EDUCATIONAL ASSESSMENT AND EXAMINATIONS SERVICE ETHIOPIAN SECONDARY SCHOOL LEAVING CERTIFICATE BIOLOGY EXAMINATION ANSWER BERIFILY 2013/14 (November 2022)

1. Which of the following is true about the importance of Lucy in resolving debates about human evolution?
   A. Big brains came before bipedalism
   B. Lucy had a brain size of 1.8% of her body mass
   C. Bipedalism came before big brains
   D. Lucy was partially an arboreal primate.
2. Which of the following can best explain behavior?
   A. The co-ordinated response of an organism to an internal or external stimuli
   B. The tendency for parts of plants to grow towards to light.
   C. The actions or reactions of a person or animal in response to external or internal stimuli
   D. A cell or group of cells that receives and processes stimuli.
3. The quick withdrawal of your hand from a hot plate is an example of
   A. Fixed action pattern C. biological clock
   B. Innate behavior D. Key stimulus
4. Which one of the following process describes a biological clock?
   A. A removal of one's thumb from hot objects quickly
   B. The growing of plants towards light
   C. Circannual migration of birds from temperate to tropical areas.
   D. Kinesis and taxes of woodlice and other simple animals.
5. Identify learned behavior fro the following
   A. Dog trained to hunt C. Honey bee making honey
   B. Child withdraws hand from hot things D. birds making nest.
6. Which one of the following features is unique to bacteria?
   A. Presence of permeable membrane C. Absence of nuclear membrane
   B. Being unicellular D. Having flagella for locomotion
7. It is possible to produce human insulin in bacterial strain. The insulin gene should be inserted in a plasmid and the recombinant DNA plasmid should be inserted into a bacterium. What is the role of the bacterium in this process?
   A. The source of insulin and modification
   B. The source of plasmid and insulin production
   C. Multiplying the recombinant DNA molecule
   D. Joining the gene of insulin with the gene of plasmid.
8. Bacteria can cause diseases in all of the following mechanisms EXCEPT.
   A. Changing the genetic structure of the host cell
   B. Entering the living cells and disrupting metabolic system.
   C. Releasing toxic as they multiply.
   D. Invading and growing on the tissues of organs.
9. Functional disease differ from infectious disease in that they
   A. Are caused by microorganisms
   B. Occur in the brain and heart
   C. Are common in females than males
   D. Show no signs of damage on the organ
10. The social impact of AIDS can be mainly revealed by
    A. Fears by stigmatization C. Reduced labour force
    B. Loss of appetite D. Loss of body weight
11. Which one of the following is a DNA virus?
    A. Herpes complex B. HIV C. Hepatitis C
12. Which one of the following is a correct comparison of lytic and lysogenic cycles of virus multiplication?
    A. Lysogenic virus release new viruses using only chronic cycle.
    B. Lytic cycle involves incorporation of viral DNA into the host DNA.
    C. Lytic cycle releases new viruses only by splitting the host cell.
    D. Both cycles damage the host cell DNA following infection.

13. In HIV/AIDS community screening, students were asked to take part in voluntary testing. The following discussion presents the view of four grade 12 students named A, B, C and D towards HIV testing.
Student A: I should not take the testing; it is simply boring.
Student B: I should take the testing, since we are educated; we should be exemplary. Student C; If we get tested and got positive, what should we do? So let us not get tested. Student D: You know, this HIV/AIDS testing is simply a business. We should not be cheated.
Which student do you think is correct?
A. Student B B. Student A C. Student D D. Student C
14. Which event of cellular respiration takes place in the cytoplasm of eukaryotic cells?
A. Production of pyruvate from glucose
B. Reaction of acetyl CoA with oxaloacetate
C. Production of ATP through chemiosmosis
D. Reaction of pyruvate with coenzyme A
15. Suppose two moles of glucose is burned aerobically. How many moles of ATP can be produced by substrate level phosphorylation in Krebs cycle?
A. 4 B. 6 C. 10 D. 8
16. During alcoholic fermentation, CO_2 is released when
A. Acetaldehyde is reduced C. Pyruvate is decarboxylated
B. Pyruvate is oxidized D. Ethanol is oxidized
17. During anaerobic respiration, NAD is required to
A. Split pyruvate to CO_2 and acetaldehyde C. Convert lactate into pyruvate
B. Reduce pyruvate to lactate D. Reduce pyruvate to acetyl CoA
18. Why do we get tired and fatigued during heavy exercise such as long distance running? It is due to:
A. Accumulation of CO_2 C. High rate of aerobic respiration
B. Accumulation of lactic acid D. Shortage of glucose
19. If one base in the six triplets of the gene coding for one of the four polypeptides in the haemoglobin molecule alters the triplet from GAG to GTG, which one of the following biological terms best describes the above phenomenon?
A. Mutation B. Cloning C. Regular D. Expected
20. Which one of the following is basic characteristic of mutation? It is
A. Spontaneous B. Planned C. Regular D. Expected
21. The theory suggests "life can evolve automatically from nonliving objects" is known as:
A. Cosmozoan theory C. Biochemical theory
B. Spontaneous generation theory D. Eternity theory
22. Which one of the following is rue about Neo-Darwinian theory?
A. There is a natural variation in features and variations which are heritable.
B. All species tend to produce more offspring than can possibly survive
C. It takes into account genetics and animal behaviour to understand evolution.
D. Development of new feature is important for survival.
23. Which of the fo0llowing statements describes the evolutionary theory of Lamarck?
A. Acquired characteristics cannot be inherited
B. Structures commonly used become more developed
C. Origin of species happens only through natural selection
D. Species started complex and gradually become simple.
24. The behavior which trainers look, if modified, could lead to the desired behavior and reward such behavior is
A. Innate B. Instinct C. Reflex D. Operant conditioning
25. Which one of the following examples of behavior describes when an animal stops responding to stimulus or cue after a period of repeated exposure?
A. Imprinting B. Reflex C. Habituation D. Conditioned
26. A policeman trained a dog on how to find explosive materials through sniffing; on another instant the same police man observed a week-old puppy following him on the road side. Which one of the following is correct about the behaviors of the animals in the observation?
A. The first case is genetically encoded and the second is adaptive
B. Both of the cases indicate natural behaviors of the animals
C. Both of the cases indicate learned behaviors of the animals
D. The first cases develop through trial and the second genetically coded.
27. Which one of the following behaviours is a courtship behavior?

A. Touch B. Scent marking C. Ritual fighting D. Defending a den

28. The Ethiopian wolf (*Canis simensis)* lives and hunt in packs. During patrolling their habitat both male and female wolves of the group maintain their area with urine containing pheromone. This pattern of behaviour best exemplifies:
    A. Courtship behaviour C. Operant behaviour
    B. Territorial behaviour D. Learned behaviour
29. The terrestrial biome characterized by cold temperature, dry precipitation, frozen soil and inhibited by migrating birds is:
    A. Boreal forests B. Deserts C. Tropical rain forests D. Tundra
30. Which of the following explains biodiversity?
    A. The variability among living organisms, within species, and of ecosystem.
    B. The large number of human races in the world
    C. The similarity and difference of organisms which live in different ecosystems.
    D. The extent to which an ecosystem contains different species.
31. A major factor in controlling the population size that helps to minimize predators and recover prey's number is
    A. Disease causing organisms C. Inter-specific competition
    B. Predation D. Intra-specific competition
32. What is the major difference that viruses have with free living cells?
    A. Reproduce only asexually C. Do not fusion outside of the a living cell
    B. Lack genetic material of their own D. Lack of locomotors structure
33. Why is nutrient cycling important in an environment? Because
    A. The amount of nutrients in the environment is limited
    B. It adds new types of molecules into the environment
    C. Nutrients in an environment will be depleted if recycled
    D. Nutrients should be exchanged between the earth and other planets.
34. Which one of the following orders of life processes correctly illustrates occurrence of the nutrient cycle?
    A. Feeding→ death and decomposition→ Excretion→ Respiration and breathing
    B. Feeding→ Excretion→ Death and decomposition→ Respiration and breathing
    C. Death and decomposition→ Feeding→ Excretion→ Respiration and breathing
    D. Respiration and breathing→ Feeding→ Excretion→ Death and decomposition
35. The item is based on the table below

Condition	Population size
Natality exceeds mortality	X
Mortality exceeds natality	Y
Mortality and natality are equal	Z

    The population number of X, Y and Z, respectively will
    A. Decrease, increase, remain the same C. Decrease, remain the same
    B. Increase, decrease, remain the same D. Remain the same, increase, decrease
36. Drosophila melanogaster are convenient experimental animals in genetics. Because they
    A. Have 23 pairs of chromosomes per cell
    B. Are small animals with a short life cycle
    C. Are too cheap to breed in large numbers
    D. Have chromosomes that can't be easily detected.
37. Suppose the heterozygous brown eye father is married with a blue eye mother. What would be the proportion of homozygous children for eye colour? (Hint: brown eye is dominant over blue eye).
    A. 50% B. 100% C. 75% D. 25%
38. If organisms share very similar molecules such as DNA, then they must be closely related evolutionarily. Which evidence of evolution supports the above information?
    A. Comparative embryology C. Comparative physiology
    B. Comparative anatomy D. Comparative biochemistry
39. Which of the following CANNOT be used as a evidence of evolution through paleontology?
    A. Stomach B. Teeth C. Hair D. Bones
40. The process in which individuals with a particular heritable trait survive better than the other is

A. Adaptation B. Evolution C. Selective breeding D. Natural selection

41. Which type of selection favors individuals at both extremes in a particular situation?
    A. Stabilizing selection C. Directional selection
    B. Natural selection D. Disruptive selection
42. Which one of the following is true about human evolution?
    A. Humans and chimpanzees both evolved from a common ancestor
    B. Humans evolved from chimpanzees
    C. Humans evolved from different lines of evolution than great apes
    D. Humans evolved from great apes
43. Which one of the following organic molecules is used to make haemoglobin?
    A. Glycogen B. Lipids C. Proteins D. Nucleic acids
44. Which one of the following is the correct formula of maltose?
    A. C612H6O B. $C_{12}H_{24}O_{12}$ C. $C_5H_{10}O_5$ D. $C_{12}H_{22}O_{11}$
45. A grade 12 student added Benedict's reagent on food sample and heated the mixture for 5 minutes. Then he observed a color change. Which one of the following is FALSE about the result?
    A. An orange color shows that a reducing sugar is present
    B. A yellow color shows that a reducing sugar is present
    C. An orange color shows that a non-reducing sugar is present
    D. A red color shows that a reducing sugar is present
46. In a Benedict's test for sucrose, why does the sample first boil with hydrochloric acid?
    A. To reduce Benedict's solution C. To neutralize the solution
    B. To hydrolyze non-reducing sugar D. To retest the mixture with Benedict's solution
47. Which one of the following statements explains the specification of enzymes? Enzymes
    A. Catalyze one reaction only C. Can be destroyed by excessive heat
    B. Speed up a reaction without being used up D. Can be used over and over again
48. The relevance and promise of biological sciences can be demonstrated by their contribution in
    A. Finding mechanisms to feed the growing human population
    B. Finding solutions to ethnic conflicts
    C. Development of housing and construction sectors
    D. Advancement of aviation technology
49. All are the roles of biology to combat the spread of HIV/AIDS EXCEPT
    A. Producing drugs that can stop the virus from reproducing
    B. Breaking the transmission pathway
    C. Rising for infected people
    D. Producing a vaccine against the virus
50. Which one of the following statements is INCORRECT about AIDS? The rate of transmission of AIDS will reduce when
    A. The transmission pathways is broken C. Promiscuous sexual intercourse is reduced
    B. The number of sexual partners is restricted D. Men and women are circumcised
51. Which one of the following statements explains the property of water? It
    A. Takes less energy to heat water up C. Has the lowest latent heat of vaporization
    B. Is a transparent molecule D. is highly viscous substance
52. Suppose there are two communities in a village. Community A actively participates in HIV/AIDS awareness creation, HIV prevention and got blood test for HIV whereas community B is frequently request for blood aid, participate in afforestation activities and HIV positive individuals keep the secret to themselves. In which community do you think that the incidence of HIV/AIDS most probably high?
    A. In both communities C. Impossible to decide
    B. In community B D. In community

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53. Which of the following statements best distinguishes hypotheses from theories in science?

    A. Theories are hypotheses that have been proved
    B. Hypotheses are guesses; theories are correct answers
    C. Hypotheses usually are relatively narrow in scope; theories have broad explanatory power
    D. Hypotheses and theories are essentially the same thing

54. To be useful in science, a hypothesis must be:
    A. measurable B. testable C. observable D. correct
55. Which of the following statements about a controlled experiment is true?
    A. All the variables must be kept the same
    B. Only one variable is tasted at a time
    C. Everything can be studied by setting up a controlled experiment
    D. Controlled experiments cannot be performed on living things
56. The purpose of peer review in science is to ensure that
    A. All scientific research is funded
    B. The results of experiments are correct
    C. All scientific results are published
    D. Published results meet standards set by the scientific community
57. To ensure that a scientific work is free of bias and meet standards set by the scientific community, a research group's work is peer reviewed by
    A. Anonymous scientific experts C. the general public
    B. The researchers friends D. lawmakers
58. If data from repeated experiments do not support the hypothesis, what is the scientist's next step?
    A. Give up C. revise the hypothesis
    B. repeat the experiment D. overturn the theory

59. The word science comes from the Latin word 'Scientia' meaning what?
    A. Study B. Experiment C. Life D. Knowledge
60. Which of the following substances can be used over and over again in an enzyme-catalyzed reaction?
    A. Enzyme substrate-complex B. Substrate C. Enzyme D. Reaction product
61. What is the intermediate compound that is formed during an enzyme-catalyzed reaction?
    A. Reactant B. Substrate C. Product D. Enzyme-substrate complex
62. Which of the following microorganisms are prokaryotic?
    A. Bacteria B. Protozoa C. Yeast D. Algae
63. Which of the following laboratory tools is **LEAST** accurate to measure 1 ml of liquid?
    A. Pipette B. Measuring cylinder C. Burette D. Beaker
64. From which of the following diseases can one be protected by sleeping under the cover of a mosquito net?
    A. Sleeping sickness B. AIDS C. Malaria D. Athlete's foot
65. Which of the following parts of the flower did Mendel remove from young flowers to prevent self-pollution?.
    A. Stamens B. Sepals C. Petals D. Ovaries

66. A hypothesis that is supported many times become:
    A. An experiment C. a conclusion
    B. a theory D. an observation
67. Which of the following laboratory equipment is used to separate the organelles of the cell according to their density?
    A. Centrifuge C. Filter paper with fine pores
    B. measuring cylinder D. Incubator
68. For which of the following is a theodolite used in biology is a theodolite used in biology education?
    A. Measuring the pH of water or soil
    B. Recording position where the species is found
    C. Measuring the height of trees
    D. Measuring the rate of flow of water in a cell
69. Pitfall traps are used to catch
    A. Small ground-dwelling animals C. flying insects
    B. small birds in the forest D. damaged plans
70. Compared to most other substances, a great deal of heat is needed to raise the temperature of water by a given amount. This because water
    A. Readily forms solutions C. acts as a buffer
    B. has a high heat capacity D. acid

71. What do we call the place where organisms live in their ecosystem?
    A. Abiotic B. Biotic C. Habitat D. Niche

72. Which of the following is the sex chromosome constitution of human males?
    A. XX B. XY C. ZZ D. ZW
73. Which of the following plants use CAM photosynthesis?
    A. Sugarcane B. Sorghum C. Maize D. Cactus
74. Which of the following bases is **NOT** found in RNA?
    A. Adenine B. Guanine C. Cytosine D. Thymine
75. In a report of scientific experiment, description of which of the following comes before all the others?
    A. Procedure B. Results C. Hypothesis D. Conclusion
76. Which one of the following is different from the other three?
    A. Starch B. Glycogen C. Cellulose D. Maltose

77. Which of the following is an example of a qualitative data?
    A. The temperature decreased from 20^0C to 15^0C.
    B. The plants height is 25 centimeters (cm).
    C. The fish swam in a zigzag motion.
    D. The six pairs of robins hatched an average of three chicks.
    E. The contents of the stomach are mixed every 20 seconds.
78. The single factor that can be altered in an experiment is the:
    A. control B. Hypothesis C. dependent variable D. independent variable
79. Which of the following is NOT an organic molecule found in living organisms?
    A. Protein B. Sodium chloride C. Nucleic acid D. Lipid
80. Which of the following molecules is made up of glycerol and fatty acids?
    A. Sugar B. Lipids C. Starch D. Nucleic acids
81. Which sentence about the hydrogen bond is not true?
    A. It occurs with polar molecules C. It is absent in water
    B. It is found in proteins D. It is a weak bond

82. What happens when a plant cell absorbs in more water?
    A. It shrinks. B. It becomes turgid C. It becomes wilted D. It swells and bursts
83. Which level of protein structural organization involves two or more polypeptide?
    A. Primary structure C. Secondary structure
    B. Tertiary structure D. Quaternary structure
84. Which of the following do biologists consider ancestral to the higher organisms of today?
    A. Plantae B. Animalia C. Fungi D. Protista
85. Which type of fatty acid is healthier when used as a human food source?
    A. Saturated fatty acid C. Polyunsaturated fatty acid
    B. Monounsaturated fatty acid D. Fatty acids in animal products
86. Which of the following is NOT recycled in the ecosystem?
    A. Sulphur B. Energy C. Carbon D. Phosphorus
87. What kind of cross is performed to determine whether the parent was homozygous or heterozygous?
    A. Monohybrid cross B. Dihybrid cross C. Back cross D. Double cross
88. Which type of animal behavior happens without learning?
    A. Innate B. Latent C. Insight D. Conditioned

89. Amino acids are the subunits of
    A. Carbohydrates B. nucleic acids C. lipids D. proteins
90. Which joins amino acids together?
    A. Peptide bonds C. van der Waals forces
    B. Hydrogen bonds D. ionic bonds
91. Which of the following is a hydrophobic material?
    A. Table salt B. Wax C. Sugar D. Pasta
92. Many mammals control their body temperature by sweating. Which property of water is most directly responsible for the ability of sweat to lower body temperature?
    A. Water's change in density when it condenses
    B. Water's ability to dissolve molecules in the air.
    C. The release of heat by the formation of hydrogen bonds
    D. The absorption of heat by the breaking of hydrogen bonds

E. Water's high surface tension

93. Which of the following categories includes all others in the list
A. monosaccharides B. carbohydrates C. disaccharides D. polysaccharide

94. When a drop of iodine solution is added to a solution of food stuff and the foodstuff turns dark blue, what does the food stuff contain?
A. Reducing sugar B. Disaccharide C. Glucose D. Starch

95. Which of the following has the highest risk of HIV transmission?
A. Hand shaking B. Needle sharing C. Towel sharing D. Toilet sharing

96. Which of the following elements is the most abundant in living things?
A. Nitrogen B. Carbon C. Hydrogen D. Oxygen

97. Which of the following organelles is common to both plant and animal cells?
A. Cell wall B. Chloroplast C. Mitochondria C. Central vacuole

98. Among the following organic molecules, identify the one that does not contain nitrogen.
A. Starch B. Protein C. DNA D. RNA

99. If a cell fails to form lysosomes, which of the following cellular functions will get disturbed first?
A. Protein synthesis C. Removal of cellular debris
B. Chromosome replication D. Transport across cell membrane

100. Most co-enzymes are the derivatives of which of the following nutrients?
A. Proteins B. Vitamins C. Carbohydrates D. Fats

101. To produce glucose from starch, which of the following enzymes would one use?
A. Isomerases C. Amylases C. Peptidases D. Ligases

102. Which class of enzyme inhibitors has similar shape as that of the normal substrate?
A. Allosteric B. Competitive C. Denaturing D. Irreversible

103. The enzyme amylase can break glycosidic linkages between glucose monomers only if the monomers are in the α form. Which of the following could amylase break down?
A. Glycogen, starch, and amylopectin C. Glycogen and cellulose
B. Cellulose and chitin D. Starch, amylopectin and cellulose

104. Which of the following statements concerning unsaturated fatty acids is true?
A. They are more common in animals than in plants
B. They have double bonds in the carbon chains of their fatty acids
C. They generally solidify at room temperature
D. They contain more hydrogen than do saturated fats having the same number of carbon atoms

105. The structural level of a protein least affected by a disruption in hydrogen bonding is the
A. Primary level B. secondary level C. tertiary level D. quaternary level

106. Compared to most other substances, a great deal of heat is needed to raise the temperature of water by a given amount. This is because water
A. is an acid C. has a high heat capacity
B. readily forms solution D. acts as a buffer

107. For a substance to easily pass across the cell membrane by simple diffusion which of the following properties should it possess.
A. Large size B. Ability to dissolve in lipid C. Positive charge D. Negative charge

108. Among the following factors that affect enzyme activity, which one does NOT cause enzyme denaturation.
A. High pH B. Low pH C. High temperature D. Competitive inhibitor

109. Which of the following is a type of ecological succession that starts from a cleared forest area?
A. Hydrosere B. primary C. Secondary D. Pioneer

110. Which of the following stages of photosynthesis can take place in the dark?
A. Photolysis of water B. Photosystem I C. Photosystem II D. Calvin cycle

111. Which of the following is the major role-played by bacteria and fungi in the ecosystem?
A. Causing diseases C. Fixing carbon dioxide
B. Nutrient recycling D. Producing antibiotics

112. If a heterozygous tall pea plant (Tt) is crossed with a short pea plant (tt), what percentage of the progeny is expected to be short?
A. 100% B. 75% C. 50% D. 25%

113. Which of the following human cell types is attacked by HIV?
A. Red blood cells B. White C. T-lymphocytes D. Leukocytes
114. Which of the following processes is most important to release nutrients from dead organic matter into the soil?
A. Fixation B. Decomposition C. Excretion D. Respiration
115. Which of the following biomes supports the highest diversity of plant and animal life?
A. Tropical rainforest B. Deciduous forest C. Grassland D. African savannah
116. Which of the following demographic factors can increase the size of the world population?
A. Natality B. Migration C. Emigration D. Immigration
117. When Mendel crossed a tall pea plant with a short plant, the F1 progeny were all tall. What F1 did he obtain when he made the reciprocal cross?
A. Short plants B. Tall plants C. Extra-tall plants D. Plants of average height

118. Chemical bonds that involve the total transfer of electrons from one atom or group of atoms to another are called:
A. Covalent bonds C. Hydrogen bonds
B. Ionic bonds D. Van der Waals bonds
119. Which substance is not part of a nucleotide?
A. A phosphate B. a base C. A sugar D. water
120. Which energy rich organic compound contains adenine in its molecule?
A. Carbohydrate B. Lipid C. ATP D. glucose
121. A compound that produces hydrogen ions in solution is a (an)
A. Salt B. Base C. Acid D. Polymer
122. Nucleotides consist of a phosphate group, a nitrogenous base, and a
A. Fatty acid B. 5-carbon sugar C. Lipid D. 6-carbon sugar
123. An enzyme speeds up a reaction by
A. Lowering activation energy C. Releasing energy
B. Raising the activation energy D. Absorbing energy

124. Among the following ABO blood group genotype, which one produces two types of antigens?
A. AO B. BO C. AB D. BB
125. Which of the following methods do animal breeders use to produce domestic animals with hybrid vigor?
A. Feeding with nutritive food C. Giving proper veterinary care
B. Mating together related animals D. Crossbreeding their animals
126. Which of the following groups are believed to be the first photosynthetic organisms to evolve on Earth?
A. Green plants B. Green algae C. Blue green algae D. Lichens
127. Which of the following factors brings about changes during both evolution and breeding of plants and animals?
A. Limited resources C. Selection
B. Production of excess progeny D. Competition
128. Among the following, which one is held most responsible for the present fast depletion of the world biodiversity?
A. Herbivores B. Carnivores C. Grazers D. Humans
129. Which of the following reproductive isolating mechanisms keeps the horse and donkey as two independent species?
A. Hybrid inviability C. Ecological isolation
B. Hybrid infertility D. Habitat isolation
130. Which of the following activities of an organism do we call a behavior?
A. Reception of external stimulus C. Responding to stimulus
B. Responding of internal stimulus D. Lack of receptors to receive stimulus
131. A reflex that involves internal organs such as the heart is referred to as:
A. Somatic reflex B. External reflex C. Spinal reflex D. Autonomic reflex
B. P1 generation B. F1 generation C. F2 generation D. F3 generation
132. Which of the following organs serves as a coordinating system in a reflex action?
A. Spinal cord B. Dehydrogenase C. Nerve cells D. Oxidoreductase

133. In a chemical reaction, a reactant binds to an enzyme at a region known as
A. Catalyst B. Substrate C. Product D. Active site
134. If an enzyme in solution is saturated with substrate, the most effective way to obtain a faster yield of products is to
A. Add more of the enzyme C. Heat the solution to 90^0C
B. Add more substrate D. Add an allosteric inhibitor
135. The rate of an enzyme catalyzed reaction becomes stable after some time due to

A. increased temperature C. saturation of enzymes
B. increased pH D. accumulation of products

136. Some enzymes are metabolically active in hot springs because
A. They are able to maintain a lower internal temperature
B. High temperatures make catalysis unnecessary
C. Their enzymes have high optimal temperatures
D. Their enzymes are completely insensitive to temperatures
E. They are molecules other than proteins or RNAs as their main catalysts

137. Which type of enzyme catalyzes the joining of two molecules by the formation of new bonds?
A. Decarboxylase B. Dehydrogenase C. Ligase D. Oxidoreductase.

138. Which of the following statements about enzyme is NOT correct?
A. Enzymes speed up a chemical reaction
B. Enzymes are very specific in their reaction
C. The presence of an enzyme will change the outcome of a reaction
D. Enzymes lower the energy of activation for a reaction to occur

139. Glycolysis occurs in the _____
A. Cytoplasm B. Mitochondrion C. Nucleus D. Chloroplast

140. Anaerobic metabolism refers to the generation of ATP:
A. without the involvement of ADP C. without the use of oxygen
B. without the use of glycogen D. by the conversion of pyruvate to lactate

141. The conversion of one molecule of glucose to two molecules of pyruvate results in the net formation of:
A. two molecules of ATP C. six molecules of water
B. Three molecules of ATP. D. thirty-eight molecules of ATP

142. During alcohol fermentation, pyruvic acid in the presence of decarboxylase is first converted pyruvate
A. glucose B. lactose C. lactic acid D. acetaldehyde

143. The total amount of living tissue within a given trophic level is called:
A. organic mass B. energy mass C. trophic mass D. biomass

144. Biomes where trees predominant are called _____
A. polar biomes B. desert biomes C. forest biomes D. grassland biome

145. The goals of biodiversity conservation include all of the following EXCEPT:
A. protecting individual species
B. introducing exotic species into new environments
C. preserving habitats and ecosystems
D. making sure local people benefit from conservation efforts

146. The maximum population growth rate characteristic of a species is called
A. limiting factor C. carrying capacity
B. biotic potential D. exponential growth pattern

147. The organic molecule tightly bound to the enzyme and required for the activity of of enzyme is grouped as
A. Apoenzyme B. Activator C. coenzyme D. prosthetic group

148. If an enzyme is added to a solution where its substrate and product are in equilibrium, what will occur?
A. Additional product will be formed
B. Additional substrate will be formed
C. The reaction will change from endergonic to exergonic
D. Nothing; the reaction will stay at equilibrium

149. All enzymes are
A. Fibrous proteins that digest large molecules
B. Fibrous proteins that catalyze reactions
C. Globular proteins that digest large molecules
D. Globular proteins that catalyze reactions

150. An enzyme sucrase is an example of
A. Transferases B. Hydrolases C. lyases D. oxidoreductases

151. Which two elements are always found in amino acids?
A. Nitrogen and sulfur C. Carbon and oxygen
B. Sulfur and oxygen D. Hydrogen and phosphorus

152. In an enzyme catalyzed reaction, addition of a certain substance to the reaction mixture decreases the reaction. The substrate added must be
A. Substrate B. enzyme C. Coenzyme D. inhibitor

153. From among the following, choice the field which is a branch or a part of biotechnology.
A. Parasitology B. Phycology C. Immunology D. Genetic engineering

154. Which of the following is publicly an **UNDESIRED** research activity?
A. Breeding a new crop variety
B. Manufacture of a new effective medicine
C. Synthesis of a new vaccine
D. Breeding a new pathogenic microorganism.

155. Which of the following alternatives contains **ONLY** organic molecules?
A. Calcium carbonate, glucose, methane
B. Carbon dioxide, sodium chloride, lysine
C. Linoleic acid, glycine, methane
D. Water, carbon dioxide, calcium carbonate

156. Which test is suitable for checking the presence of lipids in foodstuffs?
A. Biuret test B. Benedict's test C. Emulsion test D. Iodine test

157. How do heavy metal ions reduce the reaction rate of enzymes?
A. By destroying the 3-dimensional shape of the enzyme's active site
B. By raising the temperature above the optimum level for the enzyme
C. By dropping the pH well below the optimum level for the enzyme
D. By inducing mutations that disrupt the functioning of the enzyme

158. What happens when enzymes become denatured?
A. They can normally catalyzed the reactions
B. Their active sites are changed
C. Rate of the reaction increases
D. Bonds holding amino acids are unaffected*

159. What happens when human red blood cells are kept in a hypertonic solution?
A. The same net gain and loss of water.
B. More water gets into the cell than leaving it
C. More water goes out of the cell than getting in
D. The cells prevent water from getting in or leaving out

160. Among the following which one best describes the cells of bacteria?
A. Eukaryotic
B. Prokaryotic
C. Both eukaryotic and prokaryotic
D. Neither prokaryotic nor eukaryotic

161. Which of the following nitrogenous bases of nucleic acids is a purine base?
A. Adenine B. Cytosine C. Thymine D. Uracil

162. Which of the plants with the following genotypes is heterozygous?
A. BBYY B. BbYb C. bbyy D. YYBB

163. The elements or compounds that enter into a chemical reaction are called
A. Catalyst B. Substrate C. Product D. Active site

164. Which of the following cell types can be rich in lysosomes?
A. Red blood cells
B. White blood cells
C. Phagocytic cells
D. Nerve cells

165. Cell membranes consists mainly of
A. Lipid bilayer B. Protein pumps C. Carbohydrates D. Proteins

166. The movement of water molecules across a selectively permeable membrane is known as
A. Exocytosis B. Phagocytosis C. Endocytosis D. Osmosis

167. The nucleus includes all of the following structures EXCEPT
A. Cytoplasm B. A nuclear membrane C. DNA D. A nucleolus

168. Which of the following is an example of active transport?
A. Facilitated diffusion B. Osmosis C. Diffusion D. Endocytosis

169. The principal chemical compound that living things use to store energy is
A. DNA B. H_2O C. ATP D. CO_2

170. Most cells cannot harness heat to perform work because
A. Heat is not a form of energy
B. Cells do not have much heat; they are relatively cool
C. Temperature is usually uniform throughout a cell

D. Heat can never be used to do work
E. Heat must remain constant during work

171. Which of the following groups of viruses copy their RNA to DNA?

A. Bacteriophages B. DNA viruses C. RNA viruses D. Retroviruses

172. Which of the following can reverse an enzyme inhibition that is caused by an allosteric inhibitor?
A. Adding more substrate C. depleting the end product
B. Adding more end product D. Depleting the substrate

173. During the Krebs cycle, to which of the following molecules is most of the energy released from food transferred.
A. ATP B. NAD C. ADP D. AMP

174. If in a DNA molecule consisting of 1000 base pairs, there are 300 adenine bases, how many guanine bases will be present?
A. 200 B. 400 C. 600 D. 700

175. During which stage of aerobic respiration does oxidative phosphorylation occur?
A. Glycolysis B. Krebs cycle C. Link reaction D. ChemiosmosisG11 U5 L3

176. What mode of feeding do soil organisms that release nutrients from dead organic matter into the soil have?
A. Photoautotrophic B. Saprophytic C. Chemoautotrophic D. Parasitic

177. When farmers are using fewer and fewer number of crop verities, what would happen to the genetic diversity of our crop plants?
A. It would get eroded C. It would be more conserved
B. It would be more diverse D. Nothing would happen to it

178. During anaerobic respiration, what is the gross number of ATP molecules that are produced per glucose molecule?
A. Two B. Three C. Four D. Six

179. Among the flowing four processes, identify the one that probably evolved before all the other three.
A. Aerobic respiration C. oxidizing atmosphere
B. Anaerobic respiration D. Photosynthesis

180. Which of the following is common to plant and animal cells?
A. Chloroplast B. Centriole C. Central vacuole D. Mitochondria

181. Which of the following is present in a prokaryotic cell?
A. Mitochondria B. Nuclear envelope C. Ribosome D. Chloroplast

182. Which structure-function pair is mismatched?
A. Nucleolus; production of ribosomal subunits
B. Lysosome; intracellular digestion
C. Ribosome; protein synthesis
D. Golgi apparatus; protein trafficking
E. Microtubule; muscle contraction

183. Which of the following pairs are both organelles concerned with energy transformation?
A. Mitochondria and nucleus C. mitochondria and chloroplast
B. Chloroplast and central vacuole D. Nucleus and nucleolus

184. Which cell would be best for studying lysosomes?
A. Muscle cell B. Nerve cell C. bacterial cell D. Phagocytic white blood cell

185. The growth of cells is limited by the ratio between
A. Organelles and surface area C. surface area and volume
B. Nucleus and cytoplasm D. organelles and cytoplasm

186. Which of the following processes includes all others?
A. Osmosis C. Diffusion of a solute across a membrane
B. Facilitated diffusion D. Passive transport

187. Which of the following is **NOT** a learned behavior?
A. Imprinting B. Habituation C. It would be more diverse D. Trial and error

188. If an actively growing seedling is kept horizontally, which of the following would eventually happen to the seedling?
A. The shoot would bend upward C. The root would bend upward
B. The seedling would stop growing D. The seedling would grow horizontally

189. Which of the following was the most possible mode of evolution by which the many species of Darwin's finches evolved on the Galapagos Islands?
   A. Phyletic evolution C. Convergent evolution
   B. Divergent evolution D. Sympatric evolution.
190. For which of the following processes is ATP **NOT** required?
   A. Diffusion of oxygen into cells C. Synthesis of molecules
   B. Active transport of molecules from one site to another D. Muscle contraction
191. Mutation may be described as:
   A. phenotypic change C. continuous variation
   B. change in gene structure D. change due to hybridization
192. Which of the following is the most **UNLIKELY** action that would be expected from Ethiopians who have been given adequate biological literacy?
   A. Engagement in activities resulting in biodiversity loss
   B. Supporting activities concerned with food security
   C. Awareness about climate change and its problem
   D. Engagement in biological resource conservation
193. Which form of mutation is responsible for the disease known as leukemia?
   A. Duplication B. Insertion C. Inversion D. Deletion
194. Which of the following characteristics can show the evolutionary relationships among organisms?
   A. Structures having similar functions C. Presence of homologous structures
   B. Presence of analogous structures D. Structures having different origins.

195. In addition to light and chlorophyll, photosynthesis requires
   A. Water and oxygen C. Oxygen and carbon dioxide
   B. Water and sugars D. Water and carbon dioxide
196. The first process in light-dependent reactions of photosynthesis is
   A. Light absorption B. Oxygen production C. Electron transport D. ATP formation
197. Which substance from light-dependent reactions of photosynthesis is a source of energy for the Calvin cycle?
   A. ADP B. H_2O C. NADPH D. Pyruvic acid
198. CAM plants are specialized to survive under what conditions that would harm most other kinds of plants?
   A. Low temperature C. Hot, dry conditions
   B. Excess water D. Long day lengths
199. In a typical plant, all of the following factors are necessary for photosynthesis EXCEPT
   A. Chlorophyll B. Oxygen C. Light D. Water

200. Which of the following species isolating processes could lead to the evolution of a new species by the mechanism known as sympatric speciation?
   A. A river that changed its course for many years
   B. A new mountain range that was created many years ago
   C. Populations of a species having different breeding seasons
   D. A land mass that separated two water bodies for many years
201. What is an Apo enzyme?
   A. A protein molecule C. An active enzyme
   B. A non-protein molecule D. A non-protein cofactor
202. For which of the following can divergent evolution be taken as an alternative name?
   A. Allopatric speciation B. Adaptive radiation C. Sympatric speciation D. Disruptive selection
203. Which one of the following is the result of the similarity observed between the wings of a bird and a pterodactyl?
   A. Convergent evolution C. Directional selection
   B. Stabilizing selection D. Divergent evolution
204. Which of the following played an important role in the evolution of human being?
   A. Emergency of wings in addition to limbs
   B. Development of even toes in the forearms
   C. Development of feathers and hallow bones
   D. Development of opposable thumb to grasp
205. In which one of the following do we use genetically modified bacteria for purpose other than human health?
   A. Production of insulin C. Production of herbicides

B. Production of antibiotics D. Production of vaccines

206. Which knowledge about cell biology did scientists discover after all the others?
   A. The first understanding that all living things are made of cells
   B. Knowledge about how chromosomes behave during mitosis
   C. First understanding about the double helix structure of DNA
   D. First understanding about the DNA sequence in human genome

207. The net gain of energy from glycolysis is
   A. 4 ATP molecules C. 2 ATP molecules
   B. 8ADP molecules D. 3 pyruvic acid molecules

208. The Krebs cycle takes place within the
   A. Chloroplast B. Mitochondria C. Nucleus D. Cytoplasm

209. The electron transport chain uses the high-energy electrons from the Krebs cycle to
   A. Produce glucose
   B. Move H^+ ions across the inner mitochondrial membrane
   C. Covert acetyl-CoA to citric acid
   D. Convert glucose to pyruvic acid

210. The process carried out by yeast that causes bread dough to rise is
   A. Alcoholic fermentation C. Cellular respiration
   B. Oxygen debt D. The Krebs cycle

211. Which of the following statements can be considered as the better definition of the biological concept of behavior?
   A. The reaction of a person or an animal in response to an external or internal stimulus
   B. The responses or reactions or movements that a living plant makes in any situation
   C. A system of coordinated response by an organism to an external or internal stimulus
   D. A receptor of some kind of stimulus, that an organism has which produces a response

212. To which category of behavior does the human behavior that involves the strengthening of existing responses or the formation of new responses to existing stimuli that occur because of practice or repetition belong?
   A. Learned behavior C. Instinctive behavior
   B. Innate behavior D. Inborn behavior

213. Which of the following is **NOT** grouped under genetically pre-programmed pattern of behavior?
   A. Reflex actions in humans C. Conditioned behavior
   B. Orientation behavior D. Instinctive behaviors

214. Which group of bacteria reduces nitrate to nitrogen gas in the nitrogen cycle?
   A. Nitrogen fixing bacteria C. Denitrifying bacteria
   B. Ammonium ion forming bacteria D. Photosynthetic bacteria

215. The main factors that determine the types of terrestrial biomes in a certain geographical arc are:
   A. Soil and vegetation C. Complexity in ecological succession
   B. Soil and biological diversity D. Precipitation & temperature

216. In which parts of Ethiopia are, lions, elephants & giraffes found more community
   A. In the afro alpine and subafroalpine zones
   B. In the highland areas of northern Ethiopia
   C. In the grasslands of southwestern Ethiopia
   D. In central and northern parts of the rift valley

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217. During the Krebs cycle

   A. Hydrogen ions and oxygen form water
   B. The cell releases small amount of energy through fermentation
   C. Each glucose molecule is broken down into two molecules of pyruvic acid
   D. Pyruvic acid is broken down into carbon dioxide in a series of molecules

218. The light reactions of photosynthesis supply the Calvin cycle with

A. Light energy C. CO_2 and ATP
B. water and NADPH D. ATP and NADPH

219. Which of the following tools is used by a biologist to study the internal anatomy of experimental animals?
A. Dissecting kit B. Petri dish C. Hand lens D. Microscope

220. Which of the following is **NOT** a characteristic of an enzyme?
A. It is a globular protein C. It functions as a catalyst
B. It lowers the energy of activation D. It is converted to products

221. Who was the first person who believed to have seen moving cells under a microscope?
A. Robert Hooke. C. Anton Van Leeuwenhoek

222. Why do microorganisms decompose dead organic matters?
A. To release mineral nutrients for the plants C. To drive energy for their own use
B. To clean up the ecosystem D. To keep the balance of atmospheric gases

223. The practice of modern agriculture that reduces crop biodiversity is:
A. Overgrazing B. Forest clearing C. growing landraces D. growing few high yielding varieties

224. Which one of the following is the best scientific approach to come to conclusive evidence showing that a given event is caused by a certain factor?
A. Having a strong belief C. Making a good guess
B. Making systematic observation D. Conducting an experiment

225. Of the following organic molecules, which one includes a pentose sugar?
A. Glucose B. Fructose C. Galactose D. Deoxyribose

226. Which metabolic pathway is common to both fermentation and cellular respiration of a glucose molecule?
A. The citric acid cycle C. Glycolysis
B. The electron transport chain D. Synthesis of acetyl CoA from pyruvate

227. Some bacteria, when faced with unfavorable environmental conditions, produce structures called
A. pili B. capsules C. endospores D. toxins

228. During a lytic cycle, after a virus enters the cell, the virus _____
A. forms a provirus B. becomes inactive C. replicates D. dies

229. _____is never a part of a virus
A. nucleic acid B. viral envelope C. protein coat D. cell wall

230. What does an enzyme do to a chemical reaction that allows it to proceed optimally?
A. It lowers the required activation energy.
B. It increases the amount of the substrate.
C. It increases the required activation energy.
D. It modifies both the pH and the temperature.

231. Which of the following is lacking in prokaryotic cells?
A. Cytosol B. Ribosome C. DNA strand D. Cellulose

232. What is the name of a major group of eukaryotic organisms that obtain their nutrition using extracellular digestion?
A. Viruses B. Bacteria C. Fungi D. Algae

233. What kind of nutrition do most of the decomposers have in general?
A. Autotrophic nutrition C. Endosymbiont nutrition
B. Saprobiotic nutrition D. Chemosynthetic nutrition

234. To which the genus of primates are the Neanderthal humans classified?
A. genus Ardipithecus C. The genus Homo
B. The genus Australopithecus D. the genus Zinjanthropus

235. In which of the following is there a **MISMATCH** behavior and the resulting action/response?
A. Instinctive behavior-Imprinting in birds
B. Reflex action-Blinking of the eyes in humans
C. Instinctive behavior - Nest-building in birds
D. Orientational movement-Weaving a web in spiders

236. What does reverse transcriptase do?
   A. It synthesizes protein from RNA
   B. It synthesizes DNA from RNA
   C. It synthesizes protein from amino acids
   D. It synthesizes RNA from DNA
237. Which of the following descriptions applies to most protists?
   A. Unicellular prokaryotes C. Multicellular prokaryotes
   B. Unicellular eukaryotes D. Multicellular eukaryotes
238. Cells were first seen using the microscope by:
   A. Schleiden B. Robert Hooke C. Schwann D. Leeuwenhoek
239. The ultimate source of genetic variation is:
   A. mutation B. migration C. genetic drift D. selection
240. Which of the following is the first step in starting a research process?
   A. Searching sources of information to locate problem.
   B. Survey of related literature
   C. Identification of problem
   D. Searching for solutions to the problem
241. For which of the following purposes is Global Positioning System (GPS) used?
   A. Map of an area B. Theodolite C. Microwave D. Satellite signal
242. Which of the following statements is **INCORRECT** with respect to an enzyme's ability to catalyze a reaction?
   A. An enzyme provides a reaction surface and a hydrophilic environment for the reaction to take place.
   B. An enzyme binds reactants such that they are positioned correctly and can attain their transition-state configurations.
   C. An Enzyme allows the reaction to go through a more stable transition state than would normally be the case.
   D. An enzyme can weaken bonds in reactants through the binding process.
243. The amount of organic matter present at a given time per unit area is called:
   A. carbon sequestration B. standing crop C. carbon foot print D. productivity
244. In the energy pyramid, which group of organisms has the least amount of energy?
   A. Primary producers B. Tertiary producers C. Herbivores D. Animals
245. Which method is NOT used to protect food against microorganisms?
   A. Heating B. Freezing C. Sterilization D. Vaccination
246. Which illness is caused by a bacterium?
   A. AIDS B. Diphtheria C. Polio D. Common cold
247. Prokaryotic cells that have a spherical shape are
   A. cocci B. bacilli C. spirilli D. methanogens
248. What is a capsid?
   A. Viral DNA that inserts into a host's DNA C. A protein coat surrounding a virus
   B. A type plant virus D. A rod-shaped bacterium
249. What characteristics do viruses share with all living organisms?
   A. respiration B. Replication C. Metabolism D. Movement
250. The sets in which scientists usually conduct two or more sets of the same experiment at the same time is:
   A. Experimental group B. Experimental design C. Replication D. Control group
251. Which of the following properties of water makes sweat a good body coolant?
   A. Its strong surface tension C. Its low density in the solid state
   B. Its strong adhesion to a surface D. Its high heat of vaporization.
252. How many molecules of glycerol and fatty acids, respectively, are needed to form 100 molecules of triglyceride fat?
   A. 50 and 50 B. 100 and 100 C. 100 and 300 D. 150 and 400:

253. In a metabolic pathway (A→B→C→D), where each step is catalyzed by a separate enzyme, which substance in the pathway serves as an allosteric regulator?
A. Substance A B. Substance B C. Substance C D. Substance D

254. Which of the following organelles settles out last when homogenized cell are centrifuged?
A. Chloroplast B. Nucleus C. Ribosome D. Mitochondria

255. Producers in aquatic food chains include
A. algae B. protozoa C. slime molds D. amoeba

256. Most fungi function as _____ in their environment
A. consumers B. Decomposers C. producers D. autotrophs

257. Cell walls of fungi contain
A. cellulose B. spores C. hyphae D. chitin

258. Which lake zone would be absent in a very shallow lake?
A. Benthic zone B. Pelagic zone C. **Aphotic zone** D. Littoral zone

259. At which stage is most of the carbon dioxide released during aerobic respiration?
A. Glycolysis B. Electron transport C. Krebs cycle D. Chemiosmosis

260. One of the following groups of plants carry out light dependent and light independent reactions of photosynthesis in separate cells of the leaf.
A. Plants adapted to temperate regions
B. Carbon-3 plants C. Carbon -4 plants D. Cacti

261. What is the nutritional mode of those bacteria, which decompose dead organic matter and thus recycle nutrients?
A. Autotrophic B. Parasistic C. Saprobiotic D. symbiotic

262. In what main way do retroviruses such as HIV differ from other types of RNA viruses?
A. They require a host cell to reproduce C. Their genes are resistant to mutation
B. They reversely copy RNA to DNA D. They are free living viruses

263. Which of the following is **NOT** true about the flow of energy in the ecosystem?
A. It is recycled by decomposers. C. It passes from one trophic level to the next.
B. It enters the ecosystem in the form of light. D. It leaves the ecosystem in the form of heat.

264. The feeding relationships among the species in a community determine the community's
A. Secondary succession C. Ecological niche
B. Species richness D. Trophic structure

265. Which of the following organisms is incorrectly paired with its trophic level?
A. Cyanbacterium — primary producer C. Zooplankton — primary producer
B. Grasshopper — primary consumer D. Fungus — detritivore

266. Fresh water biome includes
A. Ponds, lakes, rivers and wetlands
B. estuaries, ponds, lakes, and rivers
C. Wetlands, estuaries and rivers
D. pelagic zone, wetlands, and estuaries

267. Through which of the following processes do all living organisms contribute to carbon cycle?
A. Photosynthesis B. Cellular respiration C. Decomposition D. Combustion

268. In ecological context, which of the following is a population?
A. All living organisms in a habitat C. All the producers in a habitat
B. All the consumers in a habitat. D. All individuals of same species in a habitat

269. During meiosis, which process makes the four chromatids of a homologous pair of chromosomes genetically different from one another'?
A. Independent assortment B. Crossing over C. Segregation D. Linkage

270. One of the following is NOT true about protein synthesis in eukaryotes.
A. Translation takes place in the cytoplasm
B. Transcription takes place in the nucleus

C. Both transcription and translation take place in the cytoplasm
D. mRNA is modified after transcription

271. Which of the following combinations is known as Neo-Darwinism?
A. Natural selection and acquired inheritance
B. Acquired inheritance and Mendelian law of inheritance
C. Natural selection and Lamarck's theory of evolution
D. Natural selection and Mendelian law of inheritance

272. In the process of allopatric speciation, which of the following is the mechanism that prevents populations from exchanging genes?
A. polyploidy B. Geographic barrier C. Seasonal isolation D. Temporal isolation

273. A boy who had seen a snake crossing his way earlier, jumped up violently when grass touched his legs. Which behavior is it?
A. Habituation B. Sensitization C. Conditioning D. Imprinting

274. What material do microbiologists use to culture bacteria in the laboratory?
A. Moist soil B. The royal jelly C. Agar nutrient D. Mixture of iodine & sugar

275. Which of the following is usually taken as a signal for the final stage of HIV infection?
A. Signs of the disease Kaposi's sarcoma C. Outbreak of some genetic diseases
B. Uninfected T-helper cells present D. No infection by other parasitic diseases

276. The water in an estuary is
A. salt water only C. fresh water only
B. poor in nutrients D. a mixture of fresh water and salt water

277. An increase in the greenhouse effect causes an increase in
A. Carbon dioxide B. Oxygen C. Temperature D. Water

278. Permafrost characterizes the biome called
A. Taiga B. Boreal forest C. Savanna D. Tundra

279. The maximum number of organisms of a particular species that can be supported by an environment is called
A. Logistic growth C. Carrying capacity
B. Exponential growth D. Population density

280. A limiting factor that depends on a population size is called
A. Density-dependent limiting factor C. Predator-prey relationship
B. Density-independent limiting factor D. Parasitic relationship

281. Through which process can inorganic ions from the soil be absorbed into the root hairs?
A. Dehydration B. Diffusion C. Active transport D. Osmosis

282. How are organic molecules distinguished from inorganic molecules? Organic molecules always contain:
A. oxygen and hydrogen C. carbon and oxygen
B. oxygen and nitrogen D. carbon and hydrogen

283. In which industrial enzyme technology is lactase practically applied to produce lactose-free milk for use by lactose intolerant individuals?
A. Chocolate manufacturing industry C. Dairy product manufacturing industry
B. Human hormone manufacturing industry D. Cereal food manufacturing industry

284. Which kind of enzyme inhibitors bind to enzymes only weakly and the bond that hold them breaks easily releasing the inhibitor to allow the enzyme to become active again?
A. Irreversible inhibitors C. Inhibitors that bind strongly to enzymes
B. Reversible inhibitors D. Inhibitors that permanently alter enzyme structure,

285. Of the following models describing the nature of the cell membrane, which one was proposed before all the others?
A. The sandwich model C. Fluid mosaic model
B. The unit membrane model D. Phospholipid bilayer model

286. Why is it that longer races by athletes must be run slower than shorter races?
A. To give time for lactic acid fermentation in muscle cells

B. To avoid hunger as food is quickly converted to energy
C. To allow aerobic respiration to produce the required ATP
D. To adapt to the weather conditions at the racing place

287. The demographic transition is considered complete when
A. Population growth stops
B. The birth rate is greater than death rate
C. The death rate begins to fall
D. The death rate is greater than the birth rate

288. In the presence of unlimited resources and in the absence of disease and predation, what would probably happen to a bacterial population?
A. Logistic growth C. Exponential growth
B. Endangerment D. Extinction

289. Which of the following aquatic biomes have many strata like that of equatorial rain forest?
A. Wetland B. Pelagic zone C. Estuarine D. Coral reef

290. In which organ of the human body are more bacteria found
A. Lungs B. Stomach C. Small intestine D. Large intestine

291. From which group of microorganisms was, the first antibiotics produced.
A. Gram-negative bacteria C. Gram-positive bacteria
B. Gram-positive bacteria D. Viral agents

292. What is the other name for the primary consumers of the ecosystem?
A. Herbivores B. Carnivores C. Green plants D. Predators

293. Of the following activities, which one considered to have an indirect negative effect on biodiversity?
A. Human & livestock population growth C. Charcoal making and illegal logging
B. Deforestation for cultivation & urbanization D. Monoculture farming with improved crop varieties

294. If two heterozygous tall pea plants are crossed, how many of the offspring would be phenotypically tall plants?
A. 0% B. 25% C. 50% D. 75%

295. Tropical rain forest is characterized by
A. low precipitation and low temperature
B. low precipitation and high temperature
C. high precipitation and low temperature
D. high precipitation and high temperature

296. If a cell has 12 chromosomes, how many chromosomes will each of its daughter cells have after mitosis and cytokinesis? A. 4 B. 6 C. 12 D. 24

297. Before DNA could definitely be shown to be genetic material in cells, scientists had to show that it could:
A. tolerate high temperature
B. carry and make copies of information
C. be taken down into small sub units
D. be modified in response to environmental conditions

298. Which of the following features do analogous structures mostly share?
A. Phylogenetic similarity C. Developmental
B. Ancestral similarity D. functional similarity

299. In which of the following ways does learned behavior differ from innate behavior?
A. Learned behavior is adaptive in nature.
B. Learned behavior is genetically determined.
C. Learned behavior is modified by new experiences.
D. Learned behavior is functional at the first attempt.

300. Current human concerns such as famine, pestilence, and environmental degradation would be solved through the use of:
A. biological principles A. irrigation C. aquaculture D. terracing

301. The best way to control HIV/AIDS is:
   A. adequate distribution of condoms
   B. Breaking the transmission pathway.
   C. adequate distribution of antiviral drugs
   D. awareness creation

302. What is the possible effect of the weak hydrogen bond among water molecules?
   A. It helps water to boil at low temperature
   B. It results in the crystal shape of ice
   C. Plays a significant role in the interaction of a water molecule with hydrophobic surfaces
   D. It speeds up photosynthesis is

303. Cell organelles that contain hydrolytic enzymes are called:
   A. Peroxisomes B. Lysosomes C. Mesosomes D. Ribosomes

304. Which part of the cell makes necessary changes, packages and secretes proteins?
   A. Golgi apparatus B. Endoplasmic reticulum C. Mitochondria D. Cell wall

305. Which of the following takes place under normal conditions, flow down the electron transport chain of the mitochondria?
   A. NADH and FADH are oxidized.
   B. The pH of the matrix increases.
   C. The electrons lose free energy
   D. An electrochemical gradient is formed.

306. In the process of photosynthesis light is necessary to:
   A. split carbon dioxide
   B. combine CO_2 and H_2O
   C. releases energy
   D. produce ATP & a reducing substance

307. Which of the following is not an industrial use of bacteria?
   A. Recycling of minerals through ecosystems
   B. Genetic engineering
   C. Food processing
   D. Waste water treatment

308. Carbon cycle is important in nature because:
   A. the amount of energy before and after a reaction must be the same.
   B. It continuously reuses and recycles carbon in the ecosystem.
   C. It consumes oxygen and nitrogen in the atmosphere.
   D. It is used in energy capture and recapture.

309. Which of the following is essential in order for a virus to replicate?
   A. The capsid must enter the host cell cytoplasm.
   B. The host cell must be undergoing mitosis.
   C. The host cell must lack cell membrane.
   D. The genome must be released into the cytoplasm.

310. Which one of the following is NOT in situ conservation of Biodiversity?
   A. Botanical garden B. Sanctuary' C. Biosphere reserves D. National Parks

311. Which one of the following represents the population growth curve of a species with limited resources?
   A. Logistic B. Exponential C. Lognormal D. Competitive exclusion

312. One goat is heterozygous, long hair (Rr), and its mate carries homozygous short hair (rr). What is the probability of the offspring having short hair?
   A. 25% B. 100% C. 75% D. 50%

313. The type of enzyme used in recombinant DNA technology to split a specific sugar phosphate bond in each strand of a DNA double helix is called:
   A. esterase B. restriction enzyme C. lipase D. ligase

314. Lamarck's theory of evolution is known as:
   A. natural selection
   B. mutation theory
   C. survival of the fittest
   D. inheritance of acquired characters

315. Habituation and imprinting illustrate that behaviors are made up of:
   A. reversible stimulus-response learning.
   B. both innate and learned components.
   C. unchanging responses to preset stimuli.
   D. simple responses to complex stimuli.

316.. Suppose 1000 pea plants are produced from Tt and tt crosses, how many of them are expected to be tall?

A. 750 B. 500 C. 50 D. 250

317. Two parents of genotype Aa are cross-bred. The alleles show complete dominance. What proportion of the offspring will genotypically look like their parents? A. 1/2 B. 3/4 C. 1/4 D. 2/3

318. A plant has a genotype AaBb. If there is no linkage of genes, the gametes it produces are

A. AB and ab C. Aa and Bb

B. AA, aa, BB, and Bb D. AB, Ab, aB, and ab

319. The evolution of a species which is based upon the sum total adaptation changes could be preserved by:

A. natural selection B. speciation C. human conservation D. isolation

320. Based on differences in DNA, which of the following animals is closer to human beings?

A. Frog B. Domestic pig C. Zebra fish D. Domestic chicken

321. To which group of sugars can the molecule dihydroxyacetone be classified?

A. Hexose sugars B. Pentose sugars C. Triose sugars D. Oligo sugars

322. Choose the one in which the human digestive enzyme is incorrectly matched with the substrate that it normally catalyzes.

A. Lipase-fat B. Trypsin-starch C. Pepsin-protein D. pancreatic amylase-starch

323. The organelle of the cell which is concerned with the synthesis of lipids in addition to being associated with carbohydrate metabolism and detoxification is:

A. Golgi body/apparatus C. Thylakoid membrane.

B. rough endoplasmic reticulum D. smooth endoplasmic reticulum

324. Where is the convergence point for the metabolism of the building blocks of carbohydrates, lipids and proteins?

A. cytoplasm B. Krebs cycle C. Calvin cycle D. Electron transport

325. Among the following crops, which one uses a non-C4 photosynthetic pathways?

A. Maize B. Sorghum C. Pineapple D. Sugarcane

326. Which of the following is responsible for rapid evolution in RNA viruses?

A. High stability of its RNA C. Reverse transcriptase of its RNA

B. High mutation rate of its RNA D. Accurate replication of its RNA

327. What major consequence does primary ecological succession involve normally?

A. Complexity of food webs increase C. Number of species present decreases

B. Abiotic factors become less favourable D. Habitats become harsher and deteriorate

328. How quickly a population would increase or decrease in size is probably least influenced by the presence of:

A. adequate supply of oxygen C. severe inter-specific competition

B. disproportionate human races D. carnivores and herbivores

329. Among the theories about the origin of life, which one better agrees with the concept of change in organisms and their genetic composition over generations being caused by meiosis, hybridization, natural selection or mutation?

A. Cosmozoan theory C. special creationism's theory

B. Biochemical origin theory D. Spontaneous generation theory

330. Which of the following is the most accepted theory about the origin of life on earth? G12U4-L3

A. Theory of spontaneous evolution C. The comic theory

B. Theory of chemical evolution D. Theory of special creation

331. What is the possible cause or isolating mechanism for the formation of allopatric species?

A. Seasonal isolation B. Temporal isolation C. Behavioral isolation D. Geographical isolation

332. Which of the following statements about instinctive actions is **NOT** true?

A. are innate. B. are adaptive C. require learning. D. have fixed pattern

333. What does a low value for Simpson's index of diversity normally indicate to the researcher?

A. An area with high number of endemic species

B. An area dominated by one or just a few species

C. A biodiversity hotspot with abundant species

D. An area with plants but no species of animals

334. A country with a high youth population but a low old age population and low infant population shows:

A. a population pyramid with bulge in the middle
B. a population with wide base and narrow apex
C. a inverted pyramid
D. a pyramid assuming a rectangular shape

335. Which one of the following is the primary contribution of Darwin to biological theory?
A. An important mechanism of biological evolution is natural selection.
B. New alleles arise through mutation.
C. Evolution is the change in gene frequencies over time.
D. Genes are the units of inheritance.

336. Retroviruses are able to reverse transcribe RNA to DNA in order to:
A. Command the host cell in the production of genomes similar to that of the hosts.
B. Control the formation of viral protein and RNA that can be assembled into new virus particles.
C. Replicate without any interruption.
D. Control the formation of viral protein and DNA that can be assembled into new viral particles.

337. Which of the following nucleotide sequences contains four pyrimidine bases?
A. GATCAATGC B. UAGCGGUAA C. GCUAGACAA D. Both B and C

338. Significant changes in pH that can affect an enzyme molecule include:
A. Building strong ionic bonds leading to stabilization of enzymes.
B. Altering the charges on some substrates making it difficult to bind to enzyme.
C. Changing the color and palatability of food items.
D. Increasing the boiling temperature of the substrate.

339. Which of the following two elements are found in all organic molecules?
A. Carbon and oxygen C. Carbon and hydrogen
B. Carbon and nitrogen D. Carbon and phosphorus

340. Which of the following is **NOT** a requirement for a molecule to directly diffuse across the cell membrane?
A. Small size B. Non-polarity C. Large size and polarity D. Lipid solubility

341. Which of the following molecules can provide the cell the least amount of energy per molecule?
A. Glucose B. Reduced NAD C. Reduced FAD D. ATP

342. During photosynthesis, which of the following is the first step in the transduction of light energy to chemical energy?
A. ATP formation B. Carbon fixation C. Photolysis of water D. Glucose formation

343. Which of the following terms specifically refers to an ecological succession that starts in an aquatic environment? G12—U=2-2
A. Kerosene B. Hydro sere C. Primary succession D. Secondary succession

344. Suppose the age pyramid of a population has a broad base with a narrow top, which of the following is **NOT** true about the population?
A. It is fast growing C. It is dominated by young people
B. It has high life expectancy D. It has a high birth rate

345. What is the reason that Stanley Miller excluded free oxygen from the mixture of the gases that he used for his simulation experiment?
A. Early organic molecules did not contain oxygen.
B. Oxygen cannot react with the rest of the gases.
C. Primitive atmosphere was reducing.
D. The primitive atmosphere was full of oxygen.

346. Which of the following organic molecules is least informative about the evolutionary relationship between species?
A. Carbohydrates B. Proteins C. DNA D. RNA

347. In which of the following ways does mutation contribute most to evolution?
A. It preserves adaptive genes. C. It forms a new gene pool
B. It creates new alleles. D. It helps genes to recombine.

348. A small girl who had observed her mother making a telephone call, one day made a call on her own. Which learning behavior does this exemplify?
A. Insight learning B. Trial and error C. Latent learning D. Sensitization

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349. Which of the following is the Greek word for life?
A. Logos B. 'Bios C. 'Scientia' D. 'Cell
350. What is the shape of an enzyme molecule?
A. Globular B. Linear C. Branched D. Pleated
351. In which of the following groups of organisms are all the members unicellular?
A. Algae B. Fungi C. Bacteria D. Viruses
352. Which of the following chromosomal errors creates a cell with an extra chromosome?
A. Non-disjunction B. Inversion C. Deletion D. Duplication
353. What is the type of scientific research that is directly concerned with studies of the way of solving problems related to human needs?
A. Basic research B. Applied research C. Space research D. Current science
354. For which of the following purposes do biologists uses centrifuges?
A. Measuring volume C. Culturing microorganisms
B. Magnifying cell parts D. Fractionation of cell contents
355. What is the function of DNA polymerase?
A. It hydrolyzes the DNA molecule. C. It converts the DNA molecule to RNA
B. It forms DNA by joining nucleotides. D. It joins two RNA molecules to form DNA.
356. Which one of the following is commonly called the code of life? .
A. Cell B. Organelle C. Nucleus D. DNA
357. Which is another name for secondary consumer?
A. Producer B. Carnivore C. Herbivore D. Decomposer
358. Which type of chromosome mutation causes the human genetic defect known as trisomy 16?
A. Duplication B. Deletion C. Translocation D. Chromosome inversion
359. In which geologic period is the evolution of humans most probably believed to have happened?
A. Tertiary period B. Jurassic period C. Quaternary period D. Cretaceous period
360. Of the following patterns of innate behavior in animals, which one is considered the simplest?
A. Instinctive behavior C. Taxis movement
B. Reflex action D. Kinesis movement
361. What are the compounds that have the same chemical different arrangement of atoms?
A. Anomers B. Isomers C. Polymers D. Monomers
362. Which one of the following conditions is least like to denature an enzyme?
A. A high temperature B. An extreme PH
B. Heavy metal ions D. A low temperature
363. Respiration is
A. Anabolic and exergonic C. anabolic and endergonic
B. Catabolic and exergonic D. Catabolic and endergonic
364. Both photosynthesis and respiration are involved in
A. A Nitrogen Cycle B. Phosphors Cycle C. Water Cycle D. Carbon Cycle
365. Which of the following statements best describes the role of bacteria in nitrogen cycle? Bacteria turn:
A. Oxygen into nitrogen for plants to use.
B. Nitrogen into a usable form for plant use called ammonia
C. Nitrogen into a usable form in a process called transpiration
D. Carbon dioxide into oxygen during the process of photosynthesis.

366. Which one of the following terms best describes the number of different species in the biosphere or in a particular area?
A. Biodiversity B. Ecosystem diversity C. Genetic diversity D. Species diversity
367. The daily cycle of activity that occurs over a 24-hour period of time is
A. Stimulus-response B. Circadian rhythm C. Kinesis behavior D. Taxis behavior
368. Within a few weeks after a heavy rain, pools become teemed with what is the source of the tadpoles?
A. The rain water C. The decaying vegetation of the pond
B. The eggs laid by frog D. The mud on the floor
369. In what way does an antiretroviral drug help AIDS patients? It
A. stops the multiplication of HIV. C. kills opportunistic infectious agents.
B. stimulates multiplication of T-helper cells. D. provides immunity.
370. Of the following four elements, which one is the least abundant in things?
A. Oxygen B. Hydrogen C. Carbon D. Sulfur
371. If a homogenate of eukaryotic cells is spun in a centrifuge, which of the cellular organelles settles out first?
A. Nucleus B. Ribosome C. Chloroplast D. Mitochondria
372. In which part of mitochondria does the Krebs's cycle take place?
A. In the matrix C. On the inner membrane surface
B. on the outer membrane surface D. In the inner-membrane space
373. What is the ultimate source of the electrons that replace those lost from the photosynthesis II during photosynthesis?
A. Photosystem I B. Chlorophyll b C. Chlorophyll D. Water
374. Which one of the following human diseases is NOT correctly matched with its mode of transmission?
A. Malaria-vector C. Cholera-contaminated water
B. Sleeping sickness-physical contact D. Influenza-droplet infection
375. Which clinical test is routinely performed to diagnose patients for AIDS?
A. Cultural opportunistic infectious agents C. Serological test for anti-HIV antibody
B. Culturing the virus on a special media D. Determining hemoglobin amount
376. Which of the following pairs of processes add CO_2 to the atmosphere?
A. Combustion and respiration C. Respiration and photosynthesis
B. Photosynthesis and fossilization D. Decomposition and combustion
377. Which bacterial genus fixes nitrogen in the nodules of leguminous plants?
A. Agrobacterium B. Escherichia C. Rhizobium D. Azotobacter
378. One of the following agricultural practices does NOT have a negative effect on biodiversity
A. Use of pesticide C. Use of insecticides
B. Growing improved varieties D. Growing landraces
379. On which of the following points do Lamarck's and Darwin' theories of evolution agree?
A. Evolution produces new species C. Evolution occurs by natural selection
B. All living things tend to over reproduce D. New structures arise by use-and disuse
380. What is the behavior that an animal learns to ignore a trivial stimulus that repeated many times?
A. A Sensitization B. Habituation C. Insight learning D. Latent Learning
381. One of the following is true about a behavior that has a fixed action pattern.
A. It is a learned behavior. C. It can be perfected through experience
B. It is always done in the same way. D. It does not need a stimulus to trigger it.
382. If a chimpanzee piles up boxes and climbs on it to reach a bunch of banana hanging from a ceiling, which behavior is manifested?
A. Operant conditioning C. Trial and error learning
B. Insight learning D. Latent learning
383. In which of the following is the current state of biology more of promises than realized major contributions?
A. Food production by GMO and genetic engineering
B. Pest control and understanding about diseases

C. Food production and population control
D. Understanding of health and biodiversity conservation

384. Which of these elements is known to have less than 10% occurrence in many cells?
A. Carbon B. Hydrogen C. Nitrogen D. Oxygen

385. One of the following is non-carbohydrate molecule.
A. Starch B. Cellulose C. Glycogen D. Collagen

386. The industrial use of enzymes is helpful for the environment as it contributes to reduction of CO_2 emission. In which of the following is there more mass of CO_2 emissions saved per ton of products by using enzyme technology rather than traditional methods?
A. Bread making C. Manufacture of cosmetics
B. Paper making D. Cheese making

387. Which model of enzyme action requires that the shape of the substrate molecule is complementary to that of the active site?
A. The induced-fit model C. The activation energy model
B. The lock-and-key model D. The enzyme function. Model

388. If the average diameter of the human red blood cell is 0.0000007m, which one is its correct diameter when expressed in a smaller unit?
A. 0.00007µm B. 0.007µm C. 7mm D. 7000nm

389. Which procedure allows biologists to separate different cellular organelles and study their structures and compositions separately?
A. Dehydrogenation B. Cell fractionation C. Phosphorylation D. Polymerization

390. How many ATP molecules are produced during the complete cellular respiration of one glucose molecule?
A. 2 B. 4 C. 18 D. 36

391. What is the main method of transmission of botulism?
A. Direct contact C. Eating contaminated food
B. Droplet infection D. Drinking contaminated water

392. From which group of microorganism was the first antibiotics produced?
A. Members of viruses C. Gram-negative bacteria
B. Members of the fungi D. Gram-positive bacteria

393. What is a capsid?
A. The genetic material of a virus C. The DNA of a virus
B. The RNA of a virus D. The protein shell of a virus

394. What is the general name of crop plants that add nitrogen to the soil because of their symbiotic association with certain types of bacterial?
A. Nodules B. Legumes C. Cereals D. Herbs

395. If two parents with genotypes "Aa" are cross-bred and that there is no codominance in the inheritance pattern, what proportion of the offspring would have genotypes exactly like that of their parents?
A. 50% B. 75% C. 100% D. 25%

396. Which of the following is an example of a cell formed by reduction division?
A. Nerve cells. B. Kidney cells C. Bone cells D. Sperm cells

397. One of the following sources of evidence provides a more direct support to the process of Charles Darwin's theory of evolution.
A. Physiology B. Anatomy C. Genetic D. Geographical distribution

398. Which animal behavior pattern is best illustrated by the famous Pavlov's dog?
A. Associative Learning C. Instinctive behavior
B. Latent learning D. Habituation

399. Through which of the following methods can blood be separated into its cellular and fluid parts?
A. Separating funnel B. Fractional distillation C. Centrifugation D. Simple distillation

400. The most abundant inorganic molecule in the atmosphere that traps heat is:

A. H_2S B. O_2 C. H_2O D. CO_2

401. When glucose molecules are joined by α-linkage which of the following carbohydrate is obtained?

A. lactose B. starch C. glycogen D. cellulose

402. Which of the following statements is NOT correct about the effect of temperature on enzymes?

A. Raising the temperature increases the kinetic energy of molecules.
B. A ten-degree centigrade increase in temperature may increase the activity of most enzymes by 50% to 100%
C. Most enzymes are insensitive to temperature at low pH.
D. Ma enzymes are denatured at 40 Degree Centigrade

403. Organelles in the cytoplasm that are known as 'power house of the cell are:

A. Mitochondria B. Chloroplast C. ribosome D. cellulose

404. Which of the following is NOT a function of lysosomes?

A. Autophagy B. Autolysis C. Digestion D. Synthesis

405. The different steps for complete aerobic respiration are:

A. A Glycolysis and oxidative phosphorylation
B. Glycolysis and Krebs cycle.
C. Glycolysis, Krebs cycle and terminal oxidation.
D. Krebs cycle and terminal oxidation

406. Which of the following processes indicate the process of photosynthesis?

A. Reductive, exergonic and catabolic C. Reductive, endogenic and catabolic
B. Reductive, exergonic and anabolic D. Reductive, endergonic and anabolic

407. In the active sludge method Sewage treatment is based on the principle of

A. Decomposition and removal of organic matter. C. .Anaerobic respiration
B. Removal of polluting organic matter through filtration. D. Denitrification
C. Denitrification.
D. Anaerobic respiration

408. When an organism containing a gene which does NOT belong to it and is derived from Somewhere else, the organism is said to be:

A. hybrid. B. transgenic C. mutant D. clonal

409. When is reverse transcriptase a useful enzyme? When:

A. nutrients are scarce. C. there are no host cells present
B. spikes are forming in the new virus. D. an RNA virus converts its RNA to DNA.

410. If you were to travel from the Arctic Circle to the Equator, what sequence of biomes would you most likely pass through?

A. Tundra, temperate forest, taiga, tropical rain forest
B. Taiga, tundra, temperate forest, tropical rain forest
C. Tundra, taiga, temperate forest, tropical rain forest
D. Tropical rain forest, temperate forest, taiga, tundra

411. The fact that Ethiopia is a regional center of biological diversity which of the following diversity is expressed?

A. The many mountain, valleys, rivers and scenic beauty.
B. High number of endemic wild and domestic plant species.
C. Wide range of altitude and climate.
D. The number of different biomes in the country.

412. Under ideal conditions and unlimited resources, continuous population growth pattern is known as:

A. density dependent growth C. exponential growth
B. logistic growth D. population distribution growth

413. Transfer of a gene or genes through a virus is called:

A. Transformation B. transduction C. genetic engineering D. conjugation

414. Which of the following concept is attributed to Charles Darwin?
   A. Use and disuse of organs is of great importance in evolution.
   B. Every cell must come from a pre-existing cell.
   C. In the struggle for existence, the fittest would survive.
   D. The gametes will carry only one of pair of contrasting characters.

415. Occurrence of endemic species in Ethiopia is due to:
   A. the fact that these species have been extinct from other regions.
   B. continental separation.
   C. The fact that there is no terrestrial route to these places.
   D. retrogressive evolution.

416. "Skinner box" is used for experiments in:
   A. operant conditioning B. classical conditioning C. migration D. taxis

417. Which of the following factors affects enzyme activity without denaturing the enzyme molecule?
   A. High temperature B. Low temperature C. High pH D. Low pH

418. Which of the following can reverse or reduce an allosteric enzyme inhabitation?
   A. Adding more substrate C. Adding more end products
   B. Depleting the substrate D. Depleting the end product

419. In what way do retro viruses differ from other RNA viruses?
   A. Their genetic material is RNA C. They copy RNA to DNA
   B. They are parasitic D. They are smaller in size

420. As an ecological succession passes from a lower to a higher seral stage, which of the following will NOT happen?
   A. The community gets more complex C. Ecological niches increase
   B. Species get more diverse D. They are smaller in size.

421. What is the population growth phase of the current world population?
   A. Exponential phase B. Lag phase C. Decline phase D. Static phase

422. If allowed to self-pollinate, which of the following pea genotype produce progeny with 9:3:3:1 phenotypic ratio?
   A. RRYY B. RrYY C. RRYY D. RrYy G12 U3 L3

423. How many nucleotides are needed to form codons for a protein that amino acids long?
   A. 100 nucleotides B. 200 nucleotides C. 300 nucleotides D. 640 nucleotides

424. Which of the following is the common idea held by all the creationists?
   A. Life is eternal. C. Life came to Earth from elsewhere in the universe
   B. Life was created by a supernatural being. D. All life was created in six days

425. Among the following, which one had the cranial capacity of about the same size as that of *Homo sapiens*?
   A. *Homo habilis* B. *Homo erectus* C. Lucy D. the Neanderthal man

426. One of the following behavioral patterns of human babies is more or less similar to the imprinting of newly hatched goose?
   A. Fixed action pattern B. Attachment-formation C. Habituation D. Breast suckling

427. In the human body, which conditions are generally considered optimum most enzymes?
   A. 37°C and pH 1.0 B. 90°C and pH 7.0 C. 5°C and pH 9.0 D. 37°C and pH 7.0

428. Which of the following has the highest water potential than all the other?
   A. Animal cells B. Different solutions C. Pure liquid water D. Different suspensions

429. Which of the four stages in the aerobic respiration of glucose does NOT produce ATP?
   A. Glycolysis C. Electron transport and chemiosmosis
   B. The link reaction. D. Krebs cycle

430. In an experiment to study photosynthesis, a plant was provided radioactive carbon dioxide as a metabolic tracer and the radioactive carbon was incorporated first into oxaloacetate. Which one of the following would best characterize this plant?
A. C4 plant B. C3 plant C. CAM plant D. Heterotrophic plant

431. Which of the following is a correct statement about the difference between a bacterium and a virus?
A. DNA is present in the former, but absent in the latter.
B. The former is cellular, but the latter is acellular.
C. Protein is absent in the former, but present in the latter.
D. The former causes malaria, but the latter causes cholera.

432. Which of the following statement about transgenic organisms is correct?
A. A bacterium that contain genes from another organism.
B. A plant that has been cross-pollinated with another plant.
C. Any animal that has been reared in isolation in the laboratory.
D. Any organism in which a foreign gene is added to its genome.

433. If a radioactive substance that weights 5.600 grams and has a half-life of 100 years is left with 700 grams, for how long has the decaying activity been undergoing?
A. 100 years B. 200 years C. 300 years D. 500 years

434. What is the survival value of a social behavior in which some birds move in large groups?
A. Protection of a territory C. Technique for tapering
B. Protection from predators D. Displaying courtship activities

435. What is the biome of the world where succulent plants are commonly found?
A. Hot deserts B. Thorn forests C. Deciduous forests D. Temperate grasslands

436. Which of the following statements is NOT correct?

A. Employers may not dismiss an employee because of his/her HIIV status,
B. HIV-positive people are forced by law to disclose their HIV status.
C. There is no medication that can reduce your chances of contracting HIV.
D. Mothers can give their babies HIV by means of breastfeeding.

437. Lipids to become sphingolipids must contain:
A. Glycerol B. Nitrogen C. Alcohol D. Triglycerides

438. If other conditions were to remain constant, which one of the following changes would explain a reduced rate of activity in an enzyme-controlled reaction? Increase in
A. concentration of end-product. C. substrate concentration
B. enzyme concentration D. temperature towards the optimum.

439. Which of the following statements best describes an induced fit-model?
A. An active site alters shape such that it is ready to accept a substrate.
B. A substrate adopts the correct binding conformation before entering an active site.
C. A substrate binds to an active site and alters the shape of the active site.
D. An active site alters the shape of the substrate such that it can adopt the necessary active conformation for binding.

440. Which of the following happens if a nucleolus is missing in a cell?
A. Nuclear pores will be blocked C. Endoplasmic reticulum will be unfolded
B. DNA synthesis will be enhanced D. Ribosomal functions will be disrupted

441. Which one is first inhibited if a cell contains excess of ATP?
A. Krebs cycle C. Glycolysis
B. Oxidative phosphorylation D. Electron transport

442. Which of the following results in the production of oxygen during photosynthesis?
A. Reducing NADP+ C. Electron transfer system of photosystem I

B. Splitting of the water molecules D. Electron transfer system of photo system II

443. Which one of the following happens during integration of viruses in host cells?
   A. The virus takes over the host cell machinery.
   B. The viral DNA enters the host cell.
   C. The virus attaches to a host cell receptor.
   D. The viral DNA is inserted into the host DNA.

444. The following statements are correct regarding ecological succession EXCEPT:
   A. Ecological succession is a random process.
   B. The food chain relationship becomes more complex.
   C. The role of decomposers becomes more and more important.
   D. Species diversity increases as succession proceeds

445. Which one of the following phenomena supports Darwin's concept of natural selection in organic evolution?
   A. Development of transgenic animals
   B. Production of 'Dolly', the sheep by cloning
   C. Prevalence of pesticide resistant insects
   D. Development of organs from 'stem cells' for organ transplantation

446. One of the following is NOT true about operant conditioning.
   A. It is based on innate behaviors. C. It is based on reward and punishment.
   B. It is concerned with learnt behavior. D. It is based on consequences of actions

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447. Suppose 60 divisions on the scale of an eyepiece graticule correspond to 20 small divisions on the stage micrometer. Each small division on the stage micrometer is 15 um. If 6 cells fit across 60 divisions of the eyepiece graticule, what will be the length of each cell?
   A. B.500µm C. 5µm D. 0.05mm

448. Which one of the following are NOT the function cells?
   A. Repairing damaged cells through meiosis C. Energy flow
   B. Unit of organization for living organisms D. Cellular respiration

449. Consider the following table which compares prokaryotic and eukaryotic cells.

Features	Eukaryotic	Prokaryotic
Size	I	1-10µm
Ribosomes	II	III
Cell wall	Made from cellulose (in some)	IV

When comparing the two types of cells in the above table, the numbers I II, III and IV represents, respectively

   A. 10-100 µm, 70S, 80S, Made from peptidoglycan.
   B. 1-100 µm, 70S, 80S, Made from chitin.
   C. 1-100 µm, 80S, 70S, Made from peptidoglycan.
   D. 10-100 µm, 80S, 70S, Made from peptidoglycan.

450. Cellular activities are carried out more efficiently in eukaryotic cells than prokaryotes and this can be explained by the
   A. presence of enzymes in the eukaryotic cells.
   B. absence of DNA in prokaryotic cells.
   C. presence of membrane bounded organelles in eukaryotic cells.

D. absence of cytoplasm in prokaryotic cells.

451. In the structural arrangement of cell membrane, the organic molecules which serve as the structural backbone and prevent uncontrolled movement of water soluble materials are

A. cholesterols. B. peripheral proteins. C. lipid bilayers D. carbohydrates.

452. What is the chemical composition of bacterial cell wall?

A. Cellulose B. Starch C. Peptidoglycan D. Capsule

453. In his biology practical section, a biology student applied a Gram stain to two groups of bacteria named X and Y. At the end, he observed that bacteria X stained purple while bacteria Y stained pink. Which of the following could be the correct conclusion of his experiment? Bacteria

A. X are Gram positive and Y are Gram negative.
B. Y are Gram positive and X are Gram negative.
C. Y and X are both Gram positive.
D. X and Y are both Gram negative.

454. As compared to infectious diseases, functional diseases

A. are caused by pathogenic microorganisms.
B. can result from malfunction of organs.
C. can spread through the bites of insects.
D. are passed from person to person through reservoirs.

455. Which one of the following products does NOT need the role of bacteria?

A. Insulin B. Enzymes C. Vaccine D. Ethanol

456. Bacteria used in the production of vinegar to

A. produce alcohol in beer. C. oxidize alcohol to etanoic acid
B. dilute ethanoic acid into vinegar. D. supply oxygen for the fermenter.

457. By which levels of precipitation, temperature and type of plants is the Taiga biome characterized, respectively?

A. Humid, always warm and ferns C. Dry, cold and lichens
B. Almost none, cold and succulents D. Adequate, cool year round and conifers

458. What makes Ethiopia rich in biodiversity which deserves a global attention?

A. Variation in topography and vegetation C. Narrow range in altitude and climate
B. Uniformity of high lands and low lands D. Similar terrestrial and aquatic biomes

459. Why maintaining habitats is the key and fundamental aspect to conserve biodiversity? Because

A. disturbance of habitats makes the habitat well adapted.
B. destruction of habitats is the leading cause of extinction.
C. preserving habitats leads to decreased species richness and abundance.
D. replacing natural habitats by artificial ones increases food security.

460. Which of the following products are formed in anaerobic respiration of one glucose molecule in animal cells?

A. 2lactate, $2CO_2$, 2ATP C. 2ethanol, $2CO_2$, 2ATP
B. 2ethanol, 2NAD, 2ATP D. 2 lactate, 2NAD, 2ATP

461. Which stage of cellular respiration is correctly paired with its site?

A. Glycolysis – cristae C. Pyruvate oxidation cytoplasm
B. Chemiosmosis - outer membrane D. Krebs cycle – matrix

The table below compares the two types of competition.

Intra-specific completion	Inter-specific competition
Competition between different species	Competition between members of the same species
Occurs between individuals with different adaptation	Occurs between individuals with similar adaptation
Occurs for all types of requirements	Occurs for specific requirements
Directly affect the population size	Either both or one species can be suppressed

462. In the above table, which rows contain WRONGLY stated statements with respect the type of competition?

A. Row 2 and 4 B. Row 1 and 3 C. Row 1 and 2 D. Row 2 and 3

463. What happens during the process of electron transport chain? Protons
   A. diffuse against concentration gradient through ATP synthase.
   B. build up in the matrix than the inter- membrane space.
   C. diffuse down concentration gradient to reduce NAD.
   D. build up in the inter-membrane space than the matrix.

464. Identify the correct statement about the role of NAD and FAD during aerobic respiration. They
   A. are the terminal electron acceptors of electron transport chain.
   B. carry hydrogen atoms that will be split into protons and electrons.
   C. oxidize intermediate products of cellular respiration.
   D. are electron carriers that pump protons into inter-membrane space.

465. Which one of the following options represents the correct catabolic pathway of the given respiratory substrates?
   A. Lipids→fatty acids→acetyle-CoA→TCA
   B. Polysaccharide→glucose→acetyle-CoA→pyruvate →TCA
   C. Nucleic acids→amino acids→Nucleotide→acetyle-CoA→TCA
   D. Proteins→ammonia-→amino acid→pyruvate→TCA

466. The chromosomal mutation that results Down's syndrome is:
   A. inversion. C. chromosome translocation
   B. chromosome non-disjunction. D. Duplication

467. When a piece of one chromosome is transferred to another non-homologous chromosome, such kind of mutation is called
   A. inversion. B. translocation. C. duplication. D. insertion.

468. Which of the following diseases have water as their reservoir?
   A. Pneumonia and tuberculosis C. Amoeba and cholera
   B. Trachoma and diphtheria D. Salmonella and malaria

469. A geographic area with specific climate, soil type, plants and animals with similar adaptation is
   A. ecosystem B. habitat C. biome D. niche

The following table compares viruses with free-living cells.

Number	Feature	Viruses	Free-living cells
1.	Size,	10-100µm	10-100µm
2.	Nucleus	Absent	Present
3.	DNA or RNA	Present	Present
4.	Mitochondria	Present	Present

470. Which rows of the above table contain the correct comparison?

A. 1 and 4 B. 2 and 3 C. 3 and 4 D. 1and 2

471. What is the economic impact of AIDS?
   A. Increase the resources for public expenditure
   B. Enhance the life expectancy and GDP
   C. Encourage savings for medical treatment
   D. seriously affects the taxable population

472. As the energy from the sun enters the ecosystem in the form of light, one of the following happens to it.
   A. Goes on decreasing along the trophic levels from primary producers to decomposers.
   B. Depends on the type of the trophic levels and changes at each trophic level irregularly.
   C. Goes on increasing along the trophic levels from primary producers to decomposers.

D. Remains much of the time the same but increases as it reaches decomposers.

473. Suppose a self-fertilizing organism has AaBb genotype, how many different types of gametes would it produce if there is no linkage?
A. 12 B. 4 C. 16 D. 8

474. Which one of the following viruses is an RNA virus?
A. Bacteriophage B. HIV C. Herpes simplex D. HINI

475. Which one of the following statements is true regarding the need for recycling nutrients through an ecosystem?
A. It is energy consuming process hence nutrients are constantly created and destroyed.
B. It is the key to saving the earth hence nutrients become available.
C. It depletes the resources hence infinite resources become limited by the process.
D. It pollutes the environment hence waste products are accumulated during the process.

476. What is the impact of humans on the sulphur cycle? Production of
A. hydrogen sulphide through the oxidation of sulphur
B. sulphur through decomposition of dead matter
C. sulphur dioxide through combustion of fossil fuels
D. sulphate through weathering and oxidation of rocks

The bacteria that are represented by the letters W, X, Y and Z are, respectively
A. Azotobacter, Nitrosomonas, Nitrobacter and Pseudomonas.
B. Thiobacillus, Nitrosomonas, Nitrobacter and Pseudomonas.
C. Klebsiella, Nitrobacter, Pseudomonas and Rhizobium.
D. Rhizobium, Pseudomonas, Nitrobacter and Nitrosomonas.

477. As succession progresses, the bare land turns out to be productive due to the fact that the
A. species diversity and richness falls. C. environment becomes less stable
B. amount and depth of the soil increases. D. abiotic conditions remain unchanged.

478. What will happen to the population size if the rate of natality is less than the rate of mortality?
A. Unchanged B. Increase C. Fluctuate D. Decrease

479. Which one of the following statements is correct about the stages of population growth rate curve?
A. Natality exceeds mortality in stationary phase.
B. Nutrient exhausted in decline phase.
C. Toxic excretory products accumulated in log phase.
D. Organisms adapted to the environment in lag phase.

480. During meiosis, crossing over is important to increase, variation of gametes with regard to alleles that are
A. dominant and heterozygote. C. independently segregated.
B. recessive and homozygote. D. linked and not assorted independently.

481. In which phase of meiosis does pairing of chromosomes and exchange of segments take place?
A. Prophase II B. Prophase I C. Anaphase II ` D. Anaphase

482. Among the following statements, which one is correct about mutations? Mutations
A. are accidents that occur spontaneously and randomly during DNA replication.
B. that occur in somatic cells can pass on the next generation..
C. are changes in genetic composition of a population.
D. that occur in sex cells are completely harmless.

483. If the particular triplet of base in the sense strand of DNA is AGT, then the corresponding codon for the transcribed mRNA will be
A. ACU B. UGA C. UCA D. AGU

484. What is the theory that states disease is caused by microorganisms?
A. Spontaneous generation C. Biogenesis theory
B. Endosymbiotic theory D. Germ theory

485. In the bare bottom of a newly formed pond a biologist observed emergence of new algae. The form of succession he observed can be best described as

A. early succession. C. late succession.
B. secondary succession. D. primary succession.

486. The extent to which variability exists among living organisms, with in species and even between ecosystem is known as
A. biosphere. B. biomass. C. bioaccumulation. D. biodiversity.

487. Which one of the following is the significance of biodiversity?
A. Worsening of social relationships C. Increasing vulnerability to environmental stress
B. Reducing the level of material wealth D. Increasing security of food supply

488. The carrying capacity of a population can be defined as the
A. minimum population size supported by its habitat.
B. maximum population size supported by its habitat.
C. maximum population growth rate in a habitat.
D. average population size supported by its habitat.

489. If pea plants with round yellow heterozygous seeds are self-fertilized and produced 4800 seeds, how, many round green seeds will be produced? (Hint: round yellow seed is dominant),
A. 2700 B. 4800 C. 300 D. 900

490. The nucleotide that build up the DNA molecule contain the following bases EXCEPT/
A. guanine. B. adenine. C. cytosine. D. Uracil

491. A grade 12 student extracted an insulin gene from insulin producing cells of the pancreases and plasmid from bacteria. Then he transferred the insulin gene into the plasmid and the hybrid plasmid was put back into bacteria for insulin production. What enzyme did the student used to join the insulin gene and bacteria plasmid?
A. DNA helicase B. ATP synthase C. RNA polymerase D. DNA ligase

492. Which one of the following options contains the main steps of scientific method in their correct order?
A. Doing background research →Asking question→Testing the hypothesis→Formulating the hypothesis→Analyzing the result→Reporting the result
B. Asking question→Formulating hypothesis→Doing background research→Testing the hypothesis→ Analyzing result→Reporting the result
C. Doing background research → Formulating hypothesis -> Asking question -> Testing the hypothesis→Analyzing the result→Reporting the result
D. Asking question→Doing background research→Formulating hypothesis→Testing the hypothesis→Analyzing the result→Reporting the result

493. Francesco Redi disproves the belief that rotting meat produces flies. He used wide mouth jars containing meat. He left some jars open to the air and others were covered with a piece of gauze. What do you think might have been Redi's most plausible hypothesis?
A. Flies would be formed in the covered jars.
B. Only flies could produce more flies.
C. Flies could be produced through spontaneous generation.
D. Flies could be produced from rotting meat.

494. Suppose a grade 12 student wants to investigate the need of CO_2 for photosynthesis. He destarched plants A and B then he placed plant A in a bell jar which has no CO_2 in the surrounding air, while plant B in a bell jar which has normal level of CO_2. He placed the jars in a place with light for 12 hours and kept other variables constant. Finally, he tested for the presence of starch. Less starch was produced by plant A than plant B. What are the dependent and independent variables of this experiment,' respectively?
A. Amount of starch, presence of light
B. Amount of starch, presence or absence of CO_2
C. Presence of light, amount of starch
D. Presence or absence of CO_2, amount of starch

495. Helen was conducting iodine test for starch. She took two different food samples and placed one of the samples in test tube A and the other in test tube B. She added a few drop of iodine solution to both test tubes. Finally, she

observed blue-black color in test tube B, but the sample in test tube A remained unchanged. If Helen wants to write the report of this experiment, she should write

A. the importance of starch in the procedure part.
B. her name in the acknowledgement part.
C. the sample in test tube B was starch containing as her conclusion.
D. the general test for starch is iodine test as her result.

496. A field biologist can measure the slope of an area by using

A. theodolite. B. flow meter. C. scalpels. D. data logger.

497. Which organic molecules in our body have functions as antigens and antibodies of the immune system?

A. Carbohydrates C. Proteins C. Nucleic acid D. Lipids

498. If α-glucose reacts with fructose molecule in condensation reaction, what will be the chemical formula of disaccharide formed in this reaction?

A. B. $C_{12}H_{24}O_{12}$ C. $C_{10}H_{24}O_{10}$ D. $C_{12}H_{22}O_{11}$

499. In grade 11 laboratory class, the teacher gave the students a sample of food and asked them to investigate the presence of glucose. What kind of test and result will enable the students to confirm the presence of glucose?

A. Emulsion test and milky white color
B. Iodine test and blue black color:
C. Benedict's test and orange color
D. Biuret test and purple color Emulsion test is used to determine the presence of lipids in a food sample.

500. A group of grade 12 students carried out four biochemical tests to investigate the composition of four different food samples. The results with respective type of tests are shown in the table below.

Type of test	Results			
	Sample A	Sample B	Sample C	Sample D
Iodine test	Positive	Positive	Positive	Positive
Benedicts test	Positive	Negative	Positive	Negative
emulsion test	Negative	Positive	Negative	Positive
Biuret test	Negative	Positive	Positive	Positive

Which food samples contained both lipid and protein?

A. Sample A and D B. Sample B and C C. Sample B and D D. Sample A and C

501. Identify the correct statement about enzymes. They.

A. from an intermediate complex which dissociates into the product and free enzyme.
B. function as organic catalysts by irreversibly combining with the substrate.
C. are globular proteins with a multiple shaped active site.
D. function by affecting the nature of the product.

502. A medical laboratory technologist at Black Lion Hospital placed a solution of stool in a centrifuge to separate the particles quickly for the stool test. Which one of the following will happen when he spins the centrifuge at high speed?

A. The solid particles of the stool will float on the top of the mixture.
B. The gravitational forces on the solid particles force the solid particles of the stool to the bottom of the tube.
C. The solid particles of the stool will mix up highly and suspended freely.
D. The liquid particles will evaporate but the solid particles will remain in the centrifuge tube.

503. The relevance and promise of biology as a field of science can be best explained by its application in

A. agriculture and genetic engineering. C. sport and culture.

B. oil and mineral production. D. economic growth and urbanization.

504. Biologists played a role in the fight against AIDS because they developed
   A. anti-retroviral drugs that target and aim to break different stages of the HIV life cycle.
   B. anti-retroviral drugs that provide lasting immunity against reinfection by HIV.
   C. a vaccine from people who have been repeatedly exposed to HIV but never developed AIDS.
   D. a vaccine from a monkey that develops a very similar disease to AIDS which is caused by a very similar virus.

505. Which one of the following statements shows willingness of participating in a community undertaking against HIV and AIDS? A person who
   A. takes volunteer counseling and testing
   B. decides to abstain from any relation with the community
   C. discriminates HIV positive from HIV negative people
   D. isolates himself from HIV infected people

506. One benefit of water related to its high specific heat capacity is its importance
   A. to move particles inside the cell more easily.
   B. for the normal functioning of enzymes in living cells.
   C. for the transport of blood cells around circulatory system.
   D. to support the weight of some insects while they walk on it.

507. Among the parts of the cell, which organelles are bounded with double membrane?
   A. Golgi body, chloroplast and lysosome
   B. Vacuole, endoplasmic reticulum and ribosome
   C. Nucleus, mitochondria and chloroplast
   D. Lysosome, vacuole and nucleus

508. Why are cells that secret hormones and enzymes rich in rough endoplasmic reticulum? Because they produce more
   A. Lipids. B. Carbohydrates. C. ATP. D. proteins.

509. What is the role of cholesterol in the cell membrane? To
   A. anchor integral proteins with the membrane C. make the membrane selectively permeable
   B. maintain the membrane fluidity D. serve as signals to other membrane of cells

510. If potato cells immersed in a hypertonic solution, they will
   A. lose water and plasmolysed. C. lose water and become turgid.
   B. gain water and haemolysed. D. gain water and become larger.

511. Which molecule of the plasma membrane contains carbohydrate chains and allows identification of cell by the immune system?
   A. Integral protein B. Channel protein C. Peripheral protein D. Glycoprotiens

512. Which one of the following options contains only a group of organic biochemical molecules?
   A. Ribose, methane, fatty acid, lactose and sodium chloride
   B. ATP, deoxyribose, sulfuric acid, lactic acid and amino acid
   C. Fatty acid, glycine, DNA, maltose and triglyceride
   D. Lactic acid, hydrochloric acid, sucrose, water and ATP

513. Unbalanced hydrogen bonding at the surface of the water is responsible for high
   A. surface tension of water. C. latent heat of vaporization of water.
   B. density of water in its liquid form. D. specific heat capacity of water.

514. In a structure of amylose molecule that contains one hundred a-glucose monomers, how many a-1, 4-glycosidic bonds are formed? A. 99 B. 100 C. 50 D. 200

515. Which part of phospholipids is considered as hydrophobic region?
   A. Phosphate group C. Hydrocarbon tails
   B. Carboxyl group D. Glycerol head

516. Identify the organic molecule which is correctly paired with its function.
   A. Glycogen - formation of microfibrils C. Triglycerides – respiratory substrate

B. Phospholipids- control metabolism D. Cellulose - component of cell membrane

517. Where does the production of ATP and reduced NADP take place?

A. Cytoplasm B. Thylakoid membrane C. Fluid matrix D. Stroma

518. The biochemical mechanism by which chlorophyll absorbs light energy is efficient because

A. the molecules of the photosystems and ETCs are floating around in a solution.
B. the same pigment molecules in the antenna complex absorb different wave length of light.
C. the molecules of photosystems and ETCS are fixed in the membranes of thylakoid.
D. the different pigment molecules in the antenna complex absorb the same wave length of light.

519. The leaves of C_3 plants in the tropics close their stomata to minimize water loss; as a result concentration of CO_2 in the leaves falls. When C_3 plants face such problem, ribulose bisphosphate reacts oxygen and produce

A. hydrogen peroxide and CO_2 in the mitochondrion.
B. glycertae phosphate and phosphoglycolate in the chloroplast.
C. triose phosphate and sugar in the mitochondrion.
D. oxaloacetate and water in the peroxisome.

520. An enzyme which is designated as EC 2.7.1.2 can be grouped to which class of enzyme?

A. Isomerases B. Transferases C. Oxidoreductases D. Ligases

521. Sorghum and wheat are C4 plants which are well adapted to photosynthesize efficiently in hot bright days. Peas and carrots would not photosynthesize efficiently in such conditions because they are C3 plants. In which of the following features does those plants are similar? The

A. enzyme used to fix carbon dioxide C. cells where the Calvin cycle takes place
B. presence of chloroplast in the bundle sheath cells D. cells where carbon dioxide fixation take place

522. Plants that follow CAM photosynthetic pathway carry out the two stages of photosynthesis at different times. Which of the following products are formed during the night?

A. Malate and sugar C. Oxaloacetate and malate
B. ATP and NADPH D. CO_2 and sugar

523. Using enzyme technology in industrial production helps to reduce global warming. This is because enzymes

A. absorbs much carbon dioxide from the environment.
B. allow reaction to be carried out at much lower temperature.
C. increase the heat required for reactants.
D. give high energy for industrial reactants.

524. How do enzymes lower the activation energy of substrate molecules according to the induced-fit model? By

A. increasing the kinetic energy and probability of collusion.
B. providing extra energy for the conversion of reactants into a product.
C. creating a tension in the bond of substrate molecules.
D. forming strongly bonded enzyme-substrate complex.

525. If an enzyme depends on a cofactor for its activity, then the enzyme becomes active and functional when it is found in the form of

A. mineral ion. B. apoenzyme. C. holoenzyme. D. coenzyme.

526. Which one of the following enzymes requires copper ions for its catalytic activity?

A. Flavin adenine dinucleotide (FAD) C. Nicotinamide adenine dinucleotide (NAD)
B. Alcohol dehydrogenase D. Cytochrome oxidase

527. A change in temperature can affect the rate of enzymes controlled reaction by

A. increasing or decreasing the probability of collusion.
B. altering the charge amino acids that form the active site.
C. changing the shape of substrate and enzyme 'molecules.
D. decrease the turnover rate of enzymes.

528. If the amount of enzyme is kept constant and the substrate concentration is gradually increased, what will happen to the rate of the reaction? The reaction velocity

A. decreases first but increases after the active sites are occupied with the substrate.

B. increases until all the available enzyme active sites become saturated.
C. increases further as the substrate concentration increases further."
D. remains unchanged; hence it isn't influenced by substrate concentration.

529. The following reaction shows enzymes controlled metabolic pathway in a living cell.

$$\text{Substance W} \xrightarrow{E} \text{E Substance X} \xrightarrow{E2} \text{Substance Y} \xrightarrow{E1} \text{Substance Z.}$$

What will happen if the concentration of substrate Z increases beyond the cell's requirement?

A. The reaction will take place in the reverse direction.
B. Substance Z will inhibit E, and switch off the pathway.
C. E3 will convert substance Y into another substance rather than substrate Z.
D. E, and E will be inactive until substance Z equals to the normal concentration.

530. How is the process of end-product inhibition triggered? By

A. low concentration of the end product
B. inhibition of the last enzyme
C. excess production of the last product
D. change of the active site of the enzyme

531. Identify the WRONG statement about the modern cell theory.

A. Cells arise only from other pre-existing cells by division.
B. The process of metabolism and heredity occur within cells.
C. Cell is the basic unit of organization of all organisms.
D. All cells have basically different chemical composition.

532. During practice of genetic engineering, bacteria are important to

A. provide plasmids.
B. breakdown the recombinant DNA molecule.
C. produce restriction endonucleases.
D. Produce ligase enzymes.

533. Which one of the following steps of HIV life cycle comes first?

A. The viral DNA is transcribed into RNA and produces viral proteins including reverse transcriptase.
B. The RNA, proteins and reverse transcriptase molecules assembled and bud out of the host cell to infect a new cell.
C. The HIV viron attached to the plasma membrane of the T-helper.
D. The reverse transcriptase converts RNA into DNA and incorporates into the DNA of the host cells.

534. Which of the following antiretroviral drugs prevents the assembly of new virus particles?

A. Protease inhibitors
B. Entry inhibitors
C. Non-nucleotide reverse transcriptase inhibition
D. Nucleotide reverse transcriptase inhibitors

535. Which of the following statements is correct about the reproductive cycles of lytic and lysogenic viruses?

A. The DNA of lysogenic viruses duplicates as the host cell divides.
B. Only lytic viruses require the host DNA for their replication.
C. Lytic viruses are released by exocytosis.
D. Lysogenic viruses do not form a protein coat.

536. Red-green color blindness is due to X-linked gene and determined by the recessive alleles. Which one of the following is true about this condition?

A. It affects male due to alleles inherited from the father.
B. It is much more common in females.
C. Expressed in both sexes equally if the parents are carriers.
D. Females inherit one allele from each parent and becomes affected

537. Which one of the following statements is true about a chromosome? It is

A. clearly visible in the nucleus when the cell is not dividing.
B. made up of DNA which is tightly coiled many times around histones.
C. loosely organized throughout the nucleus when the cell is dividing.
D. divided into two equal sections by the centromere.

THE END

1	C	14	A	27	A	40	D	53	D	66	B	79	B
2	A	15	A	28	B	41	D	54	B	67	A	80	B
3	B	16	C	29	D	42	A	55	B	68	C	81	C
4	C	17	B	30	D	43	C	56	D	69	A	82	B
5	A	18	B	31	C	44	D	57	A	70	B	83	D
6	C	19	A	32	C	45	B	58	C	71	C	84	D
7	C	20	A	33	A	46	B	59	D	72	B	85	C
8	A	21	B	34	D	47	A	60	C	73	D	86	B
9	D	22	C	35	B	48	C	61	D	74	D	87	C
10	C	23	B	36	D	49	D	62	A	75	C	88	A
11	A	24	D	37	A	50	B	63	D	76	D	89	D
12	C	25	C	38	D	51	B	64	C	77	C	90	D
13	A	26	D	39	A	52	B	65	A	78	D	91	B

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92	D	105	A	118	B	131	B	144	C	157	A	170	C
93	B	106	C	119	D	132	A	145	B	158	B	171	D
94	D	107	B	120	C	133	D	146	B	159	C	172	B
95	B	108	D	121	C	134	A	147	D	160	B	173	B
96	C	109	C	122	B	135	C	148	D	161	A	174	A
97	C	110	D	123	A	136	C	149	D	162	A	175	B
98	A	111	B	124	C	137	C	150	B	163	B	176	B
99	C	112	C	125	D	138	C	151	C	164	C	177	A
100	B	113	C	126	C	139	A	152	D	165	A	178	C
101	C	114	B	127	C	140	C	153	D	166	D	179	B
102	B	115	A	128	D	141	A	154	D	167	A	180	D
103	A	116	A	129	B	142	D	155	C	168	D	181	C
104	B	117	A	130	C	143	D	156	C	169	C	182	E

183	C	196	A	209	B	222	C	235	D	248	C	261	C
184	D	197	C	210	A	223	D	236	B	249	B	262	C
185	C	198	C	211	C	224	D	237	B	250	A	263	A
186	D	199	B	212	A	225	D	238	B	251	D	264	D
187	A	200	C	213	C	226	A	239	A	252	C	265	C
188	A	201	A	214	C	227	C	240	C	253	D	266	A
189	B	202	B	215	D	228	C	241	A	254	D	267	B
190	A	203	A	216	C	229	D	242	C	255	A	268	D
191	B	204	D	217	D	230	A	243	D	256	B	269	B
192	A	205	C	218	D	231	D	244	D	257	D	270	C
193	C	206	D	219	A	232	C	245	D	258	C	271	D
194	C	207	C	220	D	233	B	246	B	259	B	272	B
195	D	208	B	221	C	234	C	247	A	260	C	273	B

274	C	287	A	300	A	313	D	326	B	339	C	352	A
275	A	288	C	301	D	314	B	327	A	340	C	353	B
276	D	289	D	302	B	315	D	328	B	341	C	354	D
277	C	290	D	303	B	316	D	329	B	342	D	355	B
278	D	291	B	304	A	317	A	330	B	343	C	356	D
279	C	292	A	305	C	318	D	331	D	344	B	357	C
280	C	293	D	306	A	319	A	332	C	345	C	358	A
281	C	294	D	307	B	320	B	333	B	346	A	359	C
282	D	295	D	308	D	321	C	334	A	347	B	360	B
283	C	296	C	309	A	322	B	335	A	348	C	361	B
284	B	297	B	310	A	323	D	336	B	349	B	362	D
285	D	298	D	311	A	324	B	337	A	350	A	363	B
286	C	299	C	312	D	325	C	338	B	351	C	364	C

365	**B**	**378**	**D**	**391**	**C**	**404**	**D**	**417**	**B**	**430**	**A**	**443**	**D**
366	**A**	**379**	**A**	**392**	**C**	**405**	**C**	**418**	**D**	**431**	**D**	**444**	**A**
367	**B**	**380**	**B**	**393**	**D**	**406**	**D**	**419**	**C**	**432**	**D**	**445**	**C**
368	**B**	**381**	**B**	**394**	**B**	**407**	**A**	**420**	**D**	**433**	**C**	**446**	**A**
369	**A**	**382**	**B**	**395**	**A**	**408**	**B**	**421**	**A**	**434**	**B**	**447**	**D**
370	**D**	**383**	**A**	**396**	**D**	**409**	**D**	**422**	**D**	**435**	**A**	**448**	**A**
371	**A**	**384**	**C**	**397**	**B**	**410**	**C**	**423**	**C**	**436**	**B**	**449**	**D**
372	**A**	**385**	**D**	**398**	**A**	**411**	**B**	**424**	**B**	**437**	**B**	**450**	**C**
373	**D**	**386**	**A**	**399**	**C**	**412**	**C**	**425**	**D**	**438**	**A**	**451**	**C**
374	**B**	**387**	**B**	**400**	**D**	**413**	**B**	**426**	**B**	**439**	**C**	**452**	**C**
375	**A**	**388**	**D**	**401**	**B**	**414**	**C**	**427**	**D**	**440**	**D**	**453**	**A**
376	**A**	**389**	**B**	**402**	**C**	**415**	**C**	**428**	**C**	**441**	**C**	**454**	**B**
377	**C**	**390**	**D**	**403**	**A**	**416**	**A**	**429**	**B**	**442**	**B**	**455**	**D**

456	**C**	**469**	**C**	**482**	**A**	**495**	**C**	**508**	**D**	**521**	**D**	**534**	**A**
457	**D**	**470**	**B**	**483**	**D**	**496**	**A**	**509**	**B**	**522**	**C**	**535**	**A**
458	**A**	**471**	**D**	**484**	**D**	**497**	**C**	**510**	**A**	**523**	**B**	**536**	**D**
459	**B**	**472**	**A**	**485**	**D**	**498**	**D**	**511**	**D**	**524**	**C**	**537**	**B**
460	**D**	**473**	**B**	**486**	**D**	**499**	**C**	**512**	**C**	**525**	**C**		
461	**D**	**474**	**D**	**487**	**D**	**500**	**C**	**513**	**A**	**526**	**D**		
462	**C**	**475**	**B**	**488**	**B**	**501**	**A**	**514**	**A**	**527**	**A**		
463	**B**	**476**	**C**	**489**	**D**	**502**	**B**	**515**	**C**	**528**	**B**		
464	**B**	**477**	**B**	**490**	**D**	**503**	**A**	**516**	**C**	**529**	**B**		
465	**A**	**478**	**D**	**491**	**D**	**504**	**A**	**517**	**B**	**530**	**C**		
466	**B**	**479**	**B**	**492**	**D**	**505**	**A**	**518**	**C**	**531**	**D**		
467	**B**	**480**	**D**	**493**	**B**	**506**	**B**	**519**	**B**	**532**	**A**		
468	**C**	**481**	**B**	**494**	**B**	**507**	**C**	**520**	**B**	**533**	**C**		

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