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கல்வி பொதுத் துறை மாநிர் (புது து)புதி 608, 2016 ஒன்று

General Certificate of Education (Adv. Level) Examination, August 2016

ଶ୍ରୀ ବିଦ୍ୟାଲ୍ ଉୟିରିଯଲ୍ ବିଭାଗ
Biology

09 E I

பூரை தேவை
இரண்டு மணித்தியாலம்
Two hours

Instructions:

- * Answer all questions.
- * Write your **Index Number** in the space provided in the answer sheet.
- * Instructions are given on the back of the answer sheet. Follow those carefully.
- * In each of the questions 1 to 50, pick one of the alternatives from (1), (2), (3), (4), (5) which is **correct** or **most appropriate** and mark your response on the answer sheet with a cross (x) on the number of the correct option in accordance with the instructions given on the back of the answer sheet.

7. One characteristic of each of the organisms labelled as A, B, C and D is as follows.

- Heterosporous
- Gametophyte is photosynthetic
- Seedless
- Thalloid gametophyte

The organisms A, B, C and D in correct order are

- Cycas, Marchantia, Selaginella* and *Polygonatum*.
- Pinus, Polygonatum, Cycas* and *Nephrolepis*.
- Mango, *Nephrolepis, Lycopodium* and *Marchantia*.
- Banana, *Pinus, Nephrolepis* and *Marchantia*.
- Polygonatum, Cycas, Marchantia* and *Nephrolepis*.

8. In the classification of organisms, the taxon phylum was introduced by

- Carl Woese.
- Robert Whittaker.
- Ernest Haeckel.
- Carolus Linnaeus.
- Aristotle.

9. Two phyla that include organisms having glycogen as the main stored food are

- Chytridiomycota and Lycophyta.
- Zygomycota and Pterophyta.
- Chordata and Chrysophyta.
- Cycadophyta and Phaeophyta.
- Basidiomycota and Ascomycota.

10. A student observed an animal with one pair of antennae, and one pair of appendages in each segment of the body. This animal belongs to class

- Crustacea.
- Chilopoda.
- Diplopoda.
- Insecta.
- Arachnida.

11. Anaemia is a deficiency syndrome of which of the following vitamins?

- A, D, Thiamin
- B₁₂, B₆, Folic acid
- K, B₁, Biotin
- B₅, B₃, B₁
- B₁, B₂, Pantothenic acid

12. Which of the following statements regarding the respiratory system of man is correct?

- Contraction of external intercostal muscles results in inspiration.
- Tracheal cavity is lined with columnar epithelium.
- Right lung consists of two lobes.
- Exchange of respiratory gases in the lung requires energy.
- Larynx is located at the level of 2nd and 3rd cervical vertebrae.

13. Select the **incorrect** statement regarding human blood.

- It is a specialized connective tissue.
- A mature erythrocyte lacks both nucleus and mitochondria.
- Neutrophils and monocytes are leucocytes showing phagocytosis.
- Most of the carbon dioxide is transported in combination with haemoglobin.
- It helps to regulate body temperature.

14. Which of the following is **not** a part of the conducting system of human heart?

- Chordae tendineae
- Atrioventricular (AV) node
- Bundle of His
- Sino-auricular (SA) node
- Purkinje fibres

15. Which of the following processes in plants increases in the absence of light?

- Absorption of minerals
- Absorption of water
- Ascent of sap
- Elongation of internodes
- Guttation

16. Which of the following is **incorrect** regarding phloem transport?

- Translocation of phloem sap from leaves to roots takes place through apoplast of sieve tube elements.
- Mature leaves are the major sugar sources in phloem transport.
- Developing root apices and shoot apices are usually sugar sinks in plants.
- Phloem loading and unloading are active processes.
- Translocation of phloem sap from one sieve tube element to the next is a passive process.

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17. Select the **incorrect** statement regarding human growth hormone.

- (1) It is synthesized and released by the anterior pituitary.
- (2) Its release can be either increased or reduced by the hypothalamus.
- (3) It increases blood glucose level.
- (4) It increases synthesis of fats.
- (5) It regulates the metabolism of liver.

18. Select the **incorrect** statement regarding human brain.

- (1) Functional area concerned with speech is located in the frontal lobe.
- (2) Corpus callosum connects the two hemispheres of the cerebrum.
- (3) Cerebellum plays an important role in maintaining balance and equilibrium.
- (4) Thalamus is involved in the integration of sensory information.
- (5) Reflex centre for coughing is located in the pons varolii.

19. Select the **incorrect** statement regarding an action potential of a human motor neurone.

- (1) Immediately after one action potential, a second action potential cannot be produced.
- (2) It is generated only at nodes of Ranvier.
- (3) Its depolarization phase is immediately followed by the hyperpolarization phase.
- (4) Its duration is about two milliseconds.
- (5) A threshold stimulus is essential to produce it.

20. Select the **incorrect** statement regarding excretion.

- (1) If excretion does not occur blood pH may change.
- (2) Defaecation is a form of excretion.
- (3) Bile pigments are an excretory product in man.
- (4) Carbon loss is highest when uric acid is produced as nitrogenous excretory product.
- (5) Production of ammonia as an excretory product does not require energy.

21. Which of the following statements is **incorrect** regarding smooth muscles?

- (1) They show the ability to return to original length after being stretched.
- (2) Adrenaline causes contractions in some smooth muscles and relaxation in others.
- (3) Some show rhythmic contractions.
- (4) They fatigue rapidly.
- (5) They are innervated by the autonomic nervous system.

22. Which of the following is **incorrect** regarding skeletal muscle?

- (1) Normally, acetylcholine is necessary to initiate its contraction.
- (2) During its contraction the length of A bands and I bands remains constant.
- (3) Series of power strokes occurs during its contraction.
- (4) Without ATP and Ca^{2+} it cannot contract.
- (5) During its contraction the length between two Z lines shortens.

23. Select the **incorrect** statement regarding human scapula.

- (1) It is a flat triangular-shaped bone.
- (2) Its posterior surface is rough.
- (3) Its acromion process articulates with the clavicle.
- (4) Its glenoid cavity lies in the medial border.
- (5) Coronoid process is a projection arising from its upper border.

24. Select the **incorrect** statement regarding lower limb of man.

- (1) Femur is a long bone located parallel to the mid line of the body.
- (2) Tibia is the second longest bone in the lower limb.
- (3) It consists of 30 bones.
- (4) Fibula is not a part of the knee joint.
- (5) Foot has both longitudinal and transverse arches.

25. Select the **incorrect** statement regarding reproduction of human males.

- (1) Testosterone acts on all parts of the reproductive system.
- (2) Seminal vesicular secretion contains glucose and vitamin C.
- (3) Capacitation of sperms occurs in the female genital tract.
- (4) Duration of spermatogenesis is about 72 days.
- (5) Sertoli cell functions as an endocrine structure.

26. Which one of the following reproductive structures is **unpaired**?
 (1) Seminal vesicle (2) Cowper's gland
 (3) Ejaculatory duct (4) Prostate gland
 (5) Vas deferens

27. Which of the following plant growth substances prevents leaf fall?
 (1) Abscisic acid (2) Auxins (3) Cytokinins (4) Gibberellins (5) Ethylene

28. Two true breeding plants, one with dark blue flowers and one with white flowers were crossed. The F_1 offspring of this cross produced light blue flowers. When the F_1 progeny was self crossed, 1:2:1 ratio of plants with dark blue, light blue and white flowers was observed. What genetic character is shown by these results?
 (1) Epistasis (2) Incomplete dominance
 (3) Co-dominance (4) Polyallelism
 (5) Gene linkage

29. Which of the following combinations of triplet codes in the corresponding mRNA and tRNA is the correct representation of the triplet code of CAT in DNA?

mRNA	tRNA
(1) GAA	CAT
(2) CAT	CAT
(3) GUA	CAU
(4) GTA	CAU
(5) GUA	CAT

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30. A cross between pure line short-black haired and pure line long-white haired Guinea pigs produced short-black haired offspring in the F_1 generation. If there were 33 offspring in the F_2 generation of this cross, how many of them would have short-black hair according to Mendel's laws?
 (1) 19 (2) 12 (3) 9 (4) 6 (5) 2

31. Which of the following statements regarding the inheritance of haemophilia in humans is correct?
 (1) If a carrier woman marries a haemophilic man, 50% of their children would be normal.
 (2) If a carrier woman marries a normal man, 50% of their children would be haemophilic.
 (3) If a normal woman marries a haemophilic man, 50% of their sons would be normal.
 (4) If a carrier woman marries a normal man, 50% of their children would be normal.
 (5) If a carrier woman marries a haemophilic man, all of their sons would be haemophilic.

32. Which of the following statements regarding the time of origin of different groups of organisms is **incorrect**?
 (1) Dinosaurs appeared during the same period in which the mammals appeared.
 (2) Insects appeared during the Palaeozoic era.
 (3) Modern fish originated during the Mesozoic era.
 (4) Placental mammals originated during the Cretaceous period.
 (5) Conifers appeared during the Mesozoic era.

33. Which of the following terrestrial biomes shows the least variation in temperature?
 (1) Temperate grasslands (2) Temperate broad leaf forests
 (3) Coniferous forests (4) Tropical forests
 (5) Deserts

34. Which of the following statements regarding the phosphorus cycle is correct?
 (1) The largest accumulation of phosphorus is in the soil.
 (2) HPO_4^{2-} is the most abundant form of inorganic phosphorus in the phosphorus cycle.
 (3) There is an atmospheric phase in the phosphorus cycle.
 (4) Plants absorb phosphorus in the form of $H_2PO_4^-$.
 (5) Human activities have no impact on phosphorus cycle.

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35. This question is based on the following species.

A - <i>Lantana camara</i>	B - <i>Puntius nigrofasciatus</i>
C - <i>Garcinia quae sita</i>	D - <i>Caretta caretta</i>
E - <i>Dermochelys coriacea</i>	F - <i>Elephas maximus</i>

Which of the following statements regarding the above species is correct?

- (1) Two of the above species are invasive.
- (2) Two of the above species are endemic to Sri Lanka.
- (3) Two of the above species are critically endangered.
- (4) One of the above species is extinct in the wild.
- (5) None of the above species is included in the vulnerable category.

36. Which of the following organisms causing food borne infections contain endotoxins?

(1) <i>Vibrio cholerae</i>	(2) <i>Staphylococcus aureus</i>
(3) <i>Clostridium botulinum</i>	(4) <i>Salmonella typhi</i>
(5) <i>Shigella flexneri</i>	

37. Which of the following is incorrect regarding prions?

- (1) They are infectious particles containing proteins.
- (2) They self replicate in the host tissue using their own nucleic acids.
- (3) They are smaller than viruses.
- (4) They cause fatal degenerative brain diseases in mammals.
- (5) Diseases caused by them can be transmitted to humans from animals.

38. Which of the following is a genetically modified vaccine used in active immunization?

(1) Antitetanus vaccine	(2) Hepatitis B vaccine
(3) Antirabies vaccine	(4) Oral Polio vaccine
(5) BCG vaccine	

39. Which of the following biochemical processes in the nitrogen cycle is effected by *Nitrosomonas*?

(1) Proteolysis	(2) Nitrification
(3) Denitrification	(4) Nitrogen fixation
(5) Ammonification	

40. Which of the following microorganisms are used in biological extraction of metals from low grade metal ores?

(1) <i>Pseudomonas aeruginosa</i>	(2) <i>Thiobacillus ferrooxidans</i>
(3) <i>Bacillus thuringiensis</i>	(4) <i>Lactobacillus bulgaricus</i>
(5) <i>Aspergillus oryzae</i>	

● For each of the questions 41 to 50 one or more of the responses is/are correct. Decide which response/ responses is/are correct and then select the correct number.

If only A, B and D are correct.....	1
If only A, C and D are correct	2
If only A and B are correct.....	3
If only C and D are correct	4
If any other response or combination of responses is correct	5

Directions summarised

1	2	3	4	5
A, B, D correct.	A, C, D correct.	A, B correct.	C, D correct.	Any other response or combination of responses correct.

41. Which of the following is/are the end product/products of oxidative phosphorylation?

(A) ATP	(B) Oxygen
(C) NAD ⁺	(D) H ₂ O
(E) CO ₂	

42. Which of the following is/are not a polymer/polymers of glucose?

(A) Pectin	(B) Inulin
(C) Glycogen	(D) Chitin
(E) Cellulose	

43. Which of the following feature/features can be seen in both chordates and molluscs?
(A) Internal skeleton (B) Gills
(C) Internal fertilization (D) Well developed eyes
(E) Radula

44. Which of the following 'Nutrition type – Example' combinations is/are correct?
(A) Symbiotic – *Cuscuta*
(B) Photoautotrophic – Purple nonsulphur bacteria
(C) Saprophytic – *Mucor*
(D) Chemoautotrophic – *Nitrobacter*
(E) Holozoic – *Drosera*

45. Select the correct statement/statements regarding sodium-potassium pump of a neurone.
(A) Pumping of Na^+ and K^+ are interdependent.
(B) It is located in the neurilemma.
(C) Deficiency of ATP can interrupt its functioning.
(D) It is essential for the maintenance of the resting membrane potential.
(E) It pumps Na^+ from the extracellular fluid into the neurone.

46. Urine output of a healthy adult person depends on which of the following?
(A) ADH level in blood
(B) Functioning of hypothalamus
(C) Functioning of the proximal convoluted tubules of nephrons
(D) Physical activity
(E) Blood volume

47. Select the correct statement/statements regarding human placenta.
(A) It is deciduous alantochorion type of placenta.
(B) It produces hCG and progesterone at initial stages of pregnancy.
(C) It prevents mixing of foetal and maternal blood.
(D) It can produce prostaglandins.
(E) It allows passage of water both from mother to foetus and from foetus to mother.

48. Select the **incorrect** statement/statements regarding human womb.
(A) It is a hollow, muscular, pear-shaped organ.
(B) Progesterone inhibits its contractility.
(C) Fertilization normally occurs within it.
(D) Its inner layer is composed of a cuboidal epithelium and mucus secreting tubular glands.
(E) At the end of pregnancy oestrogen stimulates its contractions.

49. Which of the following feature/features is/are **not** common to all phyla of vascular plants?
(A) Development of seeds
(B) Alternation of generations
(C) Photosynthetic gametophyte
(D) Heterospory
(E) Dominant sporophyte

50. Which of the following statements is/are correct?
(A) Allele is one of the alternative forms of the same gene.
(B) Locus is the position of an allele in a DNA molecule.
(C) Human ABO blood groups are an example for codominance.
(D) Gene is the basic unit of inheritance of a certain character.
(E) The cross carried out to determine the genotype of an organism is the back-cross.

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ଶୈଳ ବିଦ୍ୟାର
ଅଧିକାରୀ
Biology

09 E II

ஏட ஒக்ட
மூன்று மணித்தியாலம்
Three hours

Index No. :

Instructions:

- * This question paper consists of 10 questions in 09 pages.
- * This question paper comprises Part A and Part B. The time allotted for both parts is three hours.

PART A – Structured Essay (Pages 2 - 8)

- * *Answer all four questions on this paper itself.*
- * *Write your answers in the space provided for each question. Note that the space provided is sufficient for your answers and extensive answers are not expected.*

PART B – Essay (Page 9)

- * Answer four questions only. Use the papers supplied for this purpose. At the end of the time allotted for this paper, before handing over to the supervisor tie the two parts together so that Part A is on the top of Part B.
- * You are permitted to remove only Part B of the question paper from the examination hall.

For Examiners' Use Only

Part	Question No.	Marks
A	1	
	2	
	3	
	4	
B	5	
	6	
	7	
	8	
	9	
	10	
Total		
Percentage		

Final Marks

Code Numbers	
Marking Examiner 1	
Marking Examiner 2	
Marks checked by	
Supervised by	

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Part A - Structured Essay*Answer all questions on this paper itself.**(Each question carries 10 marks.)*Do not
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1. (A) (i) What are macromolecules?

.....
.....

(ii) Name the **three** types of macromolecules found in living organisms.

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.....
.....

(iii) Name the disaccharide sugar found in the following and indicate the constituent monosaccharide unit of each of them.

Disaccharide sugar	Monosaccharide unit
--------------------	---------------------

(a) Sugarcane plant
(b) Germinating seeds
(c) Milk

(iv) What is the monosaccharide unit found in NAD and ATP?

.....

(v) Lipids are one of the major organic compounds in living organisms. State **two** important characteristics of lipids which distinguish them from other major biological molecules.

.....
.....

(vi) Name **five** major types of lipids found in organisms.

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(B) (i) What are mutations?

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.....

(ii) State the significance of mutations in evolution.

.....
.....

(iii) Some human genetic disorders are inherited as mutations. State **three** such genetic disorders indicating the type of mutation in each of them.

Disorder**Type of mutation**

.....
.....
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(C) (i) What is Biological Oxygen Demand (BOD)?

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.....

(ii) What happens when a large amount of waste with high Biological Oxygen Demand (BOD) is discharged into an aquatic system?

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.....

(iii) State **two** methods used in current waste water treatment plants to reduce Biological Oxygen Demand (BOD) by oxidation of organic matter.

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.....

(iv) Solid waste disposal has caused serious environmental issues in Sri Lanka. What are the adverse effects of open dumping of solid waste on land?

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(v) What are the methods that can be used to minimize the issues of disposal of solid waste?

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2. (A) (i) What is homeostasis?

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column

(ii) State **three** factors that are homeostatically regulated in man.

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.....
.....

(iii) State **two** advantages of homeostasis in man.

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.....

(iv) State **one** disadvantage of homeostasis in man.

.....

(v) Human liver plays a variety of roles in homeostasis. State **four** such roles.

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

(vi) Give **two** examples of positive feedback mechanisms operating in man.

.....
.....

(B) (i) What is lactation?

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.....

(ii) What is the most abundant component in human milk?

.....

(iii) Name **two** placental hormones which act on the breast.

.....

(iv) Name **two** components of colostrum.

.....

(v) What is the role of oxytocin in lactation?

.....
.....

(vi) Name **two** hormones which inhibit milk production in women.

.....

(vii) State **three** advantages of breast feeding.

.....
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.....

(C) (i) State the **three** main functions of the human nervous system.

.....
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column

(ii) Name **two** phyla having animals with double ventral nerve cords.

.....

(iii) Name a phylum having animals with radial nerves.

.....

(iv) State **two** advantages of nervous regulation over endocrine regulation.

.....

(v) What is a receptor?

.....

(vi) State **three** features of receptors.

.....

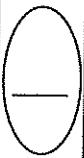
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(vii) Name **three** receptors sensitive to touch.

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.....



3. (A) (i) Some external features of five invertebrates labelled as A, B, C, D and E are as follows.

- A - Flattened, bilaterally symmetrical body with eye spots
- B - Cylindrical, radially symmetrical body with a mouth surrounded by tentacles
- C - Cylindrical, bilaterally symmetrical body with numerous setae and without a clitellum
- D - Cylindrical, bilaterally symmetrical body with a clitellum
- E - Umbrella shaped, radially symmetrical body with many tentacles around its edge

Complete the following dichotomous key using correct numbers and the letters A, B, C, D and E.

(1) Bilaterally symmetrical body

 Radially symmetrical body

(2) Flattened body

 Cylindrical body

(3) Tentacles around the edge of the body

 Tentacles around the mouth

(4) Clitellum present

 Clitellum absent

(ii) State the class of each of the animals labelled as A, B, C, D and E.

A -

B -

C -

D -

E -

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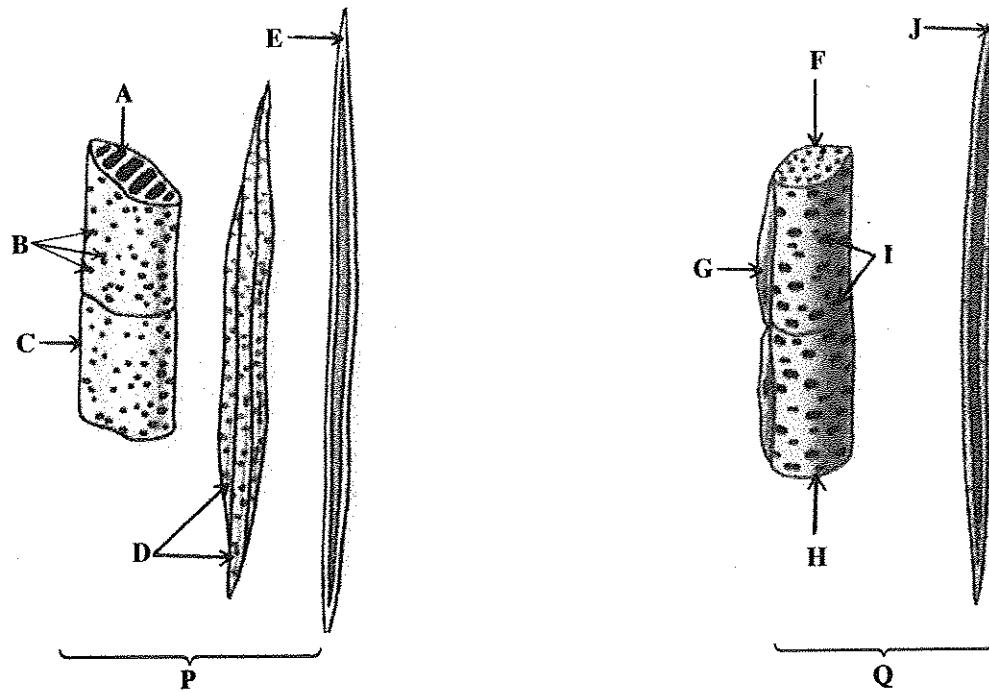
(B) (i) Name the parts that can be seen in a longitudinal section of a mature unfertilized ovule of an angiosperm.

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(ii) List the postfertilization changes that take place in the major structures of the angiosperm ovary.

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.....

(C) The diagrams P and Q given below show some constituent elements of the two vascular tissues in angiosperms.



(i) Identify the two vascular tissues shown in the diagram.

P :

Q :

(ii) Name the constituent elements indicated with arrows.

A F

B G

C H

D I

E J



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4. (A) (i) What is an ecosystem?

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.....
.....

(ii) What are the major biotic components of an ecosystem?

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.....
.....

(iv) Define 'ecological niche'.

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

(v) (a) What is meant by gross primary productivity of an ecosystem?

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

(b) State the main primary producer of each of the following ecosystems.

Ocean :

Villu :

Patana :

(B) (i) Explain what is a biome?

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

(ii) What are the **three** main terrestrial biomes in the tropics?

.....

(iii) What is the largest terrestrial biome?

.....

(iv) What is a keystone species?

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

(v) Explain the concept of flagship species.

.....

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(C) (i) What is global warming?

.....

(ii) (a) Name **five** atmospheric gases that contribute to global warming.

.....

(b) Explain how the gases stated in (a) above contribute to global warming.

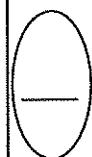
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(iii) Explain what is an invasive species.

.....

(iv) Explain how agriculture contributes to biodiversity loss.

.....



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General Certificate of Education (Adv. Level) Examination, August 2016

ଶ୍ରୀ ବିଜୁବାବୁ II
ଉପାୟିକାଯଳୁ II
Biology II

09 E II

Part B - Essay

Instructions:

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

5. (a) Describe the basic chemical nature and general structure of proteins.
(b) Briefly discuss the specific roles of DNA and RNA in protein synthesis.

6. (a) Describe the location of the human kidney.
(b) Briefly describe the microscopic structure of a typical human nephron.
(c) Briefly explain how human kidney regulates blood osmotic pressure.

7. (a) Describe briefly the nature and distribution of microorganisms in soil.
(b) Discuss the specific role of microorganisms in the natural cycling of carbon and nitrogen in the biosphere.
(c) State the significance of interactions of soil microorganisms relevant to plant growth.

8. (a) What are the general characteristics of plant growth substances?
(b) State the major types of plant growth substances and sites of their production in plants.
(c) Explain how natural growth substances regulate growth and development of plants.

9. (a) What are the **four** main forest ecosystems in Sri Lanka?
(b) Describe the main features of each of these ecosystems with reference to their distribution, rainfall and characteristics of vegetation.

10. Write short notes on the following.
(a) Human pancreas
(b) Biodiversity hotspots
(c) Mechanisms of stomatal closure and opening

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