BIOLOGY DISCUSION QUESTIONS – LIMURU GIRLS SCIENCE CONTEST 2019

1. Why are the following procedures done when preparing sections to be observed under a light microscope?
   (a) Making of thin sections (b) Using a sharp blade to make the sections
2. What are the functions of the following parts of a light microscope?
   (a) Eye piece lens (b) Condenser (c) Diaphragm
3. Given that the diameter of the field of view of a light microscope is 2000um. Calculate the size of a cell in mm if 10 cells occupy the diameter of the field of view
4. Name support tissues in plants characterized by the following
   (i) Cells being turgid (ii) Cells being thickened by cellulose (iii) Cells being thickened by lignin
5. What are the **two** functions of bile salts during the process of digestion?
6. State **three** adaptations of aquatic plants to photosynthesis
7. Name the diseases caused by deficiency of : (a) Iodine (b) Vitamin C
8. Name **two** enzymes and **one** metal ion that are needed in the blood clotting process
9. State **two** adaptations of herbivores which enable them to digest cellulose
10. State **two** factors that affect the rate of osmosis
11. A certain organ **K** was surgically removed from a rat, later drastic increase in glucose level in the blood was reported but when substance **Q** was injected into the animal the whole process was reversed. Identify: (i) Organ **K** (ii) Substance **Q**
12. a) Name the component of a persons diet that is essential for peristalisis
    b) Give **two** groups of food which are reabsorbed along the mammalian digestive system without undergoing digestion
13. State **two** ways in which the guard cells differ their adjacent epidermal cells
14. a) Name the component of a persons diet that is essential for peristalisis
    b) Give **two** groups of food which are reabsorbed along the mammalian digestive system without undergoing digestion
15. How is aerenchyma tissue adapted to its function
16. (a) State **three** structural differences between arteries and veins in mammals
    (b) Name a disease that causes thickening and hardening of arteries
17. Name the blood vessel that nourishes the heart
18. a) In which form is oxygen transported in the blood.
    b) Why do plants not take in oxygen during the day although they need it for respiration
19. Name a disease of the blood characterized by excessive production of white blood cells
20. Why would carboxyhaemoglobin lead to death?
21 State **two** causes of coronary thrombosis
22. What adaptation do red blood cells have for transportation of carbon (IV) oxide?
23. Outline **three** ways in which the gills of Tilapia fish are modified to perform their function.
24 Identify the surfaces of gaseous exchange in the following:-
    (i) Paramecium; (ii) Roots; (iii) Frog;
25. Outline **two** physiological changes that occur in the body to lower the level of Carbon (IV) Oxide after vigorous physical exercise
26. What is the importance of counter current flow in the exchange of gases in a fish
27. State **four** ways in which red blood cells (**RBC**) are adapted to the their function
28. Describe the changes that occur to the rib cage and the diaphragm during inspiration
29. How is the mammalian skin adapted to its protective function?
30. How does the sunkness of stomata help in minimizing the rate of transpiration in plants
31. State **two** roles of adrenaline in man
32. (a) Give **two** reasons why fats are not the main respiratory substrates in the body of a mammal

and yet they give a lot of energy when oxidized.

33. (a) Differentiate between respiration and respiratory surface.
    (b) Why is an effective respiratory system often associated with a circulatory system.
34. (a) State **two** functions of the kidney
    (b) Name **two** substances that are not found in urine of a healthy person
    (c) Name **two** diseases that affect the kidney
35. (a) State **two** structural modification of the kidneys of deserts animals like kangaroo rat.
    (b) Describe how ingestion of very salty food may reduce the amount of water excreted in urine.
36 (a) If the human pancrease is not functional:-
    (i) Name the hormone which will be deficient
    (ii) Name the disease the human is likely to suffer from
    (b) What is diuresis?
37. State **one** structural adaptation of nephron in the kidney of a desert mammal
38. Name the nitrogenous wastes excreted by the following organisms:-
    (i) Desert mole (ii) Marine fish (iii) Tilapia
39. What role is played by the liver in excretion?
40. A person was found to pass out large volume of dilute urine frequently. Name the:-
    (a) disease the person was suffering from?
    (b) hormone that was deficient
41. (a) Distinguish between **excretion** and **egestion**
    (b) State the importance of excretion in the bodies of living organisms.
42. What is the significance of the following in the ecosystem?
    a) Decomposers b) Predators
43. State **two** most important factors that favour exponential growth of a population of gazelle in a park
44. Explain how oil as a pollutant may affect aquatic plants and animals?
45. Outline **three** roles of active transport in human body
46. Distinguish between community and population
47. Describe how the belt transect can be used in estimating the population of a shrub in a grass land
48. What is the importance of saprophytic fungi and bacteria in an ecosystem
49. i) Name **one** main cause of global warming
    ii) What are the effects of global warming
50. Explain how saliva is important in digestion
51. Give a reason why two species in an ecosystem cannot occupy the same niche
52 (a) Explain why Larmack's Theory of evolution is not accepted by biologists today.
    (b) State the significance of mutation in evolution.
53. (a) Give **two** roles of the placenta.
    (b) Explain why hormone testosterone still exerts its influence even when vas deferens have been cut.
54. Name **two** mechanisms that hinder self fertilization in flowering plants
55. State **three** ways in which plants compensate for lack of movement
56. Name the hormone that;
    (a) Stimulate the contraction of uterus during birth
    (b) Stimulates the disintegration of the corpus inteum when fertilization fails to take place
57. State **three** ways in which flowers parent self pollination
58. (a) State the role of centrioles during cell division

(b) (i) Explain the role of chlorophyll in photosynthesis

59. (a) At what stage of meiosis is the chiasmata formed?
(b) What is the significance of the above part in living organisms?

60. (a) State **two** ways in which the male parts of a wind pollinated flower are adapted to their mode of pollination
(b) Differentiate between monoecious and dioecious plants

61. (a) Explain **two** importance of the adult stage in metamorphosis in insects
(b) What is the importance of the juvenile hormone in insects?

62 Describe the possible effects of discharging hot effluent from a factory into a slow flowing river

63. State **three** roles of placenta in mammals

64. State t**hree** ways in which seed dormancy benefits a plant

65. State the functions of the following parts in the male reproductive system
(a) Somniferous tubules (b) Sertoli cells

66. (a) Name the parts of a flower responsible for gamete formation
(b) State **one** feature of pollen grains from a wind pollinated flower

67. Name the mechanisms that hinder self-fertilization in flowering plants

68. The eggs of birds are relatively much larger than those of mammals. Explain

69. Distinguish between the following terms:
Pollination and **fertilization**

70. a) Describe the various mechanisms of fruit and seed dispersal.
b) Describe the varying events that follow a flower after fertilization.

71. Describe how fruits and seeds are suited to their mode of dispersal

72. State **two** advantages of metamorphosis in the life insects

73. State **one** disadvantage of exoskeleton in insects.

74. Distinguish between primary growth and secondary growth in a flowering plant

75. What is the role of the following to a germinating seed: (i) Oxygen (ii) Cotyledons

76. Give **three** applications of plant growth hormones in agriculture

77. State **two** functions of calcium in the human body

78. State the biological importance of ecdysis in arthropods

79 a) Distinguish between homologous and analogous structures in evolution.
b) Name **one** vestigial structure in mammals.

80. a) Give **two** examples of adaptive radiation in animals.
b) State **two** disadvantages of using fossils as evidence of evolution

81. Distinguish between camouflage and mimicry.

82 (a) (i) What is meant by vestigial structures?
(ii) Give an example of a vestigial structure in human

83 Distinguish between the struggle for existence and survival for the fittest as used in the theory of natural selection

84 Give **two** factors that determine water reabsorption in the distal convulated tubule

85. Distinguish divergent and convergent evolution

86. (a) What are the advantages of natural selection
(b) All insects are believed to have arisen from a common ancestor. However, modern insects differ widely in a variety of ways such as in the adaptation of their mouthparts for different modes of feeding. What kind of evolution is this?

87. Explain why Lamacks theory of evolution is not accepted by Biologists today.

88. a) i) What is meant by vestigal structures
ii) Give an example of vestigal structure in human
b) Explain why certain drugs become ineffective in curing a disease after many years of use

89. (a) What is organic evolution?
(b) Briefly explain the term "***survival for the fittest***" as used in Darwin's theory of natural selection
90. Explain why insecticides become ineffective against insects if used for several years in succession
91. State **three** limitations of fossils records as an evidence of organic evolution
92. State **three** pieces of evidence that support the theory of organic evolution
93. What is meant by natural selection?
94. (a) Explain why Lamarcks theory of evolution is not accepted today
(b) State **two** limitations of fossils records as evidence of organic evolution
95. In a breeding experiment, plants with red flowers were crossed. They produced 123 plants with red flowers and 41 with white flowers:
(a) Identify the recessive trait
(b) Give a reason for your answer
(c) If white flowered plants were selfed, what would be the genotype of their offspring? Show your working using appropriate symbols **(R, r**)
(d) What is a test cross?
96. Explain the various evidence for organic evolution
97. (a) What is organic evolution
(b) Explain why resistance to antibiotics is considered as an example of evolution
(c) List and explain various evidences of organic evolution
98. Pure breed red flowered plants were cross pollinated with pure breed white flowered plants. The resulting F_1 offspring's had pink flowers.
(a) Using letter **R** to represent the gene for red colour and letter W to represent gene for white colour of flowers. Work out the genotype of the $\mathbf{F_1}$ generation
(b) If seeds from the $\mathbf{F_1}$ generation plants were planted and allowed to self pollinate. Work out the phenotypic ratio of the $\mathbf{F_2}$ generation
99. State **one** function of potassium ions in the human body.
100. State **two** functions of vitamin B_5 (pantothenic acid).
101 Identify the following responses shown by plants:- (a) Shoots grow towards light
(b) Roots grow towards gravity (c) Tendril intertwine around an object
102. (a) Define the term "Gene mutation."
(b) Name the genetic disorders that result from gene mutation in human beings.
103. (i) What are mutations
(ii) Name **two** mutagens
(b) Name the site for protein synthesis in a cell
104. In a certain bird species, red flight feathers is controlled by gene **R** while white flight feathers is controlled by gene **r**. The heterozygous condition **Rr** results into pink flight feathers. The two genes are also sex linked and transmitted on x-chromosome.
a) By use of fusion lines, find the genotypes of across between a male with pink flight feathers and a female with white flight feathers
b) Which type of dominance is illustrated here?
c) i)Identify the nucleic acid whose base sequence is shown below:
G-A-C-U-A-G-A-C-G
ii) Give a reason for your answer in **c (i)** above
iii) If the nucleic acid was involved in protein synthesis, how many amino acids would be present in the protein synthesized? Give a reason