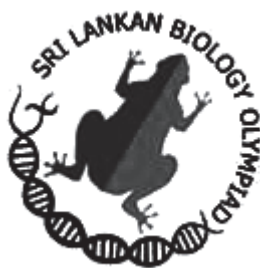


Sri Lankan Biology Olympiad 2015



Answer Sheet for Part A and Part B

Please handover this part to the Invigilator.

Only Part A is allowed to be moved out of the examination hall.

Answer Sheet for Part A

Mark the correct answer with a X

- | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1. | (1) | (2) | (3) | (4) | (5) | 21. | (1) | (2) | (3) | (4) | (5) |
| 2. | (1) | (2) | (3) | (4) | (5) | 22. | (1) | (2) | (3) | (4) | (5) |
| 3. | (1) | (2) | (3) | (4) | (5) | 23. | (1) | (2) | (3) | (4) | (5) |
| 4. | (1) | (2) | (3) | (4) | (5) | 24. | (1) | (2) | (3) | (4) | (5) |
| 5. | (1) | (2) | (3) | (4) | (5) | 25. | (1) | (2) | (3) | (4) | (5) |
| 6. | (1) | (2) | (3) | (4) | (5) | 26. | (1) | (2) | (3) | (4) | (5) |
| 7. | (1) | (2) | (3) | (4) | (5) | 27. | (1) | (2) | (3) | (4) | (5) |
| 8. | (1) | (2) | (3) | (4) | (5) | 28. | (1) | (2) | (3) | (4) | (5) |
| 9. | (1) | (2) | (3) | (4) | (5) | 29. | (1) | (2) | (3) | (4) | (5) |
| 10. | (1) | (2) | (3) | (4) | (5) | 30. | (1) | (2) | (3) | (4) | (5) |
| 11. | (1) | (2) | (3) | (4) | (5) | 31. | (1) | (2) | (3) | (4) | (5) |
| 12. | (1) | (2) | (3) | (4) | (5) | 32. | (1) | (2) | (3) | (4) | (5) |
| 13. | (1) | (2) | (3) | (4) | (5) | 33. | (1) | (2) | (3) | (4) | (5) |
| 14. | (1) | (2) | (3) | (4) | (5) | 34. | (1) | (2) | (3) | (4) | (5) |
| 15. | (1) | (2) | (3) | (4) | (5) | 35. | (1) | (2) | (3) | (4) | (5) |
| 16. | (1) | (2) | (3) | (4) | (5) | 36. | (1) | (2) | (3) | (4) | (5) |
| 17. | (1) | (2) | (3) | (4) | (5) | 37. | (1) | (2) | (3) | (4) | (5) |
| 18. | (1) | (2) | (3) | (4) | (5) | 38. | (1) | (2) | (3) | (4) | (5) |
| 19. | (1) | (2) | (3) | (4) | (5) | 39. | (1) | (2) | (3) | (4) | (5) |
| 20. | (1) | (2) | (3) | (4) | (5) | 40. | (1) | (2) | (3) | (4) | (5) |

Part B – Short Answer Questions

Please answer in the spaces provided. Please use given letters, numbers or symbols (\checkmark or X) only.

1. Indicate whether each of the following statements is correct (\checkmark) or incorrect (X).

1.	The fastest reacting enzyme known to date is catalase	
2.	All macromolecules are biopolymers	
3.	The predominant intracellular ion in the human body is Na^+	
4.	The abundant protein in the biosphere is Ribulose Bis Phosphate	
5.	DNA molecule always present as double stranded molecule	

2. This question is based on following molecules

(a) Fibrinogen (b) Tubulin (c) Chitin (d) Prostaglandin

State the correct letter (s) a – d in respect of following questions.

- N containing macromolecule.....
- Need for coagulation of blood.....
- Made up of spindle fibres.....
- Involve in inflammation.....
- Component of cell wall.....

3. Indicate whether each of the following statement is correct (\checkmark) or incorrect (X).

1.	Mitochondria has 70s ribosomes	
2.	ER can extend from one cell to a another through plasmodesmata	
3.	Microtubules are involved in the formation of pseudopodia	
4.	Some membrane proteins act as enzymes.	
5.	Ribosomal subunits are always produced by Nucleolus	

4. Indicate whether each of the characters given in the 1st column of the following Table is present (\checkmark) or absent (X) in the organisms belonging to the phyla listed in the 1st row.

	Protista	Fungi	Plantae	Animalia
Heterotrophic nutrition				
Unicellular organisms				
Presence of cilia				
Photoautotrophic nutrition				

5. Arrange the following organisms in correct order of increasing number of locomotory structures. Use only the letters (a) – (g).

(a) Bug (b) *Paramecium* (c) *Chlamydomonas* (d) Toad
 (e) Millipede (f) Tick (g) Centipede

.....,,,,

6. Indicate whether each of the vitamins given in the 1st row of the following Table is present (\checkmark) or absent (X) in green vegetables.

Vitamin A	Vitamin E	Vitamin K	Vitamin B ₁	Vitamin B ₂

7. In an experiment to determine the water potential of potato tuber cells, the discs of potato tubers were immersed in sucrose solutions of various concentrations and left for 30 minutes. Results are shown in the table.

Concentration of the Solution	Initial mass of discs(g)	Final mass of discs (g)
0.1 M	1.77	1.84
0.2 M	1.76	1.83
0.3 M	1.86	1.71
0.4 M	1.73	1.47
0.5 M	1.88	1.35

Indicate whether following statements regarding the results of this experiment are correct(√) or incorrect (X).

1.	All potato discs were not accurately cut into same dimensions	
2.	Negative correlation exists between concentration of sucrose solution and change in mass of discs	
3.	Solution isotonic to potato cells would be between 0.4 M to 0.5 M	
4.	0.5 M solution is hypotonic to potato cells	
5.	Water moves into the cells from 0.1 M solution	

8. Indicate whether each of the following statements regarding human heart is correct (√) or incorrect (X).

1.	It lies in the thoracic cavity little more towards the left.	
2.	It consists of three layers of tissues.	
3.	Its thickest tissue layer is the myocardium.	
4.	The outermost tissue layer is made up of two sacs.	
5.	Its innermost tissue layer is composed of flattened epithelial cells.	

9. Indicate whether each of the following statements regarding the sensory structures found in the human skin is correct (√) or incorrect (X).

1.	Ruffini corpuscles are sensitive to high temperatures.	
2.	Krause's end bulbs are sensitive to pressure changes.	
3.	Meissner's corpuscles are sensitive to touch.	
4.	Pacinian corpuscles are sensitive to low temperatures.	
5.	Free nerve endings are sensitive to vibrations.	
6.	Merkel's discs are sensitive to touch.	

10. Indicate whether each of the following statements regarding the human brain is correct (√) or incorrect (X).

1.	Basal nuclei influence the skeletal muscle tone.	
2.	Motor area lies in the parietal lobe.	
3.	Temporal lobe is responsible for manual dexterity.	
4.	Auditory sensory area lies in the temporal lobe.	
5.	Frontal lobe is responsible for memory.	
6.	Sensory speech area is located in the parietal lobe.	

11. This question is based on the following excretory products of animals.

- (a) Ammonia (b) Urea (c) Uric acid (d) Creatinine

Using the correct letters (a-d) indicate the most probable excretory product/products of the following animals.

Tilapia:

Man:

Sea anemone

Grasshopper

12. Some features of muscle cells are given below.

- (a) Uninucleate (b) Cylindrical in shape (c) Unbranched
(d) Neurogenic (e) non-rhythmic contraction

Using the correct letters (a-e), indicate which of the above characters is/are present in the following muscle fibers.

Skeletal muscle fibers:

Smooth muscle fibers:

Cardiac muscle fibers:

13. Indicate whether each of the following statements regarding the human sperm is correct (✓) or incorrect (X).

1. Entire sperm is covered by the cell membrane.	
2. Microtubules are present in the tail.	
3. Head possesses a modified lysosome containing trypsin.	
4. Centrioles are present in the anterior region of the mid-piece.	
5. Axial filaments start from the centrioles and run through the tail	

14. Indicate with a (✓) sign if the feature is present, and (X) sign if the feature is absent in each of the following plant species.

Feature	<i>Cycas</i>	<i>Selaginella</i>	<i>Nephrolepis</i>	<i>Pogonatum</i>	<i>Mangifera</i>
Both sporophyte and gametophyte are autotrophic					
Developing sporophyte is dependent on gametophyte					
Fertilization takes place inside a structure surrounded by wall of the spore					
Dioecious sporophyte					
Antherozoids are dispersed by water					

15. This question is based on following enzymes

- (a) RNA polymerase (b) DNA polymerase (c) Primase (d) Helicase (e) Reverse transcriptase

Using the correct letters (a-e) indicate correct enzyme which is used for the following processes.

1. Synthesis of primer in DNA replication
2. Synthesis of DNA strand in HIV virus
3. Unwinding of the double helix
4. Synthesis of DNA strand in DNA replication.....
5. Need for transcription.....

16. Few genetic phenomena are given below

- a. Epistasis b. Polygenic inheritance c. Non – disjunction d. Polypoidy
e. Dominance

Using the above genetic phenomena select a suitable one for the following descriptions and state the letter from a –e.

1. Increase the number of chromosome complement.....
2. Increase or decrease one chromosome in the chromosome complement.....
3. A specific genotype at one locus can prevent the phenotypic expression of a genotype at one or more loci.....
4. One allele of a gene suppresses the phenotypic expression of another allele at the same locus in homologous chromosomes.....
5. Many alleles at different loci are involved for the expression of a character.....

17. Indicate whether each of the air pollutants given in the 1st row of the following Table is responsible (✓) or not responsible (X) for the impacts listed in 1st column.

	Hydro-carbons	Carbon Monoxide	Sulphur Dioxide	Nitrogen oxides	Particulate matter
Asthma					
Reduction in the Oxygen carrying capacity of blood					
Cancer					

18. Gross primary productivity of a grassland was calculated to be 34,000 KJ m⁻² year⁻¹. If the energy available at the 4th trophic level of this ecosystem is 6 KJ m⁻² year⁻¹, what is the amount of energy used for respiration by the primary producers. Do your calculations in the space provided below.

Amount of energy used for respiration by the primary producers

.....

19. Indicate with a (✓) sign if the feature is present, and (X) sign if the feature is absent in each of the following bacteria.

Feature	<i>Clostridium</i>	<i>Azotobacter</i>	<i>Acetobacter</i>	<i>Lactobacillus</i>	<i>Nitrobacter</i>
CO ₂ is used as carbon source in nutrition					
Aerobic					
Increases soil N					
Endospore forming					

20. Four chemicals secreted by microorganisms are listed below. Indicate whether these chemicals conduct (✓) or do not conduct (X) by following activities.

Activity	Clotrimazole	Polymyxin	Phospholipase	Penicillin
Inhibition of cell wall synthesis				
Affects cell membrane				
Inhibition of protein synthesis				
Inhibition of DNA synthesis				