

සියලු ම හිමිකම් ඇවිරිණි  
முழுப் பதிப்புரிமையுடையது  
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අධ්‍යයන සෞඳ්‍ය සහතික පත්‍ර (ප්‍රවේශ පෙළ) විභාගය, 2010 අගෝස්තු සාමාන්‍ය පොදුතර්ජන තරාතිරම (උසස් මට්ටම) පරීட்சණ, 2010 ඔක්තෝබර් General Certificate of Education (Adv. Level) Examination, August 2010	
වෛ විද්‍යාව I உயிரியல் I Biology I	පැය දෙකයි இரண்டு மணித்தியாலங்கள் Two hours

**Important :**

- 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 60, 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.

- Which one of the following would be complimentary for a DNA strand containing the base sequence CCATCG?  
(1) GGTAGC (2) AACGAT (3) GGATUC (4) TTGCTA (5) GGUAGC
- Which one of the following organelles does not have a membrane?  
(1) Mitochondria (2) Golgi bodies (3) Lysosomes (4) Plastids (5) Ribosomes
- During meiosis crossing over takes place in.  
(1) leptotene stage. (2) zygotene stage. (3) pachytene stage  
(4) diplotene stage. (5) diakinesis stage
- The final electron acceptor in anaerobic respiration leading to the formation of ethyl alcohol is  
(1) ATP. (2) NAD (3) pyruvate (4) Oxygen. (5) Acetaldehyde
- Most of the CO<sub>2</sub> liberated during respiration of glucose arise from the reactions of  
(1) Krebs cycle. (2) glycolysis. (3) alcohol fermentation.  
(4) oxidative phosphorylation. (5) lactic acid fermentation.
- Which one of the following taxa has the highest number of common characteristics?  
(1) Phylum (2) Class (3) Genus (4) Family (5) Order
- At the time of origin of photosynthetic organisms  
(1) earth had a reducing atmosphere with hydrogen as the main component  
(2) there were no continents but only oceans on earth.  
(3) aerobic bacteria were abundant.  
(4) earth atmosphere contained methane in significant amounts.  
(5) iron oxides were one of the major components of earth crust.
- The plant species *Alphonsea hortensis*, which is an extremely rare species, was not found in any wild environment in a survey carried out recently. Which one of the following statements is most likely to be correct regarding this species?

- (1) It is an extinct species now.
  - (2) It can be included in the critically endangered category.
  - (3) If it is indigenous, it can be included in the extinct in the wild category.
  - (4) If few plants of this species are present in a cultivation, it can be included in the extinct in the wild category.
  - (5) Since given information is not adequate, it can be included in the data deficient category.
9. Which one of the following is a feature that can be seen in Lycophyta but not in Pterophyta?
- (1) Flagellated male gametes
  - (2) Sporangia attached to the upper surface of sporophylls
  - (3) Stem as a rhizome
  - (4) Gametophyte as a simple prothallus
  - (5) Vascular tissues containing lignified cells
10. A student observed a dorsoventrally flattened soft bodied animal crawling on a wet surface in his home garden on a rainy day. Which one of the following is not likely to be present in this animal?
- (1) Circular muscles
  - (2) Cilia
  - (3) Anus
  - (4) Longitudinal nerve cords
  - (5) Excretory ducts
11. Which one of the following animals is most likely to be a keystone species in the Udawalawa National Park ‘?’
- (1) Toque monkey
  - (2) Elephant
  - (3) Peacock
  - (4) Deer
  - (5) Marsh crocodile
12. Some respiratory structures found among animals and the phyla to which the animals that possess these structures belong are given below. Which one of the following respiratory structure - phylum combinations is incorrect?
- | Respiratory structure | Phylum     |
|-----------------------|------------|
| (1) External gills    | Annelida   |
| (2) Trachea           | Arthropoda |
| (3) Book lungs        | Mollusca   |
| (4) Lungs             | Chordata   |
| (5) Body surface      | Chordata   |
13. Which one of the following statements regarding the digestive system of man is correct?
- (1) Skeletal muscle fibres are present in the muscularis mucosa of some regions of the gut
  - (2) Gastric cavity is lined by cuboidal epithelium.
  - (3) Lipase is present in intestinal juice and pancreatic juice.
  - (4) The most proximal part of the large intestine is the ascending colon.
  - (5) Pancreatic juice contains the enzymes that act on disaccharides.
14. Which of the following indicates the blood vessels in correct sequence that a molecule of urea passes from its site of production to site of excretion in man?
- (1) Hepatic vein → inferior vena cava → pulmonary vein → pulmonary artery → aorta → renal artery
  - (2) Capillaries → venules → veins → inferior vena cava → renal vein
  - (3) Hepatic vein → inferior vena cava → pulmonary artery → pulmonary vein → aorta → renal artery
  - (4) Capillaries → venules → veins → pulmonary vein → pulmonary artery → aorta → renal artery
  - (5) Capillaries → arterioles → arteries → aorta → dermal arteries → arterioles → capillaries
15. Which one of the following statements is correct regarding the upper limb of man?
- (1) Distal end of radius is over the ulna during supination.
  - (2) Immovable joints are present between carpels.
  - (3) Opposability of the thumb is due to high movability of its first phalange.
  - (4) Ulna is longer than the radius.
  - (5) Elbow joint is formed by the articulation of ulna with humerus.



16. Smooth muscles
  - (1) never get fatigued.
  - (2) may contract faster than skeletal muscles.
  - (3) are not attached to tendons.
  - (4) are composed of cylindrical shaped fibres.
  - (5) are composed of cells having one or two nuclei
17. Which one of the following statements on implantation of human embryo is correct?
  - (1) It is the process of embedding of morula stage in the endometrium.
  - (2) It usually starts on the third day of fertilization.
  - (3) It is completed by the 15th day after fertilization.
  - (4) It takes about two weeks to complete.
  - (5) When it is completed, the embryo is known as the foetus.
18. Leydig cells
  - (1) are located in the germinal epithelium of the seminiferous tubules.
  - (2) help to remove the excess cytoplasm of spermatids during spermatogenesis
  - (3) provide nourishment to the developing sperms.
  - (4) secrete inhibin.
  - (5) secrete testosterone.
19. Which one of the following does not contribute to increase the rate of heart beat in man?
  - (1) Adrenalin
  - (2) Thyroxine
  - (3) Sex hormones
  - (4) Reduction of blood pH
  - (5) Stimulation of parasympathetic nervous system
20. Which one of the following is incorrect regarding endodermis of plant roots?
  - (1) Its cells have suberin in cell walls.
  - (2) It separates apoplast of cortex from apoplast of vascular tissues.
  - (3) It separates symplast of cortex from symplast of pericycle.
  - (4) It is differentiated from ground meristem.
  - (5) It helps in selective absorption of mineral ions:
21. Two pieces of a lower epidermal peel of a Rhoeo leaf were immersed separately in two sucrose solutions labelled A and B. Solute potential of solution A was -1450 kPa and that of solution B was -1120 kPa. After the tissues had come to equilibrium with the solutions, it was found that 50% of the cells in the peel immersed in solution A were plasmolysed. Which of the following would be close to the pressure potential of the cells immersed in solution B?
  - (1) 1450 kPa
  - (2) 1120 kPa
  - (3) 330 kPa
  - (4) 0 kPa
  - (5) -330 kPa
22. Which of the following is incorrect regarding the root apex of monocotyledonous plants?
  - (1) Apical initials produce new cells in all directions.
  - (2) Root hairs differentiate in the zone of cell elongation.
  - (3) Protoxylem differentiates at the peripheral zone of procambium.
  - (4) Pith is differentiated from procambium.
  - (5) Cells of the root cap divide continuously.
23. Which of the following is incorrect regarding the leaves of *Zea mays*?
  - (1) Mesophyll cells have well developed grana.
  - (2) Liberation of  $O_2$  takes place mainly in bundle sheath cells.
  - (3) Bundle sheath cells have well developed chloroplasts.
  - (4) Bundle sheath cells produce pyruvate in the presence of light.
  - (5) Mesophyll cells have low amounts of RuBP carboxylase.
24. Which of the following is incorrect regarding the role of Mg in plant nutrition?
  - (1) It is a constituent of some important molecules.
  - (2) It acts as an activator of enzymes
  - (3) Its deficiency symptoms first appear in mature leaves.
  - (4) Its deficiency causes chlorosis.
  - (5) Its main function is to maintain osmotic balance of cells.

25. Which of the following is not associated with the opening of stomata?
  - (1) Increase in the concentration of abscisic acid in mesophyll
  - (2) Decrease in the concentration of  $\text{CO}_2$  in intercellular spaces
  - (3) Increase in the concentration of malate in guard cells
  - (4) Increase in the concentration of  $\text{Cl}^-$  in guard cells
  - (5) Decrease in the starch content of guard cells
26. Which of the following features of *Nephrolepis* does not indicate that it is adapted to land habit better than Bryophytes?
  - (1) Gametophyte is a short lived generation in the life cycle.
  - (2) Gametophyte produces multi-flagellate male gametes.
  - (3) Sporophyte is differentiated into stems, leaves and roots.
  - (4) Sporophyte propagates asexually.
  - (5) Sporangia are covered by an indusium.
27. Which of the following is an incorrect statement?
  - (1) *Phaseolus* plant produces hypogynous flowers.
  - (2) *Psidium* plant produces epigynous flowers.
  - (3) *Ixora* plant produces gamopetalous flowers.
  - (4) *Cassia* plant produces polypetalous flowers.
  - (5) *Cocos* plant produces flowers with monocarpellary ovary
28. Which of the following is incorrect regarding weeds?
  - (1) Biological control methods are the most efficient methods of their control
  - (2) Most weeds have short life spans.
  - (3) Some important weeds are exotic plants.
  - (4) Most weeds propagate by asexual methods.
  - (5) Some weeds produce allelopathic substances.
29. Which of the following is incorrect regarding bud grafting?
  - (1) Scion and stock can come from different varieties of plants.
  - (2) Cambial tissues of stock and scion should come in contact.
  - (3) It can be used to produce large number of similar trees quickly
  - (4) It can be used to prevent some diseases.
  - (5) Scion should be treated with fungicide before grafting.
30. Which of the following statements regarding heredity is incorrect?
  - (1) The fact that hereditary factors exist in pairs and they segregate in the formation of gametes was discovered by Mendel.
  - (2) Boveri and Sutton proposed that hereditary factors are carried in chromosomes.
  - (3) Johannsen gave the name genes to hereditary factors.
  - (4) Morgan discovered that chromosomes pair in meiosis before gametes are formed.
  - (5) Hertwig discovered that gametes fuse at fertilization.
31. Which of the following statements regarding nucleic acids is incorrect?
  - (1) Hereditary characters do not change easily because of the stability of DNA molecules.
  - (2) RNA acts as an intermediate in the translation of genetic information into phenotypes.
  - (3) Selfreplication is an important feature of DNA and RNA molecules.
  - (4) Triplet nature of genetic code has increased the capacity for information storage in DNA
  - (5) Mutations may occur because of mispairing of bases during replication of DNA.
32. Which of the following statements is incorrect regarding inheritance of genes?
  - (1) Independent segregation of genes cannot take place without meiosis.
  - (2) Presence of codominant alleles tend to increase the phenotypic classes of a genetic character
  - (3) Genetic recombination decreases genetic diversity in populations.
  - (4) Epistasis can occur due to dominant alleles as well as recessive alleles.
  - (5) Genes determining polygenic characters usually segregate independently.



33. In a plant species, red flowers (R) is a dominant character while white flowers (r) is a recessive character. Elongated fruits (L) is a dominant character while round fruits (l) is a recessive character. Assume that the two genes R and L are present in the same chromosome with 18 map units apart. When a true breeding plant with red flowers and elongated fruits was crossed with a true breeding plant with white flowers and round fruits, and the  $F_1$  plants were self pollinated to produce  $F_2$  plants, what percentage of plants in the  $F_2$  progeny will have white flowers and round fruits?  
 (1) 82% (2) 41% (3) 18% (4) 9% (5) 0%
34. Which of the following statements regarding the evolution of organisms is incorrect?  
 (1) Organisms that evolved first on earth were anaerobic prokaryotes.  
 (2) Organisms with extensive specialization face the risk of extinction.  
 (3) Evolution of highly advantageous characters has lead to adaptive radiation.  
 (4) Shelled eggs of reptiles and birds are an example for parallel evolution.  
 (5) Warm bloodedness evolved before three dimensional vision.
35. Which of the following is not an essential step in a procedure for cloning a foreign gene in a bacterium?  
 (1) DNA molecules are cut into pieces with restriction enzymes.  
 (2) Agarose gel electrophoresis is used to separate pieces of DNA.  
 (3) DNA pieces in the gel are blotted into nitrocellulose membranes.  
 (4) Different DNA molecules are joined with ligase enzymes.  
 (5) Plasmids are used as vectors to introduce DNA into bacterial cells.
36. Which of the following appear smallest under the highest magnification available in a light microscope?  
 (1) *Rhizobium* cells seen in crushed root nodules  
 (2) *Saccharomyces cerevisiae* cells in a toddy sample  
 (3) Sporangiophore of *Mucor*  
 (4) Filament of *Oscillatoria*  
 (5) Cells of an epidermal peel of onion
37. Which of the following is incorrect?  
 (1) All Cyanobacteria are photoautotrophs.  
 (2) All viruses are parasitic.  
 (3) All bacteria are not chemoautotrophic.  
 (4) All fungi are not filamentous.  
 (5) All bacteria reproduce by binary fission.
38. Many pathogenic bacteria produce toxins which disrupt normal function of cells during an infection. Which of the following bacteria produces a neurotoxin?  
 (1) *Corynebacterium diphtheriae* (2) *Clostridium botulinum*  
 (3) *Salmonella typhi* (4) *Vibrio cholerae* (5) *Staphylococcus aureus*
39. Which of the following methods of food preservation is likely to produce a food completely devoid of live microorganisms?  
 (1) Salting (2) Drying (3) Smoking (4) Canning (5) Pasteurization
40. Which one of the following fish combinations is suitable for polyculture in a fresh water environment in Sri Lanka with no decaying plant matter?  
 (1) Nile Tilapia and Catla (2) Rohu and Mossambique Tilapia  
 (3) Mrigal and Rohu (4) Mossambique Tilapia and Indian white prawn  
 (5) Mossambique Tilapia and Mrigal
41. Which one of the following is the most suitable for extensive aquaculture in Sri Lanka?  
 (1) Seasonal reservoirs in the dry zone (2) Abandoned ponds used for shrimp farming  
 (3) Lagoons in the coastal belt (4) Villus in the dry zone (5) Mahaweli reservoirs

42. Which one of the following is not a traditional method used for insect pest control?  
 (1) Crop rotation (2) Pruning (3) Water management  
 (4) Use of trap crops (5) Use of natural enemies
43. Which one of the following statements is correct regarding *Entamoeba histolytica*?  
 (1) Infective stage is the pre-cyst stage. (2) Infective stage has eight nuclei.  
 (3) Parasite is released from the cyst in the large intestine of man.  
 (4) Trophozoite may have 1 or 2 flagellae. (5) Trophozoite may live as a commensal.
44. Root knot disease in paddy can be controlled by  
 (1) chemical insecticides. (2) nematocides. (3) fungicides.  
 (4) bactericides. (5) chemical fertilizer containing micronutrients
45. Which one of the following is correct regarding tropical rain forests in Sri Lanka?  
 (1) They are located in areas where annual rainfall is 1200-2000 mm.  
 (2) Prominent plants are the evergreen and deciduous trees.  
 (3) Their canopy is discontinuous.  
 (4) There is a clear stratification of plants.  
 (5) There is well developed ground layer.
46. Emission of sulphur dioxide in large amounts into atmosphere may lead to  
 (1) sea level rise. (2) change in rainfall pattern.  
 (3) increase in skin cancer. (4) increase in the incidence of cataract. (5) destruction of forests.
47. Soil is  
 (1) a non-living non-renewable resource (2) a non-living renewable resource.  
 (3) a non-living inexhaustible resource. (4) a living renewable resource. (5) a living non-renewable resource,
48. Which of the following biomes are present between the equator and tropic of cancer of the earth?  
 (1) Tropical rain forests, deserts, monsoon forests, savanna  
 (2) Tropical rain forests, tropical deciduous forests, tundra, coniferous forests  
 (3) Tropical rain forests, deserts, chaparral, savanna  
 (4) Tropical rain forests, tropical deciduous forest, coniferous forests, taiga  
 (5) Tropical rain forests, deserts, tropical deciduous forests, chaparral
49. Which one of the following is correct regarding the hydrological cycle?  
 (1) It occurs mainly due to interactions between biotic and abiotic components of an ecosystem  
 (2) Human activities significantly influence it.  
 (3) Solar energy is essential to maintain it.  
 (4) It is confined to a particular area.  
 (5) Forests are essential to maintain it.
50. Which of the following should be calculated to determine whether observed frequencies are significantly different from expected frequencies?  
 (1) Mean (2) Standard error (3) Standard deviation  
 (4) Mode (5) Chi square value
- For each of the questions 51 to 60 one or more of the responses is/ are correct, Decide which of the 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
A, B, D correct	A, B, D correct	A, B correct	Any other response of combination of responses correct

51. Which of the following is/are correct regarding photosynthesis?
- (A) The light reactions of photosynthesis provide ATP and  $\text{NADPH}_2$  for the Calvin cycle.  
 (B) The correct sequence of flow of electrons during photosynthesis is  
 $\text{H}_2\text{O} \rightarrow \text{P}_{680} \rightarrow \text{electron acceptors} \rightarrow \text{P}_{700} \rightarrow \text{electron acceptors} \rightarrow \text{NADP}$   
 (C)  $\text{CO}_2$  fixation during photosynthesis takes place in the thylakoid membrane.  
 (D) In  $\text{C}_4$  photosynthesis,  $\text{CO}_2$  is fixed twice.  
 (E) The red and green areas of the spectrum are the most effective in photosynthesis.
52. Which of the following cannot be present in the glomerular filtrate of a normal healthy adult person?
- (A) Albumin (B) Platelets (C) Glucose (D) Amino acids (E) Vitamins
53. Which of the following statements is/are correct regarding resting potential of a neurone of man?
- (A) It is about -70 mV.  
 (B) Carrier proteins contribute to maintain it.  
 (C) Energy is not required to maintain it.  
 (D) During resting potential, the plasma membrane of a neurone is more permeable to  $\text{Na}^+$  than to  $\text{K}^+$ .  
 (E) During resting potential,  $\text{Na}^+$  concentration inside the neurone is higher than the outside of the neurone.
54. Which of the following hormone / hormones of man acts/act on the kidney?
- (A) ADH (B) Aldosterone  
 (C) Adrenaline (D) Growth hormone (E) Erythropoitin
55. Which of the following structures in the skin of man is/are sensitive to touch and pressure?
- (A) Meissner's corpuscles (B) Ruffini corpuscles  
 (C) Free nerve endings (D) Pacinian corpuscles (E) Krause's end bulbs
56. Which of the following is/are incorrect regarding cytokinin?
- (A) It is produced in root apex. (B) It is transported in xylem tissue.  
 (C) It promotes germination of seeds. (D) It is commonly used in tissue culture  
 (E) It promotes elongation of stems.
57. Nitrifying bacteria participate in the nitrogen cycle by
- (A) converting nitrogen gas to ammonia. (B) releasing ammonia from organic compounds in soil,  
 (C) converting ammonia to nitrate in soil. (D) converting nitrite to nitrate in soil.  
 (E) converting nitrates to nitrogen gas.
58. Given below are some of the major steps of general water purification system in a municipal water purification plant. Which of the following step/steps involves/involves in the removal of pathogenic microorganisms?
- (A) Addition of aluminium sulphate (B) Allowing water to cascade in several steps  
 (C) Filtration using sand filters (D) Disinfection using chlorine  
 (E) Keeping water in large reservoirs for a specific period
59. Which of the following paddy pests has/have an adult stage with wings covered with minute scales?
- (A) Yellow stem borer (B) Swarming caterpillar  
 (C) Paddy bug (D) Case worm (E) Brown plant hopper
60. Which of the following substance/substances can be accumulated along the food chains
- (A) Chlorinated hydrocarbons (B) Heavy metals (C) Pyrethroids  
 (D) Organophosphates (E) Nitrates