General Certificate of Education (A/L) Examination
2005 - April
Biology I - Two hours

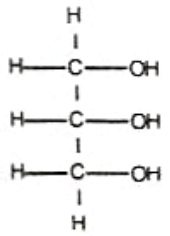
Important :

- *This question paper consists of 8 pages.*
- *Write your **Index Number** in the space provided in the answer sheet and then indicate your Index Number by shading the appropriate numbers in the grid immediatly below it*
- *Further instructions are given on the back of the answer sheet Follow them carefully*
- *You should answer **all** the questions in this paper*

*For each question there are **five** alternative responses of which only one is correct. When you have selected the response which you consider to be the best answer to a question, **mark your response on the answer sheet according to the instructions given in it.** Read and consider each question carefully but leave aside any which you find too difficult to answer and come back to it later if you have time.*

1 Which of the following statements is **incorrect** regarding enzymes?
1. Enzymes are made up of amino acids.
2. Enzymes reactions are reversible.
3. Enzymes do not alter the nature of end products of the reactions.
4. Some enzymes contain non-protein parts in their structure
5. Enzyme molecules are usually smaller than substrate molecules.

2.



Which one of the following compounds on hydrolysis will yield he above compound?
1. Starch
2. Phospholipid
3. Albumin
4. DNA
5. Glycogen

3 Which of the following statements is **incorrect** regarding DNA?
1 DNA of a cell, determines the structure of enzymes synthe sized by the cell.
2 The two strands of DNA molecule are identical.
3. Genes differ from each other in the base sequences of their DNA.
4. Mutations cause structural changes in the DNA molecule.
5. The amount of DNA doubles before the onset of mitosis.

4 Which of the following organelles in the cell is involved in lipid synthesis?
1 Golgi bodies
2. Microbodies
3. Smooth endoplasmic reticulum
4. Rough endoplasmic reticulum
5. Lysosomes

5 Oxygen taken up during aerobic respiration in living organisms is incorporated into
1. CO_2
2 Water
3. Carbohydrates
4 Pyruvic acid
5. ATP

6 In the context of biodiversity, endemic species are
1 species found growing naturally in only one country
2 species that have disappeared from all but one area due to climatic changes
3 species that are essential to the functioning of the ecosystem where they occur
4 species that serve as symbols of environmental awareness or national culture
5 species that are predominantly conserved in National parks

7 Which of the following is **not** considered an ex-situ conservation method?
1. Establishment of gene banks
2. Establishment of national parks
3. Establishment of national botanical gardens
4. Establishment of turtle hatcheries
5. Establishment of elephant orphanages

8. Which of the following is the major criterion used to determine whether the plants or animals living in one particular habitat belongs to a single species?
1. Their continuous presence in one habitat
2. Presence of identical number of chromosomes in their cells
3. Presence of similar morphological features
4. Their ability to interbreed and produce fertile offspring
5. Presence of similar life cycles

9 Which of the following statements is **incorrect** regarding the evolutionary process?
1. Natural extinction of species is a part of the evolutionary process.
2. The last major extinction in the history of evolution of biodiversity is elimination of dinosaurs.
3. The rate of evolution of species is generally higher than the rate of extinction of species.
4. Rate of extinction of species decreases with increase in human population.
5. Extinction of species favours the origin of new species.

10. Which of the following statements of comparison between dicotyledonous primary stem structure and dicotyledonous primary root structure is **incorrect**?

	Stem	Root
1.	Cortex may have photosynthetic cells	Cortex may have storage cells
2.	Endodermis not prominent	Endodermis prominent
3.	Pith is prominent	Pith is prominent
4.	Protoxylem is inner to metaxylem	Protoxylem is outside metaxylem
5.	Vascular cambium present	Vascular cambium absent

11. Which of the statements in the following comparison between Calvin's cycle and Kreb's cycle is incorrect?

	Calvin cycle	Kreb's cycle
1	CO_2 is absorbed	CO_2 is released
2	PGA is an intermediate product	PGA is not an intermediate product
3	ATP is used	ATP is produced
4	Light is necessary	Light is not necessary
5	Takes place in the stroma of chloroplast	Takes place in the stroma of mitochondria

12 Which of the following statements regarding life cycles of plants is **incorrect**?

1. *Pogonatum* has unisexual gametophytes.
2. *Nephrolepis* spores are dispersed by water.
3. *Selaginella* produce two types of sporangia.
4. *Cycas* produce seeds without fruits.
5. *Selaginella* gametophyte grows inside spore wall.

13. Which of the following statements regarding plant growth substances is **incorrect?**
1. Ethyiene promotes ripening of fruits.
2. Auxins promote root initiation.
3. Gibberellins break seed dormancy
4. Cytokinines delay aging of leaves.
5. Abscisic acid breaks seed dormancy.

14. Which of the following statements regarding casparian strips of roots is **incorrect**?
1. They can be seen only in younger plant roots.
2. They do not affect the movement of water through symplast.
3. They are found only in radial walls of endodermal cells
4. They are permeable to water but not for solutes.
5. Their cell walls are thickened with suberin.

15. Which of the following statements regarding water potential is **incorrect**?
1. Soil water has a lower water potential than plant roots.
2. Water potential increases with increasing temperature.
3. At the stage of incipient plasmolysis water potential of a cell is equivalent to its solute potential.
4. In osmosis water moves from higher water potential to a lower water potential.
5. Water potential of atmosphere is less than that of mesophyll cells.

16. Main site of hormone production in plant is the
1. cambium
2. apical meristem.
3. mesophyll.
4. vascular tissue.
5. ground tissue.

17. Which of the following elements is **not** a micronutrient?
1. Mn
2. Cu
3. S
4. Fe
5. Zn

18. Which of the following **cannot** be considered as a method of reproduction?
1. Binary fission in bacteria
2. Budding in yeasts
3. Fragmentation in *Spirogyra*
4. Endospore formation in bacteria
5. Spore formation in *Nephrolepis*

19. In man, simple squamous epithelium is seen in the
1. thyroid gland.
2. kidney.
3. oesophagus.
4. skin.
5. tongue.

20. Which of the following organs of the respiratory systerm of man is **incorrectly** paired with its functions?
1. Nose - humidifies and warms incoming air
2. Pharynx - produces mucous
3. Larynx - produces sound
4. Trachea - expels foreign matter
5. Alveoli - exchange gases

21. A non-vascularized respiratory structure is found in
1. annelids.
2. crustaceans
3. insects.
4. molluscs
5. fishes.

22. Which of the following statements is **incorrect** regarding adult human skull?
1. It is made up of 22 bones
2. Its capacity is about 1550 ml
3. Its protects the middle ear
4. It articulates with the axis vertebra
5. Its bones are joined together by sutures

23. Ommatidia are present in
1. cnidarians.
2. platyhelminths.
3. annelids.
4. arthropods.
5. molluscs.

24. Which of the following is **not** homeostasically regulated in the internal environment of man?
1. Glucose
2. Temperature
3. Urea
4. Carbon dioxide
5. Water

25. Select the **incorrect** statement regarding vertebrate motor neurone
1. It is a highly irritable cell.
2. Its cell body contains Nissl granules.
3. Its plasma membrane is polarized.
4. Its dendrites conduct impulses away from the cell body
5. It synthesises and releases acetylcholine.

26. Select the correct statement regarding human ovum
1. It contains yolk.
2. It has 23 pairs of chromosomes.
3. At ovulation it is at the secondary oocyte stage.
4. Its production starts at puberty.
5. It has no perivitelline space.

27. Which of the following statements is correct regarding human blood cells?
1. All leucocytes are granulated.
2. Monocytes are involved in the production of antibodies.
3. Usually the highest percentage of leucocytes are the neutrophils.
4. Erythrocytes store haemoerythrin.
5. Basophils are important in blood clotting.

28. When ash coloured mice were crossed to white mice all the F_1 progeny were ash coloured. When the F_1 progeny males and females were crossed, the F_2 progeny had 18 ash coloured mice, 6 black mice and 8 white mice.

Based on the above results, which of the following conclusions is **incorrect?**
1. Black colour of mice is a recessive character.
2. This is an example of incomplete dominance.
3. Ash coloured parents used in the first cross were homozygous.

4 F_1 progeny were heterozygous
5 At least two genes are involved in determining coat colour of mice

29 Which of the following statement regarding Russel Wallace is correct?
1 His experiments supported the theory of inheritance of acquired characters
2 His experiments disproved the theory of spontaneous generation of life
3 He carried out experiments to prove that organic matter can arise from morganic matter.
4 He found evidence to support the theory of natural selection
5 He believed that life has come to earth from outer space

30 Select the **incorrect** statement regarding inheritance
1 Principle of dominance in heredity was first discovered by Gregor Mendel.
2 Inheritance of characters do not always follow Mendelian laws.
3 Mendelian dihybrid crosses always produce 4 phenotpes in 9:3:3:1 ration in the F_2 generation.
4 Dihybrid test crosses always produce four types of progeny in 1:1:1:1 ratio.
5 All test crosses are not back crosses.

31 Which of the following statements is **incorrect**?
1 In monohybrid crosses involving a pair of characters showing incomplete dominance the F_1 progeny is different from both parents.
2. Characters showing linkages are produced by genes in the same chromosome.
3. Human ABO blood groups are caused by alleles showing incomplete dominance
4. Inheritance of sexuality of humans do not obey Mendelian laws.
5 Height of humans is a character showing polygenic inheritance

32 Which of the following events is an example of natural selection?
1 Producing a better variety of paddy, by hybridization of two different paddy varieties.
2. Increase of paddy harvest due to the application of weedicide in the field
3. Increase of insects, resistant to insecticides when insecticides are applied in the paddy field.
4. Decrease in biodiversity when agrochemicals are applied in the paddy field.
5. Decrease of paddy harvest due to rapid spread of brown hopper

33. Which one of the following is an example of a community?
1. Veddas of Dambana
2. Elephants of Udawalawe National Park
3. Bees of a bee hive
4. Plankton of Victoria reservoir
5. Pitcher plants of Sinharaja forest

34 Organisms belonging to which one of the following taxonomic groups is **not** seen in fresh water ponds of Sri Lanka?
1. Cyanobacteria
2. Cnidaria
3. Echinodermata
4. Chlorophyta
5. Mollusca

35 Which of the following is considered the major reason which led to the increase in CO_2 concentration in the atmosphere during the last century?
1 Increase in human population
2 Increase in the use of fossil fuels
3 Increase in population of plants and animals
4 Increased use of chlorofluorocarbon compounds
5 Increase of animal husbandry

36. Which of the following is **incorrect** regarding the energy pyramids?
1 They show the trophic relationships in the ecosystem
2 They are not always upright
3 About 90% energy is lost at each trophic level
4 They are considered as the best type of ecological pyramids
5 The first level of energy pyramids is mainly represented by photosynthetic organisms

37 Which of the following statements regarding depletion of ozone layer is **incorrect**?
1. Shift in equilibrium of O_1 and O_2 in stratosphere results in ozone depletion.
2. Reduction of ozone in the stratosphere will lead to increase in ground level U.V. radiation.
3. SO_2 and NO_2 resulting from burning fossil fuel react with ozone, breaking it down to oxygen.
4. Depletion of the ozone layer has been shown to occur for the first time above Antarctica
5. Depletion ozone layer is harmful to living organisms as it may lead to skin cancer

38 Which of the following statements is **incorrect** regarding forests in Sri Lanka?
1 Variations in rainfall, altitude and soil have brought about a variety of forest types in Sri Lanka.
2. The most extensive forest type in Sri Lanka is the tropical dry mixed evergreen forest.
3 Wetzone rain forests are exceptionally rich in biodiversity and high in endemics
4. One of the most important and largest wetzone forests in terms of biodiversity is the peak wilderness sanctuary.
5 The latest survey in Sri Lanka shows that natural forests occupy only 40% of the total land area.

• Questions No 39 and 40 are based on the following information.

Given below are methods used in microbiology to control microbial population at various situations.

A - Autoclaving at 121°C
B - Membrane filtration
C - Pasteurization
D - Heating in hot - air oven at 160°C
E - Addition of preservatives

39 Which of the above can be used to sterilize a nutrient agar medium?
1 A and C
2. A and B
3. D
4. A
5. C

40. Which of the above can be generally used to control microorganisms in bottled fruit juice?
1. A
2. B
3. C
4. B and C
5. C and E

41. Which of the following is the major objective of the secondary treatment stage in an industrial waste water treatment plant?
1. Removal of toxic metals
2. Destruction of pathogenic organisms
3. Removal of sand
4. Removal of floating material
5. Lowering of Biochemical Oxygen Demand (BOD) by microbial oxidation

42. Which of the following pathogenic bacterium produces an endotoxin?
1. *Clostridium tetani*
2. *Vibrio cholerae*
3. *Corynebacterium diphtheriae*
4. *Salmonella typhi*
5. *Staphylococcus aureus*

43. *Nitrobacter* and *Nitrosomonas* are best described as
1. Chemohetertrophs.
2. Chemoautotrophs.
3. Photoautotroph.
4. Heterotrophs.
5. Photoheterotrophs.

44. Vaccination of healthy children against poliomyelitis is an example of
1. Artificial passive immunity.
2. Artificial active immunity.
3. Natural active immunity.
4. Natural passive immunity.
5. Artificially induced natural immunity

45. Select the **incorrect** statement regarding coconut black beetle
1. Adult female lays eggs in garbage heaps.
2. Symptoms of damage caused by the beetle is rotting of the crown of the coconut palm.
3. It belongs to order Coleoptera.
4. Its larvae feed on decaying plant matter.
5. The damage to the coconut palm is caused only by the adult.

46. Which one of the following statements is **incorrect** regarding the *Wuchereria bancrofti*?
1. During day time larvae live in small blood vessels of human lung.
2. Adult males and females can be distinguished from each other by external appearance.
3. Adult female never lays eggs.
4. Infective stage is L_1 larvae.
5. Polluted water facilitates its dispersal.

47. Select the correct statement regarding aquaculture.
1. Fishes which show territoriality are used in aquaculture
2. Heighest yield per unit area is found in extensive culture systems.
3. Supplementary food is given in semi intensive culture systems.
4. Maintenance of water quality is essential in extensive culture.
5. In Sri Lanka fin fish is cultured only in intensive culture systems.

48. Which of the following is **incorrect** regarding the use of tissue culture techniques in the propagation of plants?
1. It can be used to propagate plants irrespective of seasonal variations.
2. It can be used to increas genetic diversity of plants
3. It can be used to produce large number of plants in a limited space.
4. It can be used to produce plants faster.
5. It can be used to propagate seedless plants

49. In a dihybrid cross of Pea plants an experimenter found among F_2 progeny, four phenotypes in numbers, 139, 52, 46 and 13. If he wanted to check whether the ratio of phenotypes correspond to 9:3:3:1, which of the following statistical methods he should use?
1. Find the standard deviation
2. Find the variance of the numbers
3. Find standard error
4. Use chi-square test
5. Repeat the experiment to find new results

50. A rice breeder picked 100 panicles randomly from a field and counted the number of seeds in each of them. He plotted the results in a frequency distribution curve. The distribution was found to be normal with the minimum at 190, maximum at 270 and the mean at 230. Out of the panicles 70 had seeds between 215 and 245. Which of the following numbers would be the closest to the standard deviation of the distribution?
1. 5
2. 12
3. 20
4. 25
5. 30

- **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 statement/statements is/are correct regarding cell membranes?
(A) Cell membranes are not permeable to gases
(B) Inorganic ions enter the cells passively through cell membranes along with water.
(C) Chemical substances that selectively inhibit cell respiration inhibit passage of mineral ions through cell membranes
(D) Extracellular enzymes secreted by certain pathogenic bacteria destroy cell membranes
(E) Transport of water through cell membranes take place against a concentration gradient

52. Which of the following protocols/ conventions is/are important in the protection of the atmosphere?
(A) Ramsar convention
(B) Basel convention
(C) Montreal protocol
(D) Kyoto protocol
(E) CITES convention

53. Which of the following characteristic/characteristics of weeds make them grow successfully in agricultural lands?
(A) They produce fertile seeds in large numbers
(B) Their seeds show allelopathic characteristics

(C) They are perennial plants
(D) Their fruits and seeds show efficient dispersal mechanisms
(E) They are endemic plants

54 Which of the following statements regarding RUBP carboxylase enzyme is/are correct?
(A) It is essential for photosynthesis of plants.
(B) PEP is a better CO_2 acceptor than RUBP.
(C) It is needed for both C3 photosynthesis and C4 photosynthesis.
(D) Phosphoglyceraldehyde is the product of its reaction.
(E) It is found attached to thylakoid membranes of chloroplasts.

55. Which of the following is/are sensitive to low temperatures?
(A) Pacinian corpuscles
(B) Organs of Ruffini
(C) Krause's bulbs
(D) Free nerve endings
(E) Meissner's corpuscles

56. Which of the following statement/statements is/are true regarding human kidney?
(A) It is involved in the production of red blood cells.
(B) It regulates the pH of blood.
(C) Its tubules secrete glucose.
(D) It is the major osmoregulatory organ of the body.
(E) It synthesises urea.

57. Which of the following statement/ statements regearding human hormones is/are correct?
(A) FSH stimulates the growth of ovarian follicles.
(B) Cholecystokinin is secreted by the duodenum.
(C) Parathormone lowers blood calcium level.
(D) Glucagon acts on liver.
(E) Thymosin helps in the development of T-lymphocytes.

58. Select the correct statment/statements regarding human cardiac muscle fibres.
(A) They possess intercalated discs.
(B) They are long and cylindrical fibres.
(C) They are able to contract rhythmically on its own.
(D) They never get fatigue.
(E) They are non-striated.

59. Which of the following features of DNA supports the view that all living species on the earth evolved from a single stock?
(A) DNA is the hereditary substance in all organisms except in some viruses.
(B) Genetic code of DNA is common to all organisms.
(C) DNA molecule is made up of two complementary strands.
(D) DNA molecule can self replicate to form identical molecules.
(E) DNA molecule can store genetic information.

60. Which of the following is/are **incorrect**?
(A) All viruses are obligate parasites.
(B) All fungi are heterotrophs.
(C) All bacteria are heterotrophs.
(D) All microorganisms are prokaryotes.
(E) All fungi produce immotile reproductive structures.