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கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2017 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2017

ජීව විද්‍යාව I உயிரியல் I **Biology I**	**09 E I**	පැය දෙකයි 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** (×) on the number of the correct option in accordance with the instructions given on the back of the answer sheet.*

1. The major role of trace elements in living organisms is to act as
   (1) cofactors of enzymes. (2) components of cell structure.
   (3) constituents of hormones. (4) components of chlorophyll.
   (5) reactants in metabolism.

2. In eukaryotic cells, in addition to nucleus, DNA is present in
   (1) ribosomes and centrioles. (2) mitochondria and chloroplasts.
   (3) nucleolus and peroxisomes. (4) microbodies and Golgi bodies.
   (5) glyoxisomes and endoplasmic reticulum.

3. Which of the following is **not** a function of epithelial tissues?
   (1) Support (2) Transport (3) Protection (4) Secretion (5) Absorption

4. Which of the following compounds would yield the maximum amount of energy to a cell by oxidation of one molecule?
   (1) Citric acid (2) Oxaloacetic acid (3) NADH
   (4) Sucrose (5) Pyruvic acid

5. Which of the following is **not** a function of smooth endoplasmic reticulum?
   (1) Storing of Ca^{2+} (2) Packaging of materials
   (3) Synthesis of lipids (4) Synthesis of carbohydrates
   (5) Synthesis of proteins

6. Which of the following does **not** occur in the chloroplast during the light reaction of photosynthesis?
   (1) Release of electrons from photosystems I and II
   (2) Photorespiration
   (3) Cyclic photophosphorylation
   (4) Non-cyclic photophosphorylation
   (5) Photolysis

7. Which of the following is the best combination of cell junction, its location and function?
   (1) Tight junction, gut epithelium, communication
   (2) Anchor junction, skin epithelium, preventing leakage
   (3) Tight junction, gut epithelium, preventing leakage
   (4) Gap junction, nervous tissue, preventing leakage
   (5) Anchor junction, skin epithelium, communication

8. Which of the following groups contains a genus that has branched lipids in the cell membrane?
   (1) *Lyngbya, Halobacterium, Cycas* and *Agaricus*
   (2) *Clostridium, Streptomyces, Fasciola* and *Chloroxylon*
   (3) *Melursus, Staphylococcus, Allomyces* and *Garcinia*
   (4) *Rhizopus, Hevea, Salmonella* and *Gelidium*
   (5) *Macrognathus, Mucor, Thiobacillus* and *Caryota*

[See page two

9. Presence of internal fertilization and a nerve ring, and absence of a larval stage are the features of which of the following animals?
(1) *Arenicola* (2) *Oecophylla* (3) Earthworm
(4) *Bipalium* (5) Spider

10. When preparing a dichotomous key in the practical class to distinguish scorpion, millipede, cockroach, prawn and centipede, which of the following may be least useful?
(1) Exoskeleton (2) Antennae (3) Eyes (4) Wings (5) Legs

11. A genus that does **not** show heterotrophic nutrition is
(1) *Plasmodium.* (2) *Loris.* (3) *Nitrosomonas.*
(4) *Pleurotus.* (5) *Chitala.*

12. Which of the following is found both in pancreatic juice and intestinal juice?
(1) Amylase (2) Lipase (3) Sucrase
(4) Ribonuclease (5) Trypsinogen

13. Which of the following occurs during inspiration?
(1) Relaxation of external intercostal muscles
(2) Relaxation of the diaphragm
(3) Forward movement of the sternum
(4) Increase in the pressure of the pleural cavity
(5) Inflow of inter-cellular fluid into alveoli

14. Which of the following factors least affects the rate of transpiration in plants?
(1) Humidity (2) Wind
(3) Available water in soil for plants (4) Light
(5) Texture of soil

15. Which of the following statements regarding phloem transport according to pressure-flow hypothesis is correct?
(1) Transfer cells secrete sucrose into sieve tubes along a concentration gradient.
(2) Pressure inside the sieve tube is greatest at the sink.
(3) Mass flow takes place from source to sink along a pressure potential gradient.
(4) Phloem transport is a passive process.
(5) Water potential in the sieve tube increases due to phloem loading.

16. Which of the following statements regarding human blood cells is correct?
(1) About 90% of all blood cells are erythrocytes.
(2) Basophils are the largest of white blood cells.
(3) Neutrophils are the only type of leucocytes which show phagocytosis.
(4) Eosinophils are involved in elimination of blood parasites.
(5) Lymphocyte count of a normal healthy adult person is 1.5×10^6 to 3.5×10^6 per litre of blood.

17. Select the correct statement regarding the blood circulatory systems of animals.
(1) Nematodes and echinoderms do not have blood circulatory systems.
(2) Insects and tapeworms possess open blood circulatory systems.
(3) Annelids and fishes have closed blood circulatory systems.
(4) Chlorocruorin functions as a respiratory pigment in crustaceans.
(5) Atrioventricular (AV) node functions as the pacemaker of the human heart.

18. Which of the following statements regarding the human brain is correct?
(1) Corpora quadrigemina is derived from embryonic hind-brain.
(2) Pons Varolii regulates breathing rate.
(3) Forebrain controls reflex movements of eye muscles.
(4) Cerebellum controls sneezing and coughing.
(5) Cerebrum is involved in sensory perception of pain.

19. Select the **incorrect** statement regarding physiology of neurones.
(1) Sodium-potassium pump is essential to maintain resting membrane potential.
(2) Resting membrane potential is about –70 mV.
(3) Duration of an action potential is about 2 ms.
(4) In a myelinated axon, action potential is formed only at the nodes of Ranvier.
(5) K^+ influx occurs during repolarization phase of the action potential.

[*See page three*

20. Which of the following statements regarding human calcitonin hormone is **incorrect**?
(1) It is secreted by follicular cells of the thyroid gland.
(2) It lowers the blood calcium level.
(3) It increases the storage of calcium in bones.
(4) It inhibits the reabsorption of calcium in the nephron.
(5) Its effects are opposite to those of parathyroid hormone.

21. Select the correct statement regarding human hormones.
(1) Cholecystokinin acts both on pancreas and liver.
(2) Thymus influences the development of B lymphocytes.
(3) Glucagon is secreted by β cells of the islets of Langerhans.
(4) Aldosterone stimulates the reabsorption of Na^+ and K^+ in the nephron.
(5) ADH acts on distal convoluted tubule and collecting duct of kidney tubules.

22. Which of the following statements regarding excretion is **incorrect**?
(1) Excretion is essential to maintain homeostasis.
(2) Excretion is the removal of nitrogenous waste from the body.
(3) In humans, bile pigments are excreted by kidneys and gut.
(4) Nephridia are excretory structures of annelids and molluscs.
(5) The first product of nitrogenous excretion in mammals is ammonia.

23. Select the correct statement regarding human vertebrae.
(1) The body of axis vertebra has a superior process.
(2) Atlas vertebra has a rudimentary spinous process.
(3) Sacrum is formed of six vertebrae.
(4) Thoracic vertebra has a bifid spinous process.
(5) Largest vertebral foramen is found in lumbar vertebrae.

24. Select the correct statement regarding the menstrual cycle.
(1) During the cycle, peak progesterone level is seen 2–3 days prior to menstruation.
(2) It is initiated by pituitary hormones.
(3) During the cycle, peak FSH level is higher than the peak LH level.
(4) The lengths of proliferative phase and secretory phase are the same.
(5) Steady decline of oestrogen and progesterone levels leads to menstruation.

25. Which of the following statements regarding human fallopian tube is **incorrect**?
(1) It is a duct with a funnel-like opening at the distal end.
(2) Its lumen is lined by a ciliated epithelium.
(3) It propels ovum from the ovary to uterus.
(4) Its secretions nourish both ovum and sperms.
(5) Fertilization normally occurs in its lower ⅓ region.

26. Select the **incorrect** statement regarding human epididymis.
(1) It is a highly coiled tube.
(2) It is connected to the testis and vas deferens.
(3) It stores sperms before ejaculation.
(4) Within it, sperms acquire the ability to fertilize.
(5) Hyperactivation of sperms occurs within it.

27. Which of the following statements regarding the development of human foetus and growth of infant is correct?
(1) By the end of the third month of pregnancy, heart beat of the foetus can be detected.
(2) By the end of the third month of pregnancy, fine hair cover the body of the foetus.
(3) Vocalization of an infant usually starts after two months of birth.
(4) Infant can sit on its own by the end of three months after birth.
(5) By the age of 10 months, infant should be fed on the usual diet of other members of the family.

28. Opening of some flowers in the day and closing at night is an example of
(1) tactic movement.
(2) thigmonastic movement.
(3) nyctinastic movement.
(4) phototropic movement.
(5) thigmotropic movement.

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29. Which of the following statements regarding plant tissue culture is **incorrect**?
(1) Plant tissue culture is the growing of plant tissues in sterile culture media with IAA under *in vitro* conditions.
(2) Many plant cells have the ability to generate a total plant when suitable conditions are provided.
(3) Different parts or tissues of a plant can be used as explants to initiate tissue culture.
(4) Callus is a mass of undifferentiated and dividing cells produced from the explant in tissue culture.
(5) A benefit of tissue culture is producing large number of plants with the same genotype rapidly in a small space.

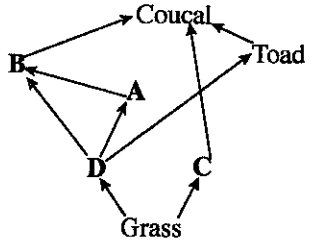
30. Which of the following features is **not** found in the plant given against it?
(1) Horizontally growing underground stem, bearing aerial shoots – *Solanum*
(2) Short swollen underground stem growing vertically, bearing aerial shoots – *Colocasia*
(3) Lateral branches growing horizontally from axillary buds of the erect stem – *Centella*
(4) Axillary buds of the aerial stem growing into small shoots with leaves and separating from main stem to produce new plants – *Dioscorea*
(5) Buds arising from vegetative parts other than the stem – *Bryophyllum*

31. Restriction endonuclease enzymes are capable of
(1) cutting DNA randomly.
(2) restricting protein synthesis.
(3) cutting DNA at specific base sequences.
(4) adding nucleotides to a growing nucleic acid chain.
(5) joining DNA molecules.

32. A genotype consisting of only one type of alleles for a character is
(1) homozygous for that character.
(2) homogenous for that character.
(3) heterozygous for that character.
(4) heterogenous for that character.
(5) monoallelic for that character.

33. Which of the following statements best explains the evolutionary advantage of meiosis?
(1) Meiosis is necessary for sexual reproduction.
(2) Meiosis contributes to maintain a constant number of chromosomes from generation to generation.
(3) Meiosis alternates with mitosis from generation to generation.
(4) Due to meiosis same genes are transmitted from generation to generation.
(5) Genetic recombinations are possible due to meiosis.

● Question No. **34** is based on the following food web seen in a home garden ecosystem.



34. Which of the following statements regarding the above ecosystem is correct?
(1) There are two primary consumers and three secondary consumers in this ecosystem.
(2) The longest food chain in this ecosystem has four trophic levels.
(3) **A** is a keystone species in this ecosystem.
(4) Removing **C** will reduce the population of coucals.
(5) **B** may be a lizard and **C** may be a snail.

35. Which of the following air pollutants does **not** affect agricultural production?
(1) Carbon dioxide
(2) Carbon monoxide
(3) Sulphur dioxide
(4) Chlorofluorocarbons
(5) Oxides of nitrogen

36. Which of the following microorganisms is **not** directly used as food or food supplements?
(1) *Aspergillus*
(2) *Agaricus*
(3) *Lentinus*
(4) *Pleurotus*
(5) *Spirulina*

[*See page five*

37. Which of the following statements is **not** a reason for choosing microorganisms as an ideal tool for biological studies?
(1) They can be easily grown in small containers using simple techniques.
(2) They grow and reproduce rapidly.
(3) Their reproductive units are always identical.
(4) All of them are fundamentally similar in metabolism.
(5) They require very little space in laboratories due to small size.

38. Which of the following 'antibiotic-inhibitory action' combinations is correct?
(1) Erythromycin – Inhibition of synthesis of bacterial cell walls
(2) Ciprofloxacin – Inhibition of synthesis of bacterial DNA
(3) Clotrimazole – Inhibition of synthesis of bacterial cell membranes
(4) Polymyxin – Inhibition of synthesis of fungal cell membranes
(5) Penicillin – Inhibition of synthesis of bacterial DNA

39. Which of the following is **not** related to prions?
(1) They are infectious particles made up of proteins.
(2) They can exist and replicate without nucleic acids.
(3) Protein coats give them a characteristic symmetry.
(4) They can be transmitted by transfusion of contaminated blood.
(5) They replicate with the help of mammalian genes that encode their proteins.

40. Which of the following is **not** associated with pathogenicity of microorganisms?
(1) Ability to invade host cells
(2) Ability to live within the body of the host
(3) Ability to produce RNA polymerase
(4) Ability to produce toxins
(5) Ability to disrupt the normal functions of the host

● **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. Seedless vascular plants that do not bear flowers can be seen in which of the following phylum/phyla?
(A) Pterophyta (B) Lycophyta
(C) Coniferophyta (D) Cycadophyta
(E) Bryophyta

42. Which of the following groups contain/contains animals **without** bony skeleton?
(A) Chordata (B) Aves
(C) Nematoda (D) Arthropoda
(E) Mammalia

43. Which of the following influence/influences the blood glucose level of a normal healthy adult person?
(A) Thyroid gland (B) Hypothalamus
(C) Parathyroid gland (D) Glucagon
(E) Aldosterone

44. Which of the following can be present in a urine sample of a normal healthy adult person?
(A) H^+ (B) Amino acids
(C) Creatinine (D) K^+
(E) White blood cells

[*See page six*

45. Which of the following statements regarding cardiac muscles is/are correct?
(A) They possess intercalated discs.
(B) They possess long, cylindrical, branched cells.
(C) They have gap junctions.
(D) They are myogenic.
(E) Each muscle cell consists of one sarcomere.

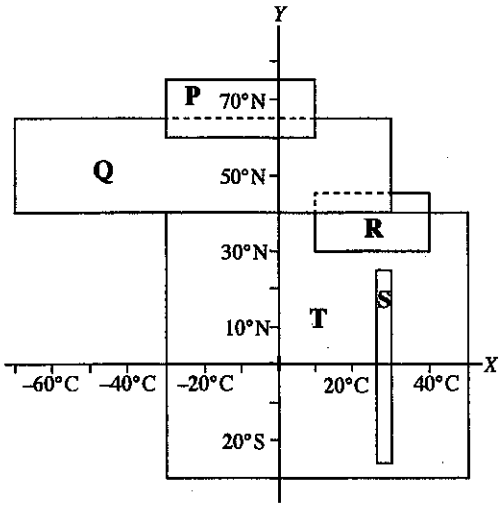
46. Which of the following statements regarding animal skeletons is/are correct?
(A) Both the endoskeleton and exoskeleton provide protection.
(B) Radiolarians possess endoskeletons.
(C) All skeletons store calcium.
(D) Hydrostatic skeleton is found in annelids and nematodes.
(E) Molluscs have only exoskeletons.

47. Which of the following disorders result/results in due to a change in the number of chromosomes?
(A) Downs syndrome (B) Klinefelter syndrome
(C) Sickle cell anaemia (D) Cystic fibrosis
(E) Thalassemia

48. In meiosis, a daughter cell differs from the mother cell as well as from other daughter cells due to which of the following?
(A) Independent assortment (B) Crossing-over
(C) Synapsis (D) Segregation
(E) Formation of the spindle

49. Some periods of the history of earth and several groups of organisms are given below. During one or more of these periods, at least one of the groups of organisms indicated against it/them was **not** living. Select that period/periods.
(A) Permian period : conifers, insects, mammals
(B) Triassic period : reptiles, mammals, modern fish
(C) Cretaceous period : flowering plants, conifers, dinosaurs
(D) Carboniferous period : gymnosperms, trilobites, amphibians
(E) Cambrian period : terrestrial plants, crustaceans, molluscs

50. Approximate ranges of temperature (*X*-axis) of five major terrestrial biomes labelled as **P**, **Q**, **R**, **S** and **T** and the latitudes of their distribution (*Y*-axis) are shown in the following diagram.



Which of the following statements regarding the biomes **P**, **Q**, **R**, **S** and **T** is/are correct?
(A) Dominant plants in biome **Q** are conifers.
(B) If the annual rainfall is above 1 000 mm, biome with the highest biodiversity is **S**.
(C) Largest terrestrial biome is **T**.
(D) Dominant plants in biome **R** are small trees and shrubs.
(E) Longest food chains are found in biome **P**.

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கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2017 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2017

ජීව විද්‍යාව II உயிரியல் II **Biology II**	**09 E II**	පැය තුනයි 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

In Numbers	
In Letters	

Code Numbers

Marking Examiner 1	
Marking Examiner 2	
Marks checked by :	
Supervised by :	

[see page two

Part A - Structured Essay
*Answer **all** questions on **this paper itself**.*
*(Each question carries **10** marks.)*

Do not write in this column

1. (A) (i) What are the main functions of water in living organisms other than being a solvent?

.....

.....

.....

(ii) There are many properties of water that are important for life. Of these, some are especially important for aquatic organisms. State **three** such properties and indicate the role of each of these properties with a suitable example.

(a) Property: .....

Role: .....

.....

Example: .....

(b) Property: .....

Role: .....

.....

Example: .....

(c) Property: .....

Role: .....

.....

Example: .....

(B) (i) State the **three** concepts of cell theory.

.....

.....

.....

(ii) What are the internal structural features of eukaryotic cells that are different from those of prokaryotic cells?

.....

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.....

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[see page three

Do not write in this column

(iii) A student was provided with an epidermal peel of onion mounted on a glass slide and a light microscope. State in correct sequence, the steps that should be followed to observe the shape of onion epidermal cells under the light microscope.

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(C) (i) Some structures that can be seen in molluscs are given below.

(a) Head (b) Suckers (c) Two pairs of tentacles
(d) Shell (e) Laterally flattened body

Using the relevant letters, indicate which of the above structures are present in each of the following animals.

Slug : .....

Mussel : .....

Chiton : .....

Octopus : .....

(ii) State **two** features seen in a heterocercal caudal fin that could be used to distinguish it from a homocercal caudal fin.

.....

.....

(iii) What is a nictitating membrane?

.....

.....

(iv) (a) Name an amphibian which has a long tail during the adult stage.

.....

(b) State a major external feature of the animal named in (a) above which can be used to distinguish it from a lizard.

.....

(v) State a genus of an amphibian which does not have legs during the adult stage.

.....

[see page four

Do not write in this column

2. (A) (i) State **three** main features that can be seen in a cross section of the human large intestine that can be used to distinguish it from a cross section of the human small intestine, when observed under the low power of a light microscope.

.....

.....

.....

(ii) State **two** major functions of HCl in the gastric juice.

.....

.....

(iii) Name **three** hormones that influence selective reabsorption of ions in the human kidney.

.....

(iv) (a) Name an ion which is both reabsorbed and secreted in the human nephron.

.....

(b) Name an ion which is reabsorbed in the human nephron both by active and passive mechanisms.

.....

(v) What is the major constituent of renal calculi?

.....

(B) (i) (a) What is the overall function of the nervous system?

.....

(b) State **three** features of dendrites that are different from those of axons.

.....

.....

.....

(ii) (a) What is a nerve impulse?

.....

(b) State **two** factors that affect the speed of conduction of a nerve impulse along an axon.

.....

.....

(iii) (a) Name **two** inhibitory hormones secreted by human hypothalamus.

.....

(b) What are the functions carried out by human hypothalamus other than the secretion of hormones?

.....

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(iv) In which lobe of the human cerebrum, is the auditory sensory area located?

.....

[see page five

Do not write in this column

(v) (a) What is a trophic hormone?

.....

.....

(b) Name the hormone that stimulates the secretion of gastric juice.

.....

(C) (i) (a) What is the overall function of the human blood circulatory system?

.....

(b) What is the most abundant plasma protein in man?

.....

(ii) (a) What is meant by cardiac cycle?

.....

.....

(b) State **three** factors responsible for maintaining blood pressure of humans within the normal range.

.....

.....

.....

(iii) Name a phylum having triploblastic animals without a blood circulatory system.

.....

(iv) (a) What happens to the water potential when solutes dissolve in water?

.....

(b) What is turgor pressure?

.....

.....

(v) (a) What is plasmolysis?

.....

.....

(b) How much is the pressure potential of a plant cell at incipient plasmolysis?

.....

(c) State whether the water potential is higher than, lower than or equal to solute potential at incipient plasmolysis of a plant cell.

.....

3. (A) (i) (a) State the **two** ways by which the most amount of carbon dioxide is transported in human blood.

.....

.....

(b) Where is the respiration control centre located in the human brain?

.....

(ii) What is locomotion?

.....

(iii) (a) State **two** features that are common to all three types of muscle fibres.

.....

.....

[see page six

Do not write in this column

(b) State **two** features of skeletal muscle fibres which are absent in cardiac and smooth muscle fibres.

.....

.....

(iv) (a) What structural arrangement permits the movement of the human upper arm over a wide range?

.....

.....

(b) State **two** features seen in the human upper limb that help in weight lifting.

.....

.....

(c) State **two** features seen in the human lower limb that contribute to erect posture.

.....

.....

(v) State a disadvantage of hydrostatic skeleton.

.....

(B) (i) Name a living plant tissue that provides support.

.....

(ii) State **two** main substances that are present in the cell walls of the tissue named in (i) above other than cellulose.

.....

(iii) What is parthenocarpy?

.....

(iv) What is parthenogenesis in plants?

.....

(v) Briefly describe seed germination.

.....

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(C) (i) (a) What are the life spans of the human sperm and human ovum?

Sperm : ..... Ovum : .....

(b) At what stage of human spermatogenesis and oogenesis the second meiotic division occurs?

Spermatogenesis : .....

Oogenesis : .....

(ii) (a) What is the role of inhibin in human spermatogenesis?

.....

(b) What is acrosome reaction of a sperm?

.....

.....

[see page seven

Do not write in this column

(iii) (a) What is ovulation?

.....

(b) What hormone triggers ovulation?

.....

(iv) Where are the sperm receptors of the human ovum located?

.....

(v) (a) State **two** functions of oestrogen.

.....

.....

(b) Name a hormone secreted by the human placenta which suppresses myometrial contractions.

.....

(c) What is the role of oxytocin in parturition?

.....

.....

4. (A) (i) (a) What is a test cross?

.....

(b) What is the purpose of carrying out a test cross?

.....

(ii) (a) What is a back cross?

.....

(b) What is the purpose of carrying out a back cross?

.....

(iii) At what condition, a back cross becomes similar to a test cross?

.....

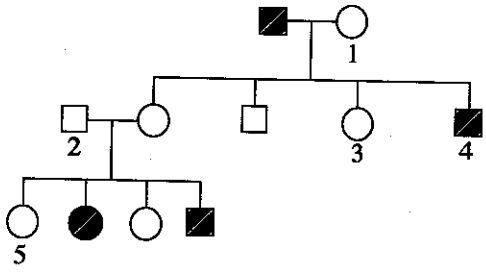
(iv) What is denoted by each of the following symbols in a human pedigree chart?

□ : .....

● : .....

□—○ : .....

(v) A pedigree chart of a human family where some members show a genetic disorder is given below.



(a) State whether the following statement regarding the above inheritance is correct (✓) or incorrect (×).

"The above character is inherited in an autosomal dominant manner." .....

(b) Using 'A' for the dominant allele and 'a' for the recessive allele, state the possible genotype of each of the individuals labelled as 1 – 5 in the above pedigree chart.

1: ..... 2: ..... 3: ..... 4: ..... 5: .....

[see page eight

Do not write in this column

(B) (i) State the organizational levels of the environment in correct order.

.....

.....

(ii) (a) What is an extinct species?

.....

(b) Give an example for an extinct bird.

.....

(iii) What are the major objectives of Biodiversity Convention?

.....

.....

.....

(iv) (a) State **four** main human activities that contribute to desertification.

.....

.....

.....

.....

(b) State **three** major impacts of desertification on humans.

.....

.....

.....

(C) (i) State the source of carbon and source of energy of each of the following nutritional types seen among microorganisms.

Nutritional type	**Source of carbon**	**Source of energy**
Chemoautotrophic	.....	.....
Chemoheterotrophic	.....	.....
Photoautotrophic	.....	.....
Photoheterotrophic	.....	.....

(ii) A student was provided with a clean dry Petri dish. How should it be sterilized to be used in a microbiological experiment?

.....

.....

.....

(iii) State **two** features of the toxin produced by *Clostridium tetani*.

.....

.....

(iv) Name an enzyme which is industrially produced using *Aspergillus oryzae*.

.....

* *

[see page nine

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கல்விப் பொதுத் தராதரப் பத்திர (உயர் தர)ப் பரீட்சை, 2017 ஓகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2017

ජීව විද්‍යාව	II
உயிரியல்	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*) Explain the mechanism of action of enzymes.

(*b*) Describe the enzymatic reactions of making the first stable product in C_3 and C_4 plants during CO_2 fixation.

(*c*) Explain how C_4 plants are more efficient than C_3 plants in CO_2 fixation.

6. (*a*) What is transpiration?

(*b*) State how different external factors affect the rate of transpiration.

(*c*) Describe how an experimental set-up is arranged to determine the rate of transpiration using a potometer.

7. (*a*) Describe the location of the human testes.

(*b*) Briefly describe the structure of the human testes.

(*c*) Briefly explain the process of spermatogenesis in man.

8. Describe the traditional selective breeding techniques that are used by man in agriculture.

9. (*a*) Giving suitable examples, describe the different types of natural resources.

(*b*) Explain the sustainable use of natural resources.

10. Write short notes on the following.

(*a*) Human vertebral column

(*b*) Invasive species

(*c*) Cyanobacteria

* * *