

1) A)

i) State **two** major environmental issues due to over exploitation of natural resources.

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ii) What is metabolism?

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iii) State **two** major properties of water to maintain life on the earth.

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iv) State the monomers of following polysaccharides.

Inulin-.....

Pectin-.....

v) Given below are the observations in a laboratory experiment conducted to demonstrate the activity of the amylase enzyme.

Time spent (minutes)	5	15	25	35	45
Colour observed	Black-blue	black-blue	blue	yellow - brown	yellow - brown

a) What is the compound formed due to the action of the amylase enzyme on starch in the aqueous solution?

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b) State one reason for each of the following observations.

i. Appearance of black-blue colour after 15 minutes -

.....

ii. Appearance of yellow-brownish appearance after 35 minutes.....

.....

c) Why are the mixtures used in the above experiment kept in a water bath?

.....

.....

d) Which compound in the above experiment, does not **undergo** chemical change although it contributes to the chemical reaction.

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B)

i) What is the type of enzyme present in lysosomes?

.....

ii) Write two biological functions of lysosomes.

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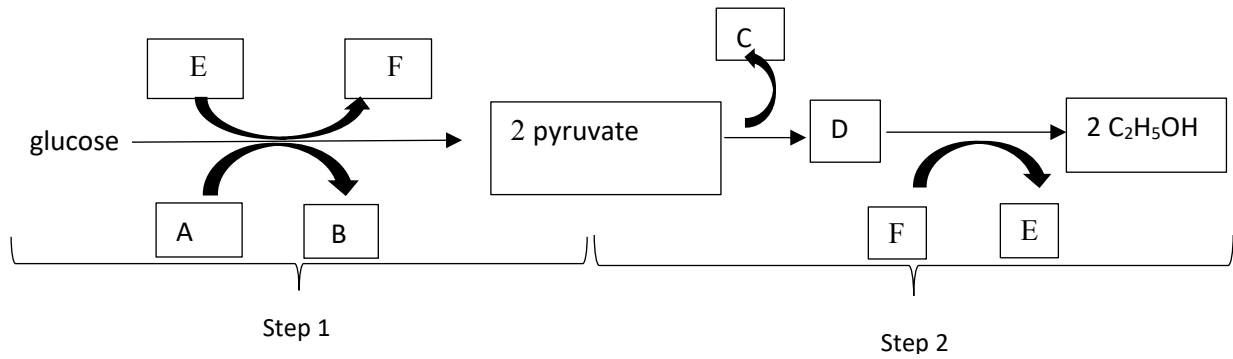
iii) Name a common structure that can be seen in the mitochondrial matrix and in the stroma of chloroplasts.

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iv) What are the processes of producing ATP on the sites given below?

- In the matrix of mitochondrium-
- On the thylakoid membranes of chloroplasts-

v) Given below is a biological process that takes place in *Saccharomyces*.



a) Name the compounds stated as C, D, E and F in the above diagram.

- C -
- D -
- E -
- F -

b) How is the second step in the above diagram important for cell metabolism?

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c) Write two economical usages of the end products of the above process.

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C)

i) a) State two principles used by Lamarck to explain his hypothesis?

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b) What is meant by classification science?

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ii) a) Name the genetic material found in protocell.

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b) State two living characteristics of protocell.

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iii) a) Name the eons in which animal evolution took place.

.....

b) State one major function of each of the following structures?

pseudopodia -

tube feet -

iv) Write two unique structural characteristics of the phylum Annelida.

.....

v) Name one plant genus which shows each of the characteristic given below?

Characteristic

Plant genus

a. Having a dioicous gametophyte

b. Having trimerous flowers

c. Protonema present in the life cycle

d. Bearing a fruit with two wing like structures

2)

A) i) What is a stomata?

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ii) a) What is the hypothesis which is used to explain the opening and closing of stomata?

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b) ii) a) Write the basic steps related to the opening of stomata according to the hypothesis mentioned in (a) above?

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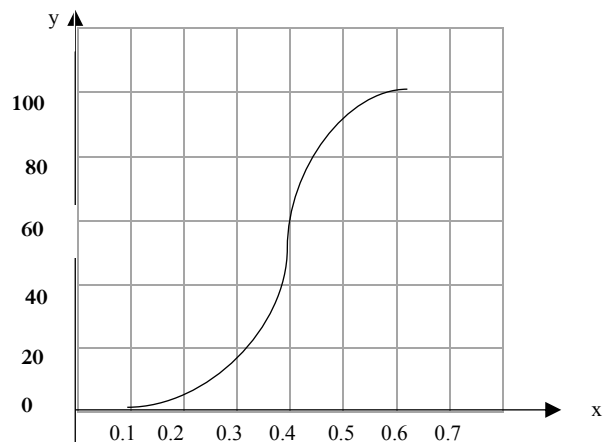
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iii) Given below is a graph drawn according to the data collected in order to find the solute potential of *Rhoeo* epidermal cells and a table of the solute potential of sucrose solutions.

Molarity of the sucrose solution (mol dm ⁻³)	Solute potential (KPa)
0.1	- 260
0.2	-540
0.3	-820
0.4	-1120
0.5	-1450
0.6	-1800



a) Name the two axes X and Y of the above graph?

x -

y -

b) What is the assumption used in this experiment?

.....

c) State the value of solute potential of *Rhoeo* epidermal tissues according to the above data,?

.....

d) What is the reason for closing the petri dishes containing tissues in (iii) above?

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B) i) a) State the major method of water entering from soil solution to root hair cells?

.....

b) State the pathways of water movement through leaf mesophyll cells ?

.....

.....

ii) State two functions of the endodermis of plant root?

.....

.....

iii) What is meant by plant stress?

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iv) State the abiotic stress condition for the following response.

- Increasing the proportion of unsaturated fatty acids in the cell membranes of cells-

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- leaves roll into a tube -like shape

- Increasing the level of solutes like sugar in cytoplasm -

v) What is the plant growth regulatory substance, that removes K^+ from the guard cells, in the scarcity of water?

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vi) Name two chemical compounds which are produced in plants after being infected by pests and pathogens.

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C) i) a) State the location of epithelial tissues.

.....

b) State three functions of epidermal tissues?

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c) What is the structure found in human mouth which contains skeletal muscles?

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ii) State three adaptations of the stomach lining to be protected from gastric juice.

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.....
iii) In which form, the end products of lipids are absorbed into the lacteal?

.....
iv) a) What are liver sinusoids?

.....
b) What is the reason for having a high concentration of nutritional materials in sinusoids?

.....
v) Name two essential nutrients to the human body.

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vi)(a) i) State two **happenings** that occur when inhaled air travels through spaces in the nasal cavity.

.....
(b) State a respiratory function of the larynx?

.....
3.

(i) A) a) **Write two examples for cells**

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.....
b) Name three major things that can act as antigens.

.....
ii) a) Write one function of the following **effector cells**.

Cytotoxic T -cells -

Plasma cells-

b) State two differences between effector cells and memory cells?

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iii) What are brain ventricles?

.....
iv) Name a structure that originates from the embryonic hindbrain which is a part of the brain stem.

.....
v) Name phases of action potential and state a main difference in the ion channels of the cell membrane in each phase.

Phase

Change

.....
.....
.....

vi) What is a tropic hormone?

.....
.....

B) i) What is the blood vessel that transports deoxygenated blood from the fetus to the placenta?

.....

ii) Write a temporary birth control method that affects the following.

- Preventing implantation by making the endometrium thin.....
- Blocks entering sperms to the uterus by thickening cervical mucus.....

iii) a) What is infertility?

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b) Write two methods of assisted reproductive technology used, to resolve infertility.

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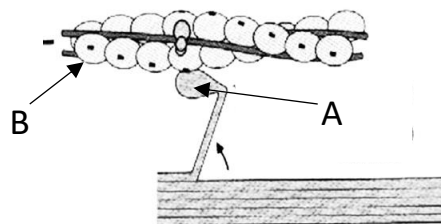
(iv)(a) Write two characteristic features of muscle tissue.

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(b) What is a sarcomere?

.....

v) The diagram below shows a step that occurs when a muscle is contracting according to sliding filament theory.



(a) Name A and B in the above diagram.

A - B -

b) Write two molecules/structures that can be attached with the part of the structure you mentioned in above (v) (a).

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d) Which ion is contributing to muscle contraction according to the sliding filament theory.

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(C) i) Write two desirable properties of garden pea plants (*Pisum sativum*) used by Mendel for genetic experiments.

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.....

ii) What is the probability of getting a homozygous genotype for both characters in a cross between two heterozygous organisms.

.....

ii) State the two current occasions where Mendel's law of segregation can be applied.

.....
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iv) What is the probability of getting an offspring with yyBbRr genotype, by a cross between two offspring with genotypes YyBbRr and yyBbrr ?

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v) (a) What is the main reason for the abnormality of the hemoglobin molecule of a person with sickle cell anaemia?

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(b) State a difference that can be seen in the blood of a person suffering from sickle cell anaemia.

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4)(A) (i)(a) What is chromatin, that can be found in eukaryotic cells?

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(b) What are the two structural differences that can be seen in the two types of chromatin found in eukaryotes?

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(ii) What is DNA replication?

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(iii) State two functions of DNA polymerase in DNA replication.

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(iv) Write two differences in the DNA replication between a prokaryotic and an eukaryotic.

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(v) State two health issues that can happen due to genetically modified organisms.

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B)i) What is an environmental pyramid?

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ii) State two reasons why the trophic levels in a food chain are limited to four or five.

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iii) Name a biome for each of the following.

a) Presence of a layer of permanent frost layer of soil. -

b) Fire resistant roots. -

c) Conical shape trees with needle like leaves. -

iv) How is peat is formed in marshes and swamp forests?

.....

v) Name an ecosystem in Sri Lanka in which the following plant species can be seen.

a) *Terminalia chebula* -

b) *Dipterocarpus zeylanicus* -

d) *Cassia auriculata* -

vi) Name an animal belonging to the following IUCN threatened category.

IUCN / Threatened category	Animal
Extinct (EX)	
Endangered (EN)	
Extinct in the wild (EW)	

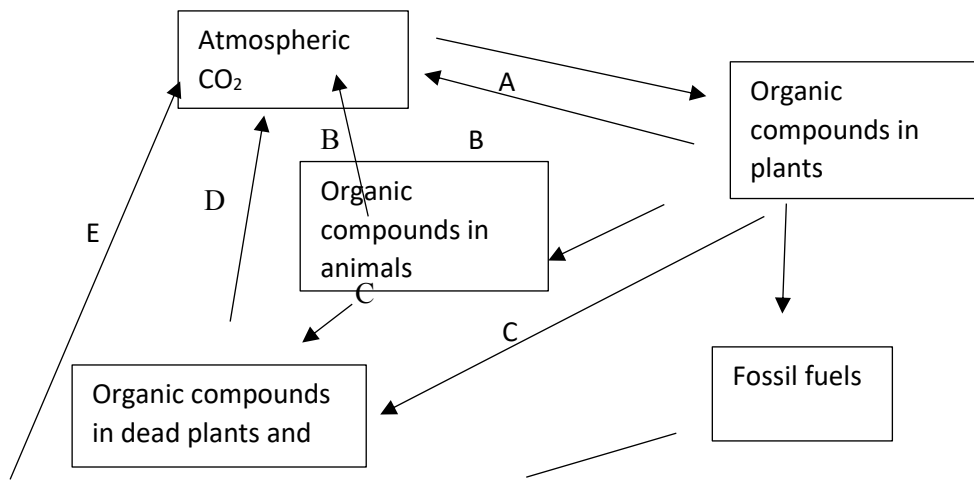
C) i) a) Write two major eucaryotic groups of microorganisms that can be seen in the soil?

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b) What is the reason for decreasing fast, the amount of microorganisms deeper in the soil?

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ii) Given below is a flow chart of C recycling in the nature.



a) Name the steps A,B,C,D, and E in the above C cycle.

- A - B -
 C - D -
 E -

b) Name the step in above diagram which directly affects global warming.

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c) Name the international protocol to minimize the effect you mentioned above.

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(iii) (a) State two physical methods of controlling the diseases Dengue and Filaria.

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(b) Write a special morphological feature of the adult filaria vector.

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(c) Name a bacterial species which produces endotoxins that is used to kill mosquitoes.

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(iv) Name an ornamental plant which is successfully grown in polytunnels and propagate through layering, grafting and cuttings.

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(v) Write the major principle which is used in the given food preservative techniques.

- Drying with salt
- Use of radiation -

(vi) (a) Write two special characteristics shown by stem cells regarding cell division.

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(b) State two medical uses of adult cells.

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