

Important:

(i) Answer all questions

(ii) Instructions are given on the back of the answer sheet. Follow those carefully.

(iii) In each of the question 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.

1. Which one of the following is **not** a monosaccharide?

- (1) Bibose (2) Galactose (3) Glucose (4) Maltose (5) Fructose

2. Which one of the following structures in the cell does not contain RNA?

- (1) Ribosomes (2) Nucleolus (3) Mitochondria (4) Lysosomes (5) Chloroplasts

3. Which one of the following statements is correct regarding proteins?

- (1) Quaternary structure of a protein is produced by folding of a single polypeptide chain. ~~X~~
 (2) Some amino acids found in proteins may contain more than one amino or carboxyl group. ~~X~~
 (3) Linkages between amino acids in proteins are known as glycosidic bonds. ~~X~~
 (4) Proteins give a red colouration with biuret reagent. ~~X~~
 (5) During heat denaturation of proteins disulphide bonds are broken. ~~X~~

4. Which one of the following organelles in the cell synthesizes lipids?

- (1) Golgi complex (2) Endoplasmic reticulum (3) Peroxisomes
 (4) Lysosomes (5) Chloroplasts

5. Which one of the following substances in plants has mainly a storage function?

- (1) Glucose (2) Cellulose (3) Starch (4) Pectin (5) Phospholipid

6. Which one of the following events takes place in the metaphase of mitosis?

- (1) Condensation of chromosomes
 (2) Disappearance of nucleolus
 (3) Alignment of chromosomes in the middle of the cell
 (4) Breaking down of nuclear membrane
 (5) Formation of spindle

7. Which one of the following organisms is **not** a characteristic feature of class Monocotyledonae?

- (1) Presence of adventitious roots
 (2) Absence of pith in the root
 (3) Presence of scattered vascular bundles in the stem.
 (4) Presence of floral parts in multiples of three.
 (5) Presence of parallel venation in leaves.

8. Which one of the following groups of animals has the closest evolutionary relationship with chordates?

- (1) Annelids (2) Nematodes (3) Molluscs (4) Arthropods (5) Echinoderms

9. Which one of the following groups of organisms is most likely to have a large number of endemic species in an island like Sri Lanka?

- (1) Sea weeds (2) Bats (3) Birds (4) Fresh water crabs (5) Marine reptiles

10. Dry Patana grasslands in Sri Lanka are seen in

- (1) low country dry zone. (2) low country intermediate zone.
 (3) Uva basin. (4) Horton plains.
 (5) arid zone.

11. Experiments to measure the rate of transpiration of plant shoots may fail if the shoots are not cut under water. This is because
- (1) when shoots are cut in air, the xylem vessels get blocked by exudates.
 - (2) transpiration cannot take place unless there is a continuous column of water in the xylem.
 - (3) when shoots are cut in air, the stomata are closed and transpiration is restricted.
 - (4) when air enters the xylem vessels, the cohesive forces of water columns are lost.
 - (5) the amount of water lost in transpiration cannot be measured when shoots are cut in air.
12. When plant leaves are exposed to light, the stomata open. Which of the following will not happen in guard cells when stomata open?
- (1) Starch is hydrolysed to sugar.
 - (2) Starch is synthesised from sugar.
 - (3) K^+ move into guard cells from other epidermal cells.
 - (4) Water potential of guard cells decreases.
 - (5) Pressure potential of guard cells increases.
13. Which one of the following is not a part of the apoplast of a plant?
- (1) Cell wall of root hair cells.
 - (2) Lumen of xylem vessels.
 - (3) Lumen of phloem sieve tubes.
 - (4) Cell wall of mesophyll cells.
 - (5) Intercellular spaces in root cortex.
14. Photosynthesis is most efficient in
- (1) green and blue light.
 - (2) red and blue light.
 - (3) green and red light.
 - (4) violet and red light.
 - (5) orange and blue light.
15. Which one of the following **cannot** be considered as an example for mutualism?
- (1) Growth of epiphytes on tree trunks.
 - (2) Algae and fungi forming lichens.
 - (3) Bacteria living in root nodules of legume plants.
 - (4) Mycorrhizae formed by fungi with roots of higher plants.
 - (5) Rhizosphere bacteria living on root surfaces of higher plants.
16. Deficiency of which one of the following elements does not cause chlorosis?
- (1) K
 - (2) Ca
 - (3) Mg
 - (4) Fe
 - (5) N
17. Which of the following statements regarding a comparison of the ovules of *Cycas* and angiosperms is **incorrect**?
- (1) *Cycas* ovule has archegonia but angiosperm ovule does not.
 - (2) *Cycas* ovule has a pollen chamber but angiosperm ovule does not.
 - (3) Angiosperm ovule has one embryo sac while *Cycas* ovule has several embryo sacs.
 - (4) Angiosperm ovule has only one egg cell while *Cycas* ovule has several egg cells.
 - (5) Angiosperm ovule has a funiculus but *Cycas* ovule does not.
18. The first stable product formed during CO_2 fixation in C_3 photosynthesis is
- (1) phosphoglyceraldehyde (PGAL).
 - (2) glucose.
 - (3) phosphoglyceric acid (PGA).
 - (4) ribulose biphosphate (RuBP).
 - (5) oxaloacetate.
19. Which one of the following statements regarding a comparison of life cycles of *Nephrolepis* and *Selaginella* is **incorrect**?
- (1) *Nephrolepis* produces sori but *Selaginella* does not.
 - (2) *Nephrolepis* produces one type of gametophyte but *Selaginella* produces two types of gametophytes.
 - (3) Gametophytes of *Nephrolepis* are photosynthetic but gametophytes of *Selaginella* are not photosynthetic.
 - (4) Antherozoides of *Nephrolepis* are multiflagellate while those of *Selaginella* are biflagellate.
 - (5) Gametophytes of *Nephrolepis* produce many antheridia while gametophytes of *Selaginella* produce only a single antheridium.

20. The structure of human ear concerned with static equilibrium is
(1) macula (2) cupula (3) organ of Corti (4) oval window (5) malleus
21. Which one of the following statements is **incorrect** regarding human colon?
(1) It has no circular intestinal folds.
(2) It secretes mucus.
(3) It is the site where faeces is formed.
(4) It is the main site in the body where water resorption occurs.
(5) Its wall has three longitudinal muscle bands.
22. Which one of the following statements is correct regarding animal skeletal systems?
(1) Arthropod skeleton is mainly composed of keratin.
(2) An endoskeleton is found only in vertebrates.
(3) In man occipital condyles articulate with axis vertebra.
(4) Femur is the longest bone in the human body.
(5) Intervertebral discs of man are mainly composed of elastic cartilage.
23. In man sodium and calcium ions are important for normal health. Which one of the following requires both of these ions?
(1) Strengthening of bones (2) Muscle contraction
(3) Synthesis of haemoglobin (4) Blood clotting
(5) Activation of enzymes
24. If the blood group of a person is B⁺ he **cannot** be transfused with blood from a donor whose blood type is
(1) O⁻ (2) O⁺ (3) B⁻ (4) B⁺ (5) A⁻
25. Ommatidia are found in
(1) Flat worms. (2) Annelids. (3) Arthropods (4) Molluscs (5) Coelenterates
26. Which of the following tastes **cannot** be detected by human tongue?
(1) Bitter (2) Sweet (3) Sour (4) Rancid (5) Salty
27. Which one of the following statements is **incorrect** regarding human pancreas?
(1) It functions both as an exocrine and endocrine gland.
(2) Pancreatic juice contains two proteolytic enzymes.
(3) Pancreatic juice helps to neutralize acidity of chyme.
(4) Damage to Langerhan islets may lead to diabetes mellitus.
(5) Secretin regulates functioning of the pancreas.
28. Which of the following statements is **incorrect** regarding a nerve impulse?
(1) It is a propagated action potential.
(2) Myelin sheath helps to increase its speed.
(3) Na⁺ and K⁺ are essential for its production.
(4) It is formed in the plasma membrane of the neurone.
(5) It travels both forwards and backwards.
29. Which one of the following statements is **incorrect** regarding human luteinizing hormone?
(1) It is a trophic hormone.
(2) GnRH regulates its release.
(3) It stimulates ovulation in females.
(4) It regulates release of testosterone in males.
(5) It stimulates the development of uterine wall after menstruation.

30. When two plants producing white flowers were crossed the F_1 plant produced red flowers. When this F_1 plant was self pollinated to obtain the F_2 generation, 179 plants produced red flowers and 141 produced white flowers. The flower colour in these plants would have been inherited.
- by polygenic inheritance.
 - by 2 genes complementing each other.
 - by 2 alleles showing incomplete dominance.
 - by 2 genes which are acting antagonistically.
 - by 2 linked genes.
31. "Features which are developed by an organism within the life time as adaptations to environment are transmitted to the offspring." Which one of the following is correct regarding above statement?
- This is a view believed by Charles Darwin.
 - This is a theory put forward by Lamarck.
 - This is an essential part of theory of natural selection.
 - This is a theory put forward by Thomas Malthus.
 - This is necessary for survival of the fittest.
32. Which of the following provides the best support for the view that all organisms on earth had a common ancestor?
- All organisms have RNA.
 - All organisms have DNA.
 - All organisms have proteins.
 - All organisms have a common genetic code.
 - All proteins are coded by DNA.
33. Chromosomal theory of inheritance states that
- all cell nuclei contain chromosomes.
 - chromosomes carry genetic information.
 - chromosomes exist in homologous pairs.
 - homologous chromosomes segregate at meiosis.
 - chromosomes behave like genetic factors discovered by Mendel.
34. Large amount of fresh water on earth is not available for human use as it is trapped in polar ice caps. This amount of fresh water as a percentage of total amount of water available on earth is approximately.
- 0.75%
 - 2.25%
 - 3%
 - 75%
 - 97%
35. Which one of the following is the correct order of the layers of the atmosphere from earth surface upwards?
- Stratosphere, Mesosphere, Thermosphere, Ionosphere, Ozone layer
 - Troposphere, Mesosphere, Thermosphere, Ozone layer, Ionosphere
 - Stratosphere, Ozone layer, Mesosphere, Troposphere, Ionosphere
 - Troposphere, Stratosphere, Mesosphere, Thermosphere, Ionosphere
 - Troposphere, Stratosphere, Mesosphere, Ionosphere, Thermosphere
36. Which one of the following components in the atmosphere is in most variable amounts?
- Nitrogen
 - Carbon dioxide
 - Ozone
 - Oxygen
 - Water vapour
37. Some international conventions and protocols to which Sri Lanka is signatory are given in the column I of the following table. The environmental issues addressed by these conventions and protocols are given in column II of the table.

Column I	Column II
Convention/Protocol	Issues addressed
A. Montreal protocol	P. Destruction of wetlands
B. Basel convention	Q. Transboundary movement of hazardous waste
C. Ramsar convention	R. Release of chlorofluorocarbons into the atmosphere
D. CITES	S. Trading of endangered animals and plants.

The correct order of the issues addressed by the conventions/protocols A, B, C, D is

- (1) Q, R, P, S. (2) R, P, C, S. (3) S, R, P, Q (4) S, R, Q, P. (5) R, Q, P, S

Which one of the following is least likely to contribute to the rise in sea level?

- (1) Reclamation of coastal wetlands (2) Burning of fossil fuel
(3) Denudation of forests (4) Release of chlorofluorocarbons into the atmosphere
(5) Animal husbandry

Which one of the following ecological pyramids is most likely to be inverted?

- (1) Pyramid of biomass in a shallow freshwater pond with dense aquatic vegetation
(2) Pyramid of numbers in a well maintained paddy field.
(3) Pyramid of biomass in the ocean.
(4) Pyramid of biomass in a tropical rain forest.
(5) Pyramid of numbers in the ocean.

Which one of the following does not contain living microorganisms?

- (1) Pasteurized milk (2) Sea water (3) Spring water (4) Oral polio vaccine (5) Tetanus toxoid

Which one of the following bacteria can convert atmospheric Nitrogen to NH_4^+ ?

- (1) *Azotobacter* (2) *Nitrosomonas* (3) *Pseudomonas* (4) *Nitrobacter* (5) *Acetobacter*

Which one of the following is the major objective of employing activated sludge system in an industrial waste water treatment plant?

- (1) Destruction of pathogenic microorganisms.
(2) Reduction of number of microorganisms in waste water.
(3) Encourage microbial oxidation to reduce Biological Oxygen Demand of waste water.
(4) Removal of heavy metals
(5) Removal of nitrates and phosphates of waste water

Which one of the following antibiotics inhibits bacterial growth by damaging cell membranes of bacteria?

- (1) Griseofulvin (2) Penicillin (3) Tetracycline (4) Polymyxin (5) Erythromycin

Which one of the following microorganisms is responsible for causing illness due to food intoxications?

- (1) *Salmonella typhi* (2) *Shigella* (3) *Vibrio cholera*
(4) *Clostridium tetani* (5) *Clostridium botulinum*

Four major insect pests of coconut are given below.

- A - Red weevil B - Black beetle C - Coconut leaf miner D - Coconut caterpillar

Which of the above pests could be controlled by parasitic insects?

- (1) A and C (2) B and C (3) A and D (4) B and D (5) C and D

Brown plant hopper

- (1) sucks juice from tender paddy grains. (2) lays eggs in leaf sheaths of the paddy.
(3) has nymphs which are green in colour. (4) takes about four weeks to complete the life cycle
(5) is usually controlled using trap crops.

The following features were observed in a fish used for extensive aquaculture in Sri Lanka.

- (i) Long dorsal fin without spines. (ii) Two pairs of barbels

Which one of the following could be this fish?

- (1) *Cirrhinus mrigala* (2) *Cyprinus carpio* (3) *Labeo rohita*
(4) *Oreochromis mossambicus* (5) *Oreochromis niloticus*

Which of the following in paddy is caused by a bacterium?

- (1) Leaf Blight (2) Sheath Blight (3) Root Knot
(4) Stunted growth (5) Reduced tillering

49. Which of the following characters seen in weeds contributes least to their competitive ability?
- (1) Production of large number of light seeds. (2) Completion of the life cycle within one year
(3) Presence of allelopathic characters (4) Fast growth
(5) Presence of efficient dispersal mechanisms.
50. The number of children in five families selected at random are 1, 1, 3, 5 and 5. The standard deviation of this sample is,
(1) 1.8 (2) 2.0 (3) 3.0 (4) 3.2 (5) 4.0
- 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	5
A, B, D correct	A, C, D correct	A, B correct	C, D correct	Any other response or combination of responses correct

51. Which of the following biochemical processes require/requires ATP?
(A) Conversion of glucose to pyruvic acid in glycolysis. ✓
(B) Photolysis of water in photosynthesis. ✗
(C) Absorption of K^+ into root hair cells from soil solution.
(D) Diffusion of O_2 into living cells through cell membrane.
(E) Transport of sucrose produced in leaf into sieve tubes during phloem translocation.
52. Which of the following statements regarding *Entamoeba histolytica* is/are correct?
(A) It can live in the large intestine of man as a commensal.
(B) Three stages could be clearly identified in the life cycle.
(C) Trophozoite could be easily identified by the elongated nucleus.
(D) The metacyst stage found in the faeces of the host contains eight amoebulae.
(E) The precyst stage is binucleated.
53. Which of the following groups of animals became extinct during the mass extinction that took place about 65 million years ago?
(A) Ammonites (B) Trilobites (C) Flying reptiles (D) Dinosaurs (E) Primitive bony fishes
54. Which of the following statements is/are correct regarding members of the class Echinoidea?
(A) They locomote by tube feet. (B) They possess pedicellaria.
(C) Some of them possess long arms. (D) Some of them possess flat disc shaped bodies.
(E) Some of them lack anus.
55. When the intensity of light falling on a leaf is gradually increased, its rate of photosynthesis increases up to a point and then remains unchanged. Which of the following statements is/are incorrect regarding this observation?
(A) At the beginning, the intensity of light was limiting the rate of photosynthesis.
(B) Concentration of CO_2 could have become the limiting factor during the second stage.
(C) At higher light intensities rate of respiration may have balanced the rate of photosynthesis.
(D) At higher light intensities an increase in temperature could have prevented the increase in the rate of photosynthesis.
(E) At higher light intensities, the rate of dark reaction may have become a limiting factor.

56. Which of the following statements is/are correct regarding human smooth muscle fibres?
- (A) They lack striations.
 - (B) They are uninucleated.
 - (C) They get fatigued.
 - (D) They are involuntary.
 - (E) They are not connected to bones.
57. Which of the following statements is/are correct regarding human nephron?
- (A) Several nephrons open into a single collecting duct.
 - (B) ADH acts on the distal convoluted tubule.
 - (C) Obligatory resorption of water occurs at proximal and distal convoluted tubules.
 - (D) Na^+ is actively resorbed from all main parts of the nephron.
 - (E) Ultrafiltration occurs in the Bowman's capsule.
58. Which of the following statements is/are **incorrect** regarding mutations?
- (A) A mutation may be produced by a change of a single base in a DNA molecule.
 - (B) Change in the total number of chromosomes in a cell may cause a mutation.
 - (C) Most mutations produce dominant phenotypes.
 - (D) Mutations may remain undetected in organisms for several generations.
 - (E) Most mutations arise in somatic cells.
59. Tobacco mosaic virus
- (A) contains RNA
 - (B) contains DNA
 - (C) is a helical virus
 - (D) is transmitted through insects.
 - (E) is an enveloped virus.
60. Which of the following is/are most likely to show a normal distribution?
- (A) Numbers of cervical vertebrae in different species of mammals
 - (B) Age distribution of children in a school.
 - (C) Numbers of fruits in mango trees in an orchard.
 - (D) Fasting blood glucose levels of healthy people.
 - (E) Diameters of pencils manufactured in a factory.
