



School of Aygoda
PRIMARY, SECONDARY & COLLEGE PREPARATORY
Academic Year 2012 E.C
Tel, 011-440-43-78/79

Full Name: _____ **Time Allowed: 2:00**
hrs.

Grade: 12 Section: _____ Subject: Biology 3rd Quarter Model Exam

Direction: This exam contains a total of 100 questions. Each of the questions is followed by four possible alternatives. Read each question and carefully blacken only the letter of your' choice on the separate answer sheet provided.

- What kind of natural selection does a bell shaped curve in a variable indicate?
A. Stabilizing selection
B. Divergent selection
C. Unidirectional selection
D. Disruptive selection
- Which of the following statement concerning multiple allele inheritance is NOT true?
A. The alleles may be dominant, recessive or codominant.
B. There are more than two alleles in the population.
C. An individual will have more than two alleles of the gene.
D. A gene has more than two alleles.
- What happens to a human red blood cell when it is placed in a hypertonic solution?
A. It might swell and burst
B. It becomes turgid
C. It will remain unchanged
D. It might lose water and shrink
- Which organelle of the cell has a function of modifying proteins for secretion?
A. Lysosome
B. Endoplasmic reticulum
C. Golgi body
D. Ribosome
- Of the following alternatives, which one illustrates the medical application of biotechnology?
A. Protein production from single cells
B. DNA finger printing technology
C. Biosensors for testing blood glucose level
D. Recombinant DNA technology
- In a honey bee colony, which one of the following is the duty of the queen?
A. Rearing the young
B. Reproduction
C. Foraging
D. Guarding the hive

7. To which of the following molecules is most of the energy released during the Krebs cycle transferred?
 A. ADP B. NADH C. FADH₂ D. ATP
8. Among the following traits of the garden pea studied by Gregor Mendel, identify the one that did NOT express itself in the F₁ generation?
 A. Axial flower position C. Yellow pod colour
 B. Round seed shape D. Green seed colour
9. In the Miller and Urey's simulation experiment to study organic molecules formation in primeval atmosphere of the earth, all the following gases were used except which one?
 A. Methane B. Oxygen C. Hydrogen D. Ammonia
10. The bones in human hands, flippers of the whale and wings of the bird are known as what?
 A. Vestigial structures C. Homologous structures
 B. Analogous structures D. Linker fossils
11. The DNA triplet AAT would code for an amino acid carried by tRNA with the anticodon
 A. AAU B. TTA C. AAT D. UUA
12. Which of the following groups of organisms could be a good pioneer colonizer in a primary succession that start with bare rocks?
 A. Weeds B. Liverworts C. Lichens D. Mosses
13. Where in the mitochondria does the Krebs cycle take place?
 A. On the outer membrane. C. In the fluid matrix
 B. Between the outer and inner membrane. D. On the cristae
14. Regarding seed characteristics suppose a heterozygous round yellow pea plant of RrYy is selfed and produced 3200 seeds, how many of the seeds are expected to be wrinkled yellow? (Assume independent assortment)
 A. 600 B. 200 C. 800 D. 1800
15. In Pavlov's classical conditioning experiment with dogs, which one of the following is the conditioned stimulus?
 A. The sound of the bell C. The sight of food
 B. The salivation of the dog D. The smell of food
16. According to Lamarck's theory of evolution, what is the origin of new structures that are necessary for evolution?
 A. use - and - disuse of body parts C. Gene recombination
 B. Natural selection D. Mutation

17. Suppose in a certain population, natural selection removes individuals with average height, leaving tall and short individuals behind, which of the following modes of selection is in operation?
- Disruptive selection
 - Directional selection
 - Normalizing selection
 - Stabilizing selection
18. If the DNA of the following animals is hybridized to human DNA, with which one of them would human DNA hybridize least?
- Old world monkey
 - Lorises
 - Orangutan
 - Lamprey
19. Which of the following defines ATP?
- Nitrogen + sugar + triple phosphate
 - Adenosine + ribose sugar + triple phosphate
 - Adenine + Adenosine + triple phosphate
 - Adenine + ribose sugar + tripe phosphate
20. Among the following, which one can be an example of eukaryotic organisms?
- Lactobacillus
 - Penicillin
 - Diplococcus
 - Treponema
21. Which alternative best explains speciation?
- Two different species are able to interbreed in captivity.
 - A process that only results from interspecific hybridization.
 - It is characterized by minor extinction events.
 - Members of a species diverge genetically and produce new species.
22. All of the following information was most important to the development of the techniques of modern genetic engineering EXCEPT:
- genes can be cut out of a DNA molecule using enzymes.
 - genes can be inserted into another DNA molecule using enzymes.
 - genes can be transferred into other cells using vectors.
 - The discovery of lethal genes.
23. Among the following human diseases, identify the one that is NOT transmitted through a vector
- Leishmaniasis
 - Sleeping sickness
 - Salmonellosis
 - Malaria
24. Identify the statement that more correctly explains why each cell contains so many different types of enzymes? Enzymes are:
- easily synthesized in the cell.
 - specific to their substrate.
 - used over and over again.
 - consumed in the process of catalysis.
25. Which of the following is a mismatch between a biome and what it contains?

A. Thorn forest – Drought and fire adapted animals.

B. Tundra – lichens and mosses.

C. Tropical rainforest – poor, thin soil.

D. Temperate deciduous forest – evergreen trees.

26. If an animal inhales a radioactive form of oxygen, in which of the following products of the cellular respiration would the radioactivity be detected?

A. NADH

B. ATP

C. CO₂

D. H₂O

27. Which evolutionary evidence was very unlikely to have been used by Darwin in the formulation of the theory of evolution by natural selection?

A. Geographical distribution

C. Comparative biochemistry

B. Fossils

D. Comparative anatomy

28. Suppose a girl, after watching her mother cooking “Doro wet” on several occasions, successfully did it herself, what type of learning is this?

A. Latent learning

B. Habituation

C. Insight learning

D.

Sensitization

29. If pieces of fresh potato are kept for some time in sugar solutions of 15%, 8%, 3% and distilled water, which piece will gain the highest percentage of weight? The one in:

A. distilled water

B. 3% solution

C. 8% solution

D. 15% solution

30. Wood lice increase their movement in different directions in response to increased light intensity.

This is an example of which of the following?

A. Phototropism

B. Kinesis

C. Positive taxis

D. Negative taxis

31. Animals without close evolutionary relations are sometimes seen to have similar structures

adapted for the same function. Which evolutionary principle is illustrated by this observation?

A. Allopatric evolution

C. convergent evolution

B. Sympatric evolution

D. Divergent evolution

32. Which one of the following is most important for speciation to occur?

A. Free flow of genes between populations

C. Isolation of the gene pool

B. Migration between populations

D. Hybridization among

population

33. If, due to incomplete dominance, the F₁ plants from across of red flowered and white flowered

parent are pink, which of the following ratios are expected in the F₂ generation?

A. 3 red : 1 pink

C. 2 red : 1 pink : 1 white

B. 1 red : 1 pink : 2 white

D. 1 red : 2 pink : 1 white

34. Which of the following helps to keep the biological membranes in a fluid state?

A. Water B. Cholesterol C. Phospholipids D. Waxes

35. Post - transcriptional modification of mRNA is carried out in order to:

- A. alter its shape so that it can bind with an amino acid.
- B. alter its shape so that it can bind with a ribosome.
- C. remove introns.
- D. remove exons.

36. Which of the following phases of mitosis if blocked would produce a cell with twice as many chromosomes as the mother cell?

- A. Telophase
- B. Anaphase
- C. Prophase
- D. Interphase

37. Which property of water keeps the bottoms of lakes and the life there in from being frozen during cold winters in the temperate regions?

- A. Its high latent heat of fusion
- B. Its high specific heat capacity
- C. its high heat of vaporization
- D. Its highest density at 4°C

38. In Ethiopia, which of the following groups of the vertebrates is the least diverse in terms of species number?

- A. Amphibians
- B. Reptiles
- C. Birds
- D. Mammals

39. Which one of the following types of chromosomal mutations is responsible for malfunction of the hypothalamus?

- A. Inversion
- B. Deletion
- C. Insertion
- D. Duplications

40. If one keeps on adding a substrate to a fixed amount of an enzyme, when does the reaction rate reach a plateau? When:

- A. much of the products are accumulated.
- B. most of the enzyme molecules are consumed.
- C. all the active sites of the enzyme are occupied.
- D. all the substrate is converted to products.

41. If it is known that the total amount of DNA in a cell contains 600 nucleotides and adenine

contribute to 160 of these, how many nucleotide go to guanine?

- A. 140
- B. 440
- C. 140
- D. 180

42. Which one is the correct direction of transfer of genetic information in most living things?

- A. DNA → mRNA → protein
- B. Protein → mRNA → DNA
- C. DNA → protein → tRNA
- D. Protein → DNA → mRNA

43. Which one of the following terms is most appropriate to collectively refer to all the plants, animals

and micro - organisms found in Bale Forest in Ethiopia?

- A. Community
- B. Population
- C. Ecosystem
- D. Ecology

44. Why are T - lymphocytes more vulnerable to HIV infection? Because they possess:

- A. large pores in their cell membrane
- C. gp_{120} on their surface

D. thin plasma membrane

important to keep the horse and the donkey as separate species?

C. Their hybrid is sterile.

D. Their hybrid is not viable.

D. Birth rate that is greater than death rate.

certain critical period, and rejects all other. This is an example of:

D.

and size as the substrate, which one of the following would happen?

D. Competitive inhibition

meiosis?

D. Non - disjunction

D. 100%

B. Bacterial chromosome is not associated with histones.

C. DNA strands are held together by hydrogen bond between sugars and nitrogenous bases. D. DNA strands in double helix are antiparallel.

52. What type of molecules CANNOT pass across the cell membrane by simple diffusion?

A. Molecules of very small size

C. Non - polar molecules

B. Lipid soluble molecules

D. Charged molecules

53. Which of the following can be given as a good reason for finding large numbers of plant and mammal species in Ethiopia?

A. Good ecological and biodiversity management. C. Environment free from predators.

B. Presence of many biomes and habitats.

D. Lack of ecological disturbance.

54. In an experiment designed to test the effect of different concentrations of a fertilizer on the growth rate of a plant, which one of the following is INCORRECT?

A. The growth rate of the plant is dependent variable.

B. Concentrations of the fertilizer applied in an independent variable.

C. Plants assigned to the control group receive no treatment with a fertilizer.

D. CO₂ and H₂O concentration cannot confound the outcome.

55. In Which one of their structural parts do different molecules of amino acids differ from one another?

A. In their alpha - carbon group

C. In their amino group

B. In their carboxyl group

D. In their R group

56. In cyclic photophosphorylation, what is the source of the recycled electron?

A. Photolysis of water molecules.

C. Chlorophyll molecule

B. Adenosine triphosphate.

D. Reduced NADP

57. Which one of the following steps in the life cycle of HIV is blocked if an anti retroviral drug that inhibits the reverse transcriptase enzyme is given to an AIDS patient?

A. The integration of HIV DNA into host chromosome.

B. The assembly of parts into HIV particle.

C. The entry of HIV into CD₄ Cells.

D. Formation of DNA from RNA.

58. Which of the following statement is CORRECT about the nitrogen cycle?

A. Nitrogen fixing bacteria reduce the total amount of available nitrogen.

B. Nitrogen is consumed by bacteria and removed from the soil.

C. Nitrogen used by animals largely comes from plants.

D. Plants fix nitrates from atmospheric nitrogen.

59. When do populations of living organisms show constant growth or sometimes growth that fluctuate by mean? When:
- the carrying capacity of the environment is reached.
 - they face strong competition from other species.
 - they enter a new environment.
 - the resources are plentiful.
60. Compared with Gram - negative bacteria, Gram - positive bacteria:
- produce more dangerous endotoxins.
 - have an extra membrane outside the cell wall.
 - are more resistance to antibiotics.
 - have much more peptidoglycan in their cell walls.
61. Which of the following modes of material transport across the cell membrane is NOT governed by the concentration gradient of the transported material?
- Active transport
 - Osmosis
 - Facilitated diffusion
 - simple diffusion
62. Which one of the following statement is INCORRECT about bacteria?
- All of them contain ribosome and cell wall.
 - Some bacteria living in the human body make vitamins needed by the body.
 - Bacteria found in the human body are all pathogenic.
 - Some bacteria can photosynthesize.
63. Which of the following is the best way to check whether an individual having a dominant phenotype is homozygous or heterozygous for the trait? To:
- cross it to a homozygous dominant individual.
 - cross it to a homozygous recessive individual.
 - cross it to a heterozygous individual.
 - self the individual.
64. In the process of polypeptide hydrolysis, which one of the following happens?
- Oxygen is used up
 - Carbon dioxide is released
 - Water is released as a byproduct
 - Protein is broken down into amino acids
65. Which of the following process of photosynthesis does NOT require the presence of light to take place?
- Carbon fixation
 - Reduction of NADP
 - ATP formation
 - The splitting of water
66. During seasons of reproduction, the males of some species of birds produce colorful feathers to

attract females. What do ethnologists call this method of communication in animals?

- A. Tactile B. Auditory C. Chemical D. Visual

67. Cells immediately use the energy that electrons lose as they pass along the chain of electron carriers to:

- A. reduce NAD C. Spin the rotor of ATP synthases
B. Produce ATP D. Pump protons

68. Which of the following will primarily happen if the enzymes in the lysosomes of a cell are defective?

- A. Diffusion process will stop. C. Synthesis of lipids and steroids will cease.
B. ATP production will stop. D. Cellular debris will not be removed.

69. If a substance that weighs 6000 grams and has a half - life of 100 years is left with only 187.5

grams, for how long has the radioactive decaying activity been undergoing?

- A. 300 years B. 400 years C. 500 years D. 250

years

70. Which of the following is correct about all proteins?

- A. The monomers are held together by hydrogen bonds.
B. They are globular in shape.
C. They are twenty amino acids long.
D. They all have amino and carboxylic groups in their monomers.

71. The following are Simpson's index of species diversity calculated for four areas containing the

same types of species. Which index value is from the area where all the species are more or less equally successful?

- A. 1.5 B. 4.5 C. 6.00 D. 8.00

72. Which of the following happens in both cyclic and non - cyclic photophosphrilation?

- A. Water molecules splits C. Oxygen is generated
B. NADP is reduced D. ATP is formed

73. Which of the following is NOT a true characteristic of the population of most of the developing countries of the world?

- A. Birth rate greater than mortality rate C. High fertility rate
B. More number of old people than young people D. Short life expectancy

74. Which of the following is NOT true about C₄ plants such as maize, sorghum and sugar cane?

- A. Chloroplasts of bundle sheath cells lack thylakoids.
- B. Light - dependent reactions occur in mesophyll cells.
- C. The bundle sheath cells contain chloroplast.
- D. CO₂ is harvested during the night time.

75. Which one of the following is an example of an orientational innate behavior?

- A. Nest building by birds
- B. Sudden withdrawal of limbs from hot object
- C. Blinking of the eyes
- D. Taxis and kinesis

76. Which hormone promotes human sleepfulness in darkness and controls the sleep - wake cycle?

- A. Thyroxine
- B. Melatonin
- C. Adrenaline
- D. Insulin

77. Which one of the following is NOT true about bacteriophages that have lysogenic life cycle?

- A. Progeny viruses are released by chronic release method.
- B. They switch off host chromosome after integrating their genome into that of host genome.
- C. They are DNA viruses.
- D. They inject only their genome into host cell.

78. What is the process called when two bacteria directly contact cell to cell and exchange their genetic information?

- A. Transduction
- B. Transformation
- C. Conjugation
- D. Co - transformation

79. In scientific method, what is the importance of a background research for a given problem? To:

- A. make a conclusion
- B. prepare report of the result
- C. make a prediction
- D. formulate a hypothesis

80. If a certain food stuff gave a positive result with Benedict's test only after it was hydrolyzed with hydrochloric acid, which of the following substances could it be?

- A. Starch
- B. Maltose
- C. Triglyceride
- D. Sucrose

81. For what purpose do molecular biologists use the technology known as polymerase chain reaction or PCR? To:

- A. produce DNA from RNA
- B. multiply copies of DNA molecule
- C. produce recombinant plasmid
- D. insert plasmid into bacteria

82. A cow was found to yield much higher milk than any of the breeds of the parental cattle. What could be the most probable reason for this?
- A. Co - dominance genes
B. Recessive genes
C. Hybrid vigour
D. Dominant genes
83. In which industrial products is pyruvate fermentation by yeast practically applied?
- A. Vinegar production
B. Yoghurt making
C. Production of wine
D. Bio fuel production
84. Groups of anti - retroviral drugs that are faulty versions of the building blocks used by HIV to convert RNA into DNA and so prevent this process from taking place are inhibitors.
- A. protease
B. entry
C. nucleotide reverse transcriptase
D. non - nucleotide reverse transcriptase
85. Which of the following pairs of eukaryotic cell organelles were taught to be a free living cell before eukaryotic cells evolved?
- A. Nucleus and Mitochondria
B. Nucleus and Chloroplast
C. Chloroplast and Mitochondria
D. Mitochondria and Ribosome's
86. In which hominid species did scientists found the largest brain size (cranial capacity)?
- A. Homo neanderthalensis
B. Homo erectus
C. Homo sapiens
D. Homo habilis
87. Which one of the following pairs of diseases can be transmitted by eating contaminated food?
- A. Listeriosis and botulism
B. Salmonellosis and candidiasis
C. Typhoid fever and common cold
D. Cholera and gonorrhea
88. What is the reproductive isolating mechanism called if two species of frogs do not interbreed because they cannot understand the mating calls of one another?
- A. Isolation by distance
B. Temporal isolation
C. Behavioral isolation
D. Seasonal isolation
89. Which of the following is NOT true about photo system - II?
- A. It replenishes its lost electrons from photolysis of water.
B. The energy lost from its excited electrons reduces NADP.
C. It passes its excited electrons to photo system - I.
D. Its reaction center molecule is P680.

90. Suppose the amino acid coding region in a mRNA is 1800 nucleotides long, how long is the protein in terms of amino acid number?
- A. 600 amino acids. C. 1800 amino acids
B. 300 amino acids D. 400 amino acids
91. Which one of the following would be harder to see under the ordinary light microscope that is more likely to be available in school laboratories?
- A. A ribosome B. A mitochondria C. A bacterium D. Nucleus
92. Which of the following techniques is used to separate DNA fragments according to their size on a gel?
- A. Radioactive labeling C. Digestion by restriction enzymes
B. Southern blotting D. Electro phoresis
93. What is thought to be the correct sequence of these events, from earliest to most recent, in the evolution of life on earth?
1. origin of mitochondria 4. Origin of cyanobacteria
2. Origin of chloroplast 5. Origin of fungal – plant symbioses
3. Origin of multi cellular eukaryotes 6. Origin of dinosaurs and other reptiles
- A. 4, 3, 2, 1, 5, 6 C. 4, 1, 3, 2, 5, 6
B. 4, 1, 2, 3, 6, 5 D. 4, 3, 1, 5, 2, 6
94. The molecular formula of glucose is $C_6H_{12}O_6$. What is the molecular composition (formula) of the polymer of 100 units of glucose that have been linked by condensation reaction?
- A. $C_{600}H_{1200}O_{500}$ C. $C_{600}H_{1200}O_{600}$
B. $C_{600}H_{1000}O_{500}$ D. $C_{600}H_{1002}O_{501}$
95. Which one of the following organic compound is NOT classified as lipids?
- A. Waxes B. Chitin C. Carotenoids D. Steroids
96. Which of the following glycoside linkage forms glycogen?
- A. α - 1, 4 straight chain and β - 1, 4 branch C. α - 1, 4 straight chain β - 1, 6 branch
B. α - 1, 4 straight chain and α - 1, 6 branch D. α - 1, 4 linkage only

97. Which one of the following is NOT the use of a petridishes? It is used to:
- A. shows how well different concentrations of enzymes digest a substance.

- B. show how effective different antibiotics are against certain types of bacteria.
- C. propagates or culture micro organisms.
- D. measure oxygen produced when yeast decompose hydrogen peroxide.
98. Which one of the following is NOT true about quadrat? It is:
- A. placed at random through the habitat. C. mostly used to study vegetations
- B. best suited to count animals. D. use to record the number and types of organisms
99. All of the following could have a positive effect in increasing the reliability of an experiment EXCEPT:
- A. using the most appropriate apparatus.
- B. increasing anomalous results in experimental data.
- C. minimizing personal value judgment.
- D. carrying out repeated experiments.
100. Which of the following pair of enzymes are highly applicable in detergent industries?
- A. Biochymosin and lactase C. Pectinase and invertase
- B. Proteases and amylases D. Xylanase and esterases
101. By which of the following mechanism do human egg cells mainly take up nutrients from the surrounding follicle?
- A. Exocytosis B. Pinocytosis C. Phagocytosis D. Simple diffusion