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முழுப் பதிப்புரிமையுடையது]
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Department of Examinations, Sri Lanka

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අධ්‍යයන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2011 අගෝස්තු
கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2011 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2011

ජීව විද්‍යාව III உயிரியல் III Biology III	පැය තුනයි மூன்று மணித்தியாலம் Three hours

Index No. : .....

Important :

* *This question paper consists of 12 pages.*
* *This question paper comprises Part A and Part B. The time allotted for both parts is three hours.*

1. (A) (i) What are the major characteristics that distinguish living from non-living?

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

(ii) Living matter is composed of about 92 chemical elements. What are the six most abundant chemical elements in living matter?

.....

(iii) The most abundant inorganic compound in living matter is water. What are the main functions of water in living organisms?

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

(iv) Name two major nitrogen containing polymeric compounds in living organisms and indicate two major functions of each.

Compound	Functions
1.	.....
	.....
2.	.....
	.....

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(B) (i) What are the three major principles on which the cell theory is based?

.....

.....

.....

.....

.....

(ii) Write **four** major characteristics unique to prokaryotic organisms.

.....

.....

.....

.....

.....

(iii) Name **two** major polymeric compounds found in the plant cell wall.

.....

.....

.....

(iv) (a) What are microbodies?

.....

(b) State two microbodies commonly found in living organisms and give one function of each

Type of cell junction	**Function**
.....	.....
.....	.....

(v) (a) What are cell junctions?

.....

(b) State **three** types of cell junctions found in animal cells and give one function of each.

.....

Type of cell junction	**Function**
.....	.....
.....	.....
.....	.....

(C) (i) (a) What is catabolism?

.....

(b) Give **one** example for a catabolic reaction taking place in a living cell.

.....

(ii) (a) What is anabolism?

.....

(b) Give **one** example for an anabolic reaction taking place in a living cell?

.....

(iii) (a) What are **three** major chemical constituent groups of an ATP molecule?

.....

(b) Name three sites in a living cell where ATP is produced.

.....

(iv) How do cellular enzymes speed up metabolic reactions in a living cell?

.....

(v) What is the major difference between competitive and non-competitive inhibitors of enzyme activity?

.....

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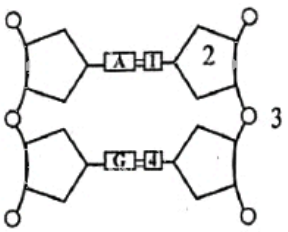
2. (A)



The diagram given above shows a part of the molecular structure of DNA

(i) (a) Label 1, 2, 3 and 4.

1. ..... 2. .....

3. ..... 4. .....

(b) Indicate in the diagram a single nucleotide by drawing a a circle around it.

(ii) How does RNA differ chemically from DNA?

.....

.....

(iii) Name the types of RNA found in an eukaryotic cell and indicate one function of each of them.

Type of RNA	Function
.....	.....
.....	.....
.....	.....

(iv) List the main features of the genetic code.

.....

.....

.....

.....

(v) Name the enzymes involved in the following stages taking place during self replication of DNA.

Unwinding of double helix .....

Formation of complementary strands of DNA .....

(B) Assume that in tomato plants, round fruit (R) is dominant to elongated fruit (r) and tall plant (T) is dominant to dwarf plant (t)

(i) (a) A true breeding dwarf plant with round fruits was crossed with a true breeding tall plant with elongated fruits. What are the genotypes of parent plants and the progeny of this cross.

Parent plants .....

Progeny .....

(b) The progeny of the above cross was subjected to a test cross. Among the progeny of the test cross, 80% of the plants had parental phenotypes and 20% had recombinant phenotypes. What are the genotypes of the parent plants and the progeny of the test cross? Indicate the percentage frequency at which each of the genotypes of the progeny has occurred.

Genotypes of parent plants .....

Genotypes of progeny .....

Percentage frequency .....

(Write in sequence corresponding to genotypes of progeny)

(c) Indicate the possible reason for not producing the different genotypes of the progeny in the above test cross in equal frequencies.

.....

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(ii) Write two benefits of meiosis in organisms

.....

.....

(C) (i) What are the major reasons for the dominance of microorganisms in the biosphere?

.....

.....

.....

(ii) What are the physical indications seen in food spoiled by microorganisms?

.....

.....

.....

(iii) What is understood by the terms (a) food borne infections and (b) food intoxication in microbial food spoilage? Give one example of a causative bacterium for each

(a) Food borne infection :.....

.....

.....

.....

Example of a causative bacterium : .....

(b) Food intoxication :.....

.....

.....

.....

Example of a causative bacterium : .....

(iv) Antibiotics used for the treatment of bacterial infections, inhibit the growth of bacteria by several mechanisms. Name four such mechanisms and corresponding antibiotics.

Mechanism	Antibiotic
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

3. (A) (i) What are the structures involved in the formation of human placenta?

.....

(ii) Name the hormone produced by the placenta during the initial stages of pregnancy and state its function.

Hormone	Function
.....	.....

(iii) Name the hormones produced by placenta during the later stages of pregnancy.

.....

(iv) (a) Name the other important substance produced by the placenta in addition to hormones and state its function.

Substance	Function
.....	.....

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(b) Name the hormone that induces the production of the substance stated in (iv) (a) above and state its site/sites of synthesis.

Hormone	Site/Sites of synthesis
.....	.....

(v) What is the hormone responsible for inhibiting the contraction of myometrium during pregnancy?

.....

(B) (i) Name the hormones responsible for the development of milk glands and their ducts.

Milk glands .....

Ducts of milk glands .....

(ii) (a) Name the hormone responsible for the production of breast milk and state its site of production

Hormone	Site of production
.....	.....

(b) Name the hormone that prevents the secretion of breast milk during pregnancy.

(iii) What are the major components of breast milk other than water?

.....

(iv) At what age should supplementary food be introduced to the infant?

.....

(v) Until what age should breast feeding be continued to the child?

.....

(C) (i) (a) What are the methods of asexual reproduction seen among organisms? Give one example for each method

Method	Example
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

(b) What are the advantages of asexual reproduction?

.....

.....

.....

(ii) What are the methods widely used by local farmers to propagate each of the crops listed below?

Sugarcane .....

Mango .....

Potato .....

Banana .....

(iii) What is alternation of generations in plants?

.....

.....

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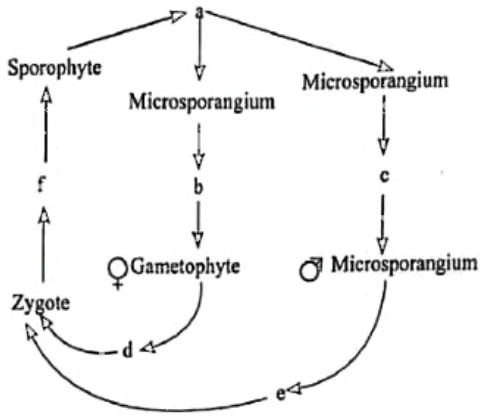
(iv) An outline of the life cycle of *Selaginella* is given below



Name a-f

a ..... b .....

c ..... d .....

e ..... f .....

(v) In the above life cycle, during the formation of which structures/ parts does meiosis occur?

.....

4. (A) (i) State three main types of skeletons found among animals and as an example for each of these, name a phylum which includes the animals having only that particular skeleton type.

	Skeleton type	Phylum
a	.....	.....
b	.....	.....
c	.....	.....

(ii) Name the three main types of cells found in bone tissue of man, and state the function of each of these types.

	Type of cell	Function
a	.....	.....
c	.....	.....
e	.....	.....

(iii) State the functions carried out by the skeletal system of man.

.....

.....

.....

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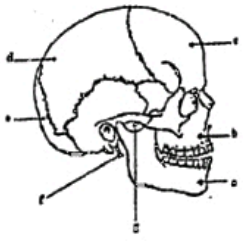
(B) Questions of this section are based on the diagram of the human skull given below:

.....

.....

.....

.....



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(i) Name the bones labelled a-e,

a ..... b .....

c ..... d ..... e .....

(ii) What are the functions of the bone labelled as e?

.....

.....

.....

.....

(iii) Name f and g and state their function

f. .....

g .....

function: .....

(iv) (a) of the bones labelled a -e , Name two bones that contain sinuses?

.....

.....

(b) What are the functions of these sinuses?

.....

.....

.....

(C) (i) What are the types of movements seen in plants? Give one example for each.

Type of movement	Example
.....	.....
.....	.....
.....	.....

(ii) (a) Auxin was the first plant growth substance discovered. What is its chemica name?

.....

(b) Name the parts of the plants where auxins are synthesized.

.....

(iii) What are the major effects of auxins on plants?

.....

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(iv) What are the commercial applications of auxins?

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(v) What are the other growth regulators produced in plants?

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Part B - Essay

5. a) What are mutations?
   b) Explain the types of mutations and their causative factors.
   (c) What is the significance of mutations in evolution?
   (d) Briefly discuss human genetic disorders caused by mutations.

6. (a) Giving suitable examples, state the four physiological groups of microorganisms recognized on the basis of their relation to molecular oxygen.

   (b) Describe, with underlying principles, the methods used to control microorganisms in the preparation of glassware and culture media in a microbiological laboratory.

7. (a) Describe the different pathways of movement of water from soil solution into xylem of a plant root with reference to the basic principles underlying the movement of water across plant cells.

   (b) Describe how the solute potential of cells of a *Rhoeo* leaf is determined in the laboratory.

8. (a) Explain what is meant by nutrition.

   (b) Giving suitable examples describe the different modes of nutrition found among organisms.

9. (a) Describe the structure of the cerebrum, of man.

   (b) Briefly explain the functions of the cerebrum of man.

10. Write short notes on the following.
    (a) C_4 pathway of photosynthesis and its significance in plants.
    (b) Major nitrogenous excretory products of animals
    (c) Scientific method.