evening .....

(d) Movement of phytoplanktons to surface layers of water bodies. .....

(e) Growth of Passionfruit tendril circling a support .....

ii. Name the plant hormone that is responsible for the following functions in plants.

Plant function	Name of the hormone
(a) maintain apical dominance	.....
(b) promotes stem elongation and cell enlargement	.....
(c) interacts with auxins and promotes cell division	.....
(d) maintain bud dormancy and seed domancy	.....
(e) induce flowering	.....

3. *(A)* (i) What are the **three** main criteria that are used in classifying organisms into five kingdoms?

(a) .....

(b) .....

(c) .....

(ii) Which the phylum of the Kingdom animalia consists of triploblastic acoelomate organisms?

.....

(iii) Write the phylum/division to which the organisms with each of the unique feature given below are grouped.

Unique feature	Phylum/ Division
(a) Presence of a planula larva	.....
(b) Presence of a meganucleus and a micronucleus	.....
(c) Presence of tube feet	.....
(d) Presence of pharyngeal slits	.....
(e) Presence of nematocysts	.....
(f) Presence of a radula	.....
(g) Presence of zygospores	.....
(h) Presence of alternation of generation with a dominant independent gametophyte	.....
(i) Presence of a pollen tube which functions as haustoria	.....
(j) Presence of vessels and companian cells in the vascular system	.....

(B) (i) What is an ecosystem?

.....

.....

.....

(ii) Name the **three** main biotic components of an ecosystem

(1) .....

(2) .....

(3) .....

(iii) State **two** unique features of the mangrove plant community which could be used in distinguishing a mangrove ecosystem from other ecosystems

(1) .....

(2) .....

(iv) In the space given below draw a labelled outline diagram to illustrate the flow of carbon in the biosphere

(C) (i) Name in sequence the main layers of the atmosphere

.....

.....

(ii) Name a pollutant generated by anthropogenic activities which is harmless to man when present in the atmosphere closer to the surface of the earth but causes harmful effects when present in the upper layers of atmosphere.

.....

(iii) State **one** main source of pollution of each of the resource given below

(1) Ocean .....

(2) Air .....

(3) Soil .....

(iv) Name the effect seen in reservoirs due to the pollution by excess usage of fertillzer.

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(v) Briefly explain how the pollution indicated in C (iv) causes harmful effects on the biota of the ecosystem.

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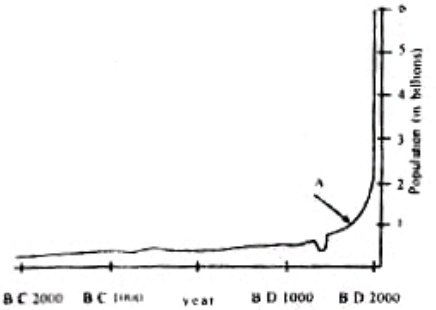
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(D) (i) Give **two** reasons why there was no significant environmental degradation during the period of hunter-gatherers.

(1) .....

(2) .....

(ii) What process brought about the change in the pattern of human population growth after point *A* of the graph given below?



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(iii) How does long term survival of life on the biosphere is ensured although the materials for the maintenance of life is limited in the earth?

.....

(iv) Name the main Act and the main government institution that is responsible for the protection of the environment of Sri Lanka.

Act .....

Government institution .....

(v) What is the importance of Basel convention in giobal environmental managenment?

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4. *(A)* (i) Indicate by writing **Present** or **absent** whether each of the features listed below are present or absent in *Pogonatum*, *Nephrolepis* and *Selaginella*.

	Pogonatum	***Nephrolepis***	***Selaginella***
(a) Heterospory	.....	.....	.....
(b) Dispersal of spores by wind	.....	.....	.....
(c) Photosynthetic gametophyte	.....	.....	.....
(d) Bisexual gametophyte	.....	.....	.....

(ii) Explain briefly what is understood by each of the following terms with regard to reproduction of fungi?

(a) Heterothallism .....

.....

(b) Zygospore .....

.....

(c) Dikaryotic phase .....

.....

(d) Ascocarp .....

.....

(B) (i) Name the parts of the Angiosperms which correspond to the parts of *Cycas* given below.

Part of Cycas	**Part in Angiosperms**
(a) microsporophyll	.....
(b) megasporophy ll	.....
(c) microsporangium	.....
(d) cone	.....
(e) female gametophyte	.....

(ii) Name an organism which shows the following structures.

Structure	**Organism**
(a) Perigonium	.....
(b) biflagellate sperms	.....
(c) basidiospore	.....
(d) sorus	.....

(C) (i) Name the floral part which develops into the following structure after fertilization.

Structure after fertilization	**Floral part**
(a) embryo	.....
(b) endosperm	.....
(c) seed coat	.....
(d) hilum	.....
(e) pericarp	.....

(ii) Give **four** differences between female gametophyte of *Cycas* and that of angiosperm.

***Cycas* female gametophyte**	**Angiosperm female gametophyte**
(a)	.....
(b)	.....
(c)	.....
(d)	.....

(D) (i) What is meant by reproduction?

.....

.....

(ii) What is the main advantage of sexual reproduction?

.....

.....

(iii) Why internal fertillzation is seen in land animals?

.....

.....

(iv) Where does fertilization occur normally in a woman?

.....

.....

(v) Give **one** change that occurs in the spermatozoa prior to the penetration into the egg.

.....

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(vi) What are the membranes that contribute to the formation of human placenta?

.....

(vii) Name **three** hormones secreted by the human placenta.

(1) .....

(2) .....

(3) .....

Part B - Essay

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

1 (a) Describe the different pathways of movement of water from soil into xylem vessels of a plant root and explain the principles underlying this movement.

(b) Explain the mechanisms which help the movement of water from xylem of the root into leaf mesophyll cells of a tall tree

2. (a) Describe the location and the gross structure of human heart

(b) Describe the cardiac cycle of the human heart in sequence

3. Giving an example for each explain the following patterns of inheritance?

(a) Incomplete dominance

(b) Human sex-linked inheritance

(c) Polyallelism

(d) Polygenic inheritance

4. Describe how activities of soil microorganisms affect plant growth indicating, their nature and distribution.

5 Write an essay on the impact of current agricultural practices in Sri Lanka on the terrestrial environment

6 White short notes on the following :

(i) Human pancreas

(ii) DNA finger printing

(iii) Non-photosynthetic modes of nutrition in plants