A/L පන්තිය

සියලු ම හිමිකම් ඇවිරිණි/முழுப் பதிப்புரிமையுடையது/All Rights Reserved]

ශ්‍රී ලංකා විභාග දෙපාර්තමේන්තුව இலங்கைப் பரீட்சைத் திணைக்களம் Department of Examinations, Sri Lanka

අධ්‍යාපන පොදු සහතික පත්‍ර (උසස් පෙළ) විභාගය, 2016 අගෝස්තු
கல்விப் பொதுத் தராதர் பத்திர (உயர் தர)ப் பரீட்சை, 2016 ஒகஸ்ற்
General Certificate of Education (Adv. Level) Examination, August 2016

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. Which of the following organelles in plant cells converts fats into carbohydrates?
   (1) Lysosomes (2) Peroxisomes (3) Glyoxisomes
   (4) Endoplasmic reticulum (5) Golgi complex

2. Which of the following is correct regarding prokaryotic organisms?
   (1) All prokaryotic organisms are heterotrophic.
   (2) All prokaryotic organisms do not have peptidoglycans in their cell walls.
   (3) All prokaryotic organisms can fix atmospheric nitrogen.
   (4) All prokaryotic organisms do not have ribosomes.
   (5) All prokaryotic organisms are not microorganisms.

3. The base Adenine (A) of DNA of an organism forms 23.3% of its composition. Which of the following is the most likely base composition of its DNA?
   (1) A = T 23.3% and G = C 23.3% (2) A = T 26.7% and G = C 26.7%
   (3) A = T 23.3% and G = C 26.7% (4) A = T 26.7% and G = C 23.3%
   (5) A = T 23.3% and G = C 76.7%

4. Which of the following 'structure-function' combinations is **incorrect**?

	Structure	**Function**
(1)	Nucleolus	Ribosome production
(2)	Glyoxisomes	Photorespiration in plants
(3)	Cytoskeleton	Determines the shape of the cell
(4)	Vacuoles	Store soluble substances needed for cellular activities
(5)	Golgi complex	Produces lysosomes

5. Which of the following is common to lactic acid fermentation, alcoholic fermentation and aerobic respiration?
   (1) Glycolysis (2) Krebs cycle
   (3) Electron transport chain (4) Production of acetyl co-enzyme A from pyruvate
   (5) Oxidation of glucose to CO_2 and water

6. Which of the following comparisons between C_3 and C_4 photosynthesis in plants is **incorrect**?

	C_3	C_4
(1)	CO_2 fixation occurs only once.	CO_2 fixation occurs twice.
(2)	Major CO_2 acceptor is RuBP.	Major CO_2 acceptor is PEP.
(3)	CO_2 fixing enzyme is RuBP carboxylase.	CO_2 fixing enzyme is PEP carboxylase.
(4)	Photosynthetic yield is high.	Photosynthetic yield is usually low.
(5)	First product of photosynthesis is PGA.	First product of photosynthesis is oxaloacetate.

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7. One characteristic of each of the organisms labelled as A, B, C and D is as follows.
   (A) Heterosporous
   (B) Gametophyte is photosynthetic
   (C) Seedless
   (D) Thalloid gametophyte
   The organisms A, B, C and D in correct order are
   (1) *Cycas, Marchantia, Selaginella* and *Pogonatum*.
   (2) *Pinus, Pogonatum, Cycas* and *Nephrolepis*.
   (3) Mango, *Nephrolepis, Lycopodium* and *Marchantia*.
   (4) Banana, *Pinus, Nephrolepis* and *Marchantia*.
   (5) *Pogonatum, Cycas, Marchantia* and *Nephrolepis*.

8. In the classification of organisms, the taxon phylum was introduced by
   (1) Carl Woese.
   (2) Robert Whittaker.
   (3) Ernest Haeckel.
   (4) Carolus Linnaeus.
   (5) Aristotle.

9. Two phyla that include organisms having glycogen as the main stored food are
   (1) Chytridiomycota and Lycophyta.
   (2) Zygomycota and Pterophyta.
   (3) Chordata and Chrysophyta.
   (4) Cycadophyta and Phaeophyta.
   (5) 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
    (1) Crustacea. (2) Chilopoda. (3) Diplopoda. (4) Insecta. (5) Arachnida.

11. Anaemia is a deficiency syndrome of which of the following vitamins?
    (1) A, D, Thiamin
    (2) B_{12}, B_6, Folic acid
    (3) K, B_1, Biotin
    (4) B_5, B_3, B_1
    (5) B_1, B_2, Pantothenic acid

12. Which of the following statements regarding the respiratory system of man is correct?
    (1) Contraction of external intercostal muscles results in inspiration.
    (2) Tracheal cavity is lined with columnar epithelium.
    (3) Right lung consists of two lobes.
    (4) Exchange of respiratory gases in the lung requires energy.
    (5) Larynx is located at the level of 2nd and 3rd cervical vertebrae.

13. Select the **incorrect** statement regarding human blood.
    (1) It is a specialized connective tissue.
    (2) A mature erythrocyte lacks both nucleus and mitochondria.
    (3) Neutrophils and monocytes are leucocytes showing phagocytosis.
    (4) Most of the carbon dioxide is transported in combination with haemoglobin.
    (5) It helps to regulate body temperature.

14. Which of the following is **not** a part of the conducting system of human heart?
    (1) Chordae tendineae
    (2) Atrioventricular (AV) node
    (3) Bundle of His
    (4) Sino-auricular (SA) node
    (5) Purkinje fibres

15. Which of the following processes in plants increases in the absence of light?
    (1) Absorption of minerals
    (2) Absorption of water
    (3) Ascent of sap
    (4) Elongation of internodes
    (5) Guttation

16. Which of the following is **incorrect** regarding phloem transport?
    (1) Translocation of phloem sap from leaves to roots takes place through apoplast of sieve tube elements.
    (2) Mature leaves are the major sugar sources in phloem transport.
    (3) Developing root apices and shoot apices are usually sugar sinks in plants.
    (4) Phloem loading and unloading are active processes.
    (5) 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.

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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

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 - *Lantana camara* B - *Puntius nigrofasciatus*
C - *Garcinia quaesita* D - *Caretta caretta*
E - *Dermochelys coriacea* F - *Elephas maximus*

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) *Vibrio cholerae* (2) *Staphylococcus aureus*
(3) *Clostridium botulinum* (4) *Salmonella typhi*
(5) *Shigella flexneri*

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) *Pseudomonas aeruginosa* (2) *Thiobacillus ferrooxidans*
(3) *Bacillus thuringiensis* (4) *Lactobacillus bulgaricus*
(5) *Aspergillus oryzae*

⊙ **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_2O
(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

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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 alantochorian 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 contractibility.
(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.

❀ ❀ ❀