General Certificate of Education (Adv. Level) Examination, August 2008
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*

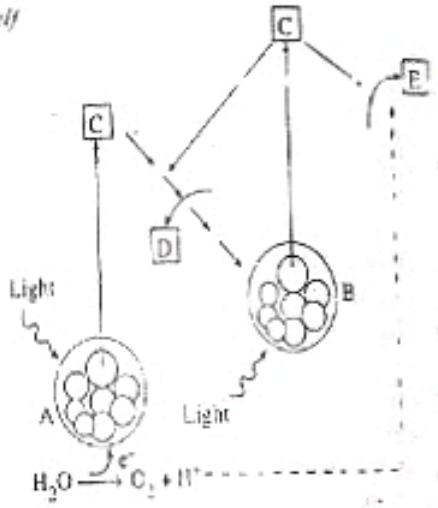
You are permitted to remove only Part ***B*** *of the question paper from the Examination Hall*

Part A - Structured Essay

Answer all questions on this paper itself

(Each question carries ***10*** *marks)*

1 (A) The diagram given below is representation of the path of electrons in the light reactions of photosynthesis.



(i) Give suitable names for A, B, C, D and E.

A. .....

B. .....

C. .....

D. .....

E. .....

(ii) What is the exact location within chloroplasts where movement of electrons, as represented above takes place?

.....

(iii) What are the pigment molecules located in A and B above?

.....

(iv) What is meant by absorption spectrum of a pigment molecule?

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(v) What is meant by action spectrum of photosynthesis?

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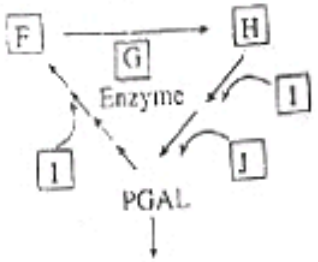
(B) The diagram below represents major steps of Calvin cycle of photosynthesis.

(i) Give suitable names for F, G, H, I and J.



F. .....

G. .....

H. .....

I. .....

J. .....

(ii) What is the exact location at which this cycle of reactions take place?

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(iii) At high concentrations of O_2 following reaction may also take place in chloroplasts

O_2 + [K] $\xrightarrow{\text{photorespiration}}$ [L] + Phosphoglycolate

Name the compounds labelled as K and L

K ..... L .....

(iv) In plants in which C_4 photosynthesis takes place, CO_2 is accepted by the reaction given below

CO_2 + M $\xrightarrow[\text{[N]}]{\text{enzyme}}$ oxaloacetate

Give the names of M and N.

M ..... N .....

(v) What is the location at which this CO_2 acceptance takes place?

.....

(C) (i) What are the functions of the following organelles in an eucaryotic cell?

Ribosomes .....

Endoplasmic reticulum .....

.....

Golgi bodies .....

.....

Mitochondria .....

Lysosomes .....

(ii) Name the four major organic compounds found in living matter, indicating elements found in them

Organic compound	Elements
.....	.....
.....	.....
.....	.....
.....	.....

(D) (i) Growth is a fundamental characteristic of life. How is growth defined?

.....

.....

(ii) Growth of a tissue of a multicellular organism can be divided into three phases. Explain briefly the **three** phases of growth.

(a) .....

(b) .....

(c) .....

(iii) What is understood by the term ageing of cells?

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(iv) State **three** causes for cell ageing?

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2. (A) (i) Why is blood considered as a specialized type of connective tissue?

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(ii) State five functions of blood other than transport.

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(iii) What are the **three** main types of proteins in human blood plasma?

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(iv) Name the protein that forms the blood clots in man.

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(v) What is the range of fasting blood glucose level of a healthy adult person?

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(B) (i) What is the average erythrocyte count in 1 mm^3 of blood of a healthy adult person?

.....

(ii) In the human adult what is the site of erythrocyte production?

.....

(iii) Name the hormone that stimulates erythrocyte production in man.

.....

(iv) State **two** features of human erythrocyte that promotes carriage of oxygen.

.....

.....

(v) How is carbon dioxide transported in blood?

.....

.....

.....

(C)

A

B

C

(i) Identify the blood cells labelled as A, B and C in the above diagram and state one main function of each of them

Blood cell		Main function
A	.....	.....
B	.....	.....
C	.....	.....

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

.....

(iii) Which is the most abundant granular leucocyte in man?

.....

(iv) What is the main function of human blood platelets?

.....

(v) Name a mosquito borne disease that could be diagnosed by taking a blood platelet count?

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(D) (i) What is a blood pigment?

.....

(ii) Name **two** iron containing blood pigments.

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(iii) What are the blood pigment of crustaceans?

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(iv) How many molecules of oxygen combines with a molecule of haemoglobin?

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(v) Why is carbon monoxide considered as a respiratory poison?

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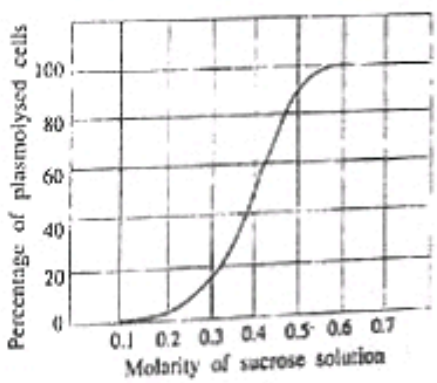
3. (A) In an experiment to determine the water potential, pieces of *Rhoeo* epidermal tissue were immersed in a series of sucrose solutions of different molarities. After one hour they were examined under the microscope and the percentage of plasmolysis in each was counted. The results are plotted in the graph given below. A table giving values of solute potential of sucrose solutions of different molarities is also provided



Molarity of Sucrose solution	Solute potential in KPa
0.1	- 260
0.2	- 540
0.3	- 820
0.4	- 1120
0.5	- 1450
0.6	- 1800

(i) According to the results of the experiment what is the molarity of the sucrose solution causing incipient plasmolysis?

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(ii) What is the solute potential of the sucrose solution causing incipient plasmolysis?

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(iii) What would be water potential of the epidermal cells at incipient plasmolysis?

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(iv) What would be the water potential of the epidermal cells immersed in sucrose solution of 0.1 molarity?

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(v) Is the value of solute potential of the above cells immersed in sucrose solution of 0.1 molarity lower, higher or equal to their water potential?

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(B) (i) Name the pathways of moment of water from soil solution to inner cortical cells of a root and define each of them.

....

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....

(ii) Which one of these pathways is unavailable for movement of water through endodermis?

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(iii) Indicate the reason for unavailability of this pathway for movement of water through endodermis

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(iv) What is the advantage to the plant of blocking this pathway at endodermis?

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(v) Name **four** factors that are important for movement of water up in the stem of a tall tree.

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(C) (i) Name **five** external factors that affect the rate of transpiration from plant shoots.

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(ii) Name **three** internal factors that affect the rate of transpiration.

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(iii) Indicate **two** advantages of transpiration to plants.

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(iv) Indicate five adaptations by plants to reduce the rate of transpiration.

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(D) (i) What is the carbohydrate that is transported through the pholem?

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(ii) What are the cells which load this carbohydrate into sieve tube elements of phloem?

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(iii) Name the macroelements, needed for plant growth, other than C, H and O and give one function of each of them in the plant.

Element	Function
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

4. (A) (i) Approximately how many years ago, the following events took place on earth?

(a) Origin of life .....

(b) Colonization of land by plants .....

(c) Colonization of land by animals .....

(d) Origin of man .....

(e) Extinction of dinosaurs .....

(ii) Name the phylum that contains diploblastic animals.

.....

(iii) Name the three classes of the phylum stated in (A) (ii) above and name an animal that belongs to each of these classes

Class	Animal
.....	.....
.....	.....
.....	.....

(iv) What is the advantage of giving a scientific name to a species?

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(B) (i) In pest management what is known as

(a) economic injury level

.....

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(b) economic threshold level

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(ii) What are the factors that affect the economic injury level?

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(iii) What is meant by integrated pest management?

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(iv) What is the main importance of integrated pest management?

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(C) (i) Name the insect pest that causes 'dead heart' disease in paddy.

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(ii) To which Order does this pest belong?

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(iii) What type of mouth parts does this pest have?

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(iv) State **four** methods that can be used to control this pest.

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(D) (i) What is meant by environmental pollution?

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(ii) Name the major pollutant that may be found in the effluents of each of the following factories.

(a) Leather factories .....

(b) Textile factories .....

(iii) What is the reason for melting of polar ice caps and glaciers?

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(iv) State activities of man that contributed to the reason stated in (D) (iii) above.

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Part B - Essay

- *Answer four questions only.*

  Give clearly labelled diagrams where necessary.

  *(Each question carries **15** marks)*

1 (a) Describe the primary structure of a dicotyledonous plant stem as seen in a transverse section, explaining the functions of different tissues.

(b) Explain how secondary thickening of dicotyledonous stem takes place and describe the secondary structure of a mature stem as seen in a transverse section.

2 (a) What are the major factors that determine the distribution of forests in Sri Lanka?

(b) Describe the distribution and characteristic features of tropical rain forests in Sri Lanka.

(c) Explain the importance of conservation of forests.

3 (a) Explain the theory of biochemical evolution of life on earth.

(b) Describe the importance of DNA in the maintenance and evolution of life.

4 (a) Briefly describe the gross structure of the human ear.

(b) Briefly explain the mechanism of hearing in the human ear.

5 Explain briefly the role of microorganisms in the following.

(a) Extraction of copper from low grade metal ore.

(b) Pathogenicity.

6 Write short notes on

(a) Structure and functions of proteins in living cells.

(b) Ex-situ conservation of species.

(c) Gastric juice.

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