

**ADDIS ABABA CITY ADMINISTRATION EDUCATION BUREAU, ADDIS  
ABEBA**

**GRADE 12 BIOLOGY MODEL EXAMINATION**

**GINBOT 2012/MAY 2020**

**NUMBER OF QUESTIONS: 100**

**TIME ALLOWED:- 2 HOURS**

**GENERAL DIRECTIONS**

THIS BOOKLET CONTAINS **BIOLOGY** EXAMINATION. IN THIS EXAMINATION, THERE ARE A TOTAL OF **100 MULTIPLE CHOICE QUESTIONS**. CAREFULLY SELECT THE BEST ANSWER AND **BLACKEN** ONLY THE LETTER OF YOUR CHOICE ON THE SEPARATE ANSWER SHEET PROVIDED. FOLLOW THE INSTRUCTIONS ON THE ANSWER SHEET AND THE EXAMINATION PAPER CAREFULLY. USE ONLY **PENCIL** TO MARK YOUR ANSWERS. YOUR ANSWER MARK SHOULD BE **HEAVY AND DARK**, COVERING THE ANSWER SPACE COMPLETELY. PLEASE ERASE ALL UNNECESSARY MARKS COMPLETELY FROM YOUR ANSWER SHEET.

YOU ARE ALLOWED TO WORK ON THE EXAM FOR **2 HOURS**. WHEN TIME IS CALLED, YOU MUST IMMEDIATELY STOP WORKING, PUT YOUR PENCIL DOWN, AND WAIT FOR FURTHER INSTRUCTIONS.

ANY FORM OF CHEATING OR AN ATTEMPT TO CHEAT IN THE EXAMINATION WILL RESULT IN AN AUTOMATIC DISMISSAL FROM THE EXAMINATION HALL AND CANCELLATION OF YOUR SCORE (S).

PLEASE MAKE SURE THAT YOU HAVE WRITTEN ALL THE REQUIRED INFORMATION ON THE ANSWER SHEET BEFORE YOU START TO WORK ON THE EXAMINATION.

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.**

**DIRECTION: Each of the following questions is followed by four possible alternatives. Read each question carefully and BLACKEN the letter of your choice on the answer sheet provided.**

- 1) Which one of the following is used to find out the way in which life began on earth from simple life form into more complex one?  
A. Paleontology  
B. Oncology  
C. Physiology  
D. Entomology
- 2) In scientific method, what is the importance of a background of research for a given problem?  
A. To make a prediction  
B. To prepare report of the result  
C. To formulate hypothesis  
D. To make a conclusion
- 3) Which of the following tools is used by biologist to study the internal anatomy of experimental animals?  
A. Dissecting kit  
B. Petri dish  
C. Hand lens  
D. Microscope
- 4) A straight line across an expanse of ground along with ecological measurements are taken continuously at regular intervals is called \_\_\_\_\_.  
A. quadrant  
B. pitfall traps  
C. flow meter  
D. transect
- 5) What is the independent variable, if we want to measure the effect of tutor on students' academic success?  
A. Academic success  
B. Class size  
C. Tutor  
D. Number of students.
- 6) Which one of the following is **TRUE** in relation to transmission electron microscope?  
A. Show the three-dimensional surface of cell  
B. Use beams of light to produce magnified images  
C. Shows the inside details of a cell structure  
D. It has less magnification and resolution power
- 7) Suppose an experimenter conducted the effect of oxygen on seed germination and divided the seeds into two groups, supplied sufficient oxygen to group "A" and absence of oxygen to group "B". What is group "B" seed called?  
A. Test group  
B. Variable group  
C. Control group  
D. Experimental group

- 8) Which of the following is a rarely clinical method to test for HIV infection?
- Testing for human anti-HIV antibodies
  - Microscopic examination of the viruse
  - Measuring the amount of hemoglobin
  - Counting the number of white blood cells
- 9) The asymptomatic period following the initial acute stage caused by HIV infection is characterized by: \_\_\_\_.
- The body is susceptible to opportunistic infection.
  - The number of HIV in the blood is high.
  - High level of HIV-antibodies.
  - High level of T-lymphocytes.
- 10) One of the following **decreases** the reliability of an experiment?
- Repeat experiment many times
  - Working as quickly as possible
  - Minimizing personal judgment
  - Use the most appropriate apparatus
- 11) What are the two most abundant elements in the body of an organism?
- Hydrogen and Carbon
  - Carbon and Oxygen
  - Hydrogen and Oxygen
  - Hydrogen and Nitrogen
- 12) Which property of water allows organisms to resist change in temperature in cells and aquatic habitat?
- High surface tension
  - High specific heat
  - Low density when frozen
  - Solvent property
- 13) Which one of the following linkage, links glucose and fructose molecule in making sucrose?
- $\alpha$ -1,4 glycosidic bond
  - $\alpha$ -1,2 glycosidic bond
  - $\beta$ -1,6 glycosidic bond
  - $\beta$ -1,4 glycosidic bond
- 14) In the process of condensation reaction making a double sugar, which one of the following happens?
- Water is used up
  - Carbon dioxide is released
  - Two oxygen molecules is released
  - Water is released as byproduct
- 15) Which of the following group of monosaccharaides are **all** ketose?
- Dihydroxy acetone, Fructose and Ribose
  - Glyceraldehyde, Ribose and Glucose
  - Dihydroxy acetone, Ribulose and Fructose
  - Glyceraldehyde, Ribulose and Glucose

- 16) What makes phospholipids molecules arrange themselves into bilayer in a water molecule?
- A. The double bond of fatty acid                      C. The high solubility of water  
B. The length of fatty acid chain                      D. The amphipathic nature of lipids
- 17) What hold and stabilizes secondary structure of protein?
- A. Ionic bonding    C. Disulphide Bridge  
B. Hydrogen bonding                                      D. Hydrophobic interaction
- 18) One of the following is **correct** about tertiary structure of a protein.
- A. Linear sequence of amino acid chain              C. Three dimensional structure of protein  
B. Helical structure of protein                          D. Sub unit structure of protein
- 19) Which of the following organic compound is most abundant in animal tissue?
- A. Carbohydrates    C. Lipids  
B. Protein    D. Nucleic acid
- 20) Which organic molecule in a cell is the constituent of gene?
- A. Nucleic acid    C. Protein  
C. Lipids    D. Carbohydrates
- 21) When enzyme is denature by extreme temperature, which one of the following does it lost?
- A. The peptide bond    C. Primary structure  
B. Tertiary structure    D. Secondary structure
- 22) Identify the statement that correctly explains why a small amount of enzyme can bring about a change in a large amount of its substrate.
- A. Enzymes consumed during chemical reaction.      C. Enzymes specific to their substrate.  
B. Enzymes reused over and over again.                  D. Enzymes easily synthesized in the cell.
- 23) In which area of enzyme application invertase injected to sucrose paste in order to produce liquid chocolate?
- A. Detergent making industry                              C. Food processing industry  
B. Pulp and paper industry                                  D. pharmaceutical industry
- 24) In which of the following does the induced fit model of enzyme action differ from the lock and key model?
- A. Enzymes lower the energy of activation  
B. Substrate binds at the active site of the enzyme  
C. During the reaction an enzyme substrate complex is formed  
D. Active site moulded to a precise conformation

- 25) Which type of enzyme inhibition its effect is reversed by increasing substrate concentration?
- A. Allosteric inhibition
  - B. Competitive inhibition
  - C. Non-competitive inhibition
  - D. End product inhibition
- 26) What is the cause of tomato fruits to ripen much more slowly when kept in a refrigerator than on a table at room temperature?
- A. Enzyme produce by bacteria normally inhibit ripening
  - B. Humidity accelerates enzyme activity and ripening process
  - C. Room temperature arrest the action of ripening enzymes
  - D. Low temperature slow the normal action of ripening enzymes
- 27) If a cell fails to modify proteins and distributes them to the appropriate part of the cell, which one of its organelle is most likely not functioning?
- A. Ribosomes
  - B. Golgi bodies
  - C. Mitochondria
  - D. Vacuole
- 28) Which of the following organelle are likely to be more abundant in phagocytic white blood cells?
- A. Lysosomes
  - B. Endoplasmic reticulum
  - C. Mitochondria
  - D. Vacuole
- 29) What is the importance of turgor pressure?
- A. Prevent loss of water from plant
  - B. Helps the root to loss excess water
  - C. Make plant cells plasmolysis
  - D. Supporting young plant stems.
- 30) If a homogenate of eukaryotic cells spun in a centrifuge, which of the cellular organelles settle out last?
- A. Chloroplast
  - B. Ribosome
  - C. Nucleus
  - D. chloroplast
- 31) Which of the following cell is an example of a cell formed by reduction division?
- A. Bone cell
  - B. Nerve cell
  - C. Egg cell
  - D. Skin cell
- 32) Suppose a cell was kept in a solution of unknown concentration and found to have lost its water content after an hour. Which of the following is correct explanation about the solution and the cell?
- A. Cell is hypertonic to the solution
  - B. Solution is hypotonic to the cell
  - C. The cell is isotonic to solution
  - D. Solution is hypertonic to the cell

- 33) When athletes take a part in a short distance running, how do the cells generate most of the energy that is needed?
- A. Oxidative phosphorylation in muscle cell      C. Lactate fermentation in muscle cell  
B. Alcoholic fermentation in muscle cell      D. Aerobic respiration in muscle cell
- 34) Under normal condition as electron flow down the electron transport chain of mitochondria, one of the following could **not** happen?
- A. NAD and FAD are reduced      C. Chemiosmosis synthesis of ATP  
B. The electron lose free energy      D. Proton chemical gradient is formed
- 35) Which of the following stages of respiration occur in the cytoplasm of the cell?
- A. Glycolysis      C. Acetyl CoA formation  
B. Krebs cycle      D. Electron transport chain
- 36) During aerobic respiration, from which process does most of the ATP molecule is produced?
- A. Krebs cycle.      C. Conversion of glucose to pyruvate.  
B. Substrate level phosphorylation.      D. Chemiosmotic phosphorylation.
- 37) One of the following could **happen** in the Calvin-Benison cycle of photosynthesis?
- A. Photolysis of water      C. NADP is reduced  
B. ATP is synthesis      D. Carbon dioxide is reduced
- 38) Which of the following happen in both cyclic and non-cyclic phosphorylation?
- A. Water is splitting      C. NADP is the last electron acceptor  
B. Formation of ATP      D. Oxygen is evolved as by product
- 39) In which part of chloroplast does light dependent reaction of photosynthesis take place?
- A. In the inter membrane space      C. In the thylakoid  
B. In the stroma      D. On the inner membrane surface
- 40) Which of the following is true about CAM plants such as cacti?
- A. Carbon dioxide fixation takes place in bundle sheath cell  
B. Photorespiration occur during high light intensity  
C. Chloroplast of bundle sheath cell lack thylakoids  
D. Carbon dioxide harvested during the night time
- 41) Which of the following microorganism is not an example of protozoa?
- A. Amoeba      C. Euglena  
B. Plasmodium      D. Chlamydomonas

- 42) Surface appendages used by bacteria to attach to one another and to host organisms are
- cell wall.
  - pilli.
  - flagella.
  - capsule.
- 43) Gram positive and Gram negative bacteria are differentially stained by Gram's stain due to the structure difference in their \_\_\_\_.
- cell membrane.
  - ribosome.
  - capsule.
  - cell wall.
- 44) Which of the following bacterial structure is found in all bacteria?
- Plasmid.
  - capsule.
  - DNA.
  - flagella.
- 45) What is the disease caused by pathogenic microorganisms?
- Degenerative
  - Infectious
  - Functional
  - Human induced
- 46) Which of the following human disease is **NOT** correctly matched with its mode of transmission?
- Sleeping sickness - Physical contact
  - Cholera - contaminated water
  - Malaria - vector born
  - Influenza - droplet infection
- 47) One of the following statements is **true** about Gram-positive bacteria?
- stained pink by Gram's stain.
  - have thick peptidoglycan in their cell walls.
  - Take the color of secondary stain safranin .
  - have a membrane outside the peptidoglycan.
- 48) "Farmer's lung" which results in an allergy in the lung is caused by \_\_\_\_.
- bacteria.
  - fungus.
  - virus.
  - protozoa.
- 49) Which bacterial species is used to transfer recombinant DNA to plants?
- Escherichia coli
  - Agrobacterium
  - Nitrogen fixing bacteria
  - Denitrifying bacteria
- 50) Which of the following can be taken as a good example a cell that lacks nuclear membrane and mitochondria?
- Algal cell
  - Fungal cell
  - Bacterial cell
  - Protozoan cells

**51) Which statement is not true about bacteria? Bacteria have \_\_\_\_.**

- A. circular DNA. C. prokaryotic cells.  
B. cell wall which made from peptidoglycan. D. linear DNA in chromosome.

**52) During Genetic engineering process, the genes that can be inserted into another DNA using:**

- A. restriction endonucleases.
- B. vectors.
- C. ligase enzyme.
- D. polymerase enzyme.

**53)** In DNA cloning technology, which of the following molecules serves as a vector of gene of interest to be transferred to bacterial host?

- A. Bacterial DNA  
B. Plasmid DNA  
C. Nuclear DNA  
D. Mitochondrial DNA

54) Which part of bacteriophage become incorporated into a bacterium and instructs the bacteria to produce more viruses?

- A. DNA  
B. RNA  
C. Envelope  
D. Peptidoglycan

**55)** HIV virus inserts its RNA into the host cell and converts its RNA into DNA by using \_\_\_\_.

- A. reverse transcriptase. C. gp-120.  
B. restriction endonuclease. D. CD4.

**56)** In the stages of virus infection of cells, the replication in enveloped DNA virus takes place at \_\_\_\_\_.

- A. nucleus.
- B. cytoplasm.
- C. cell membrane.
- D. mitochondria.

57) Which of the following features makes human T-lymphocyte cells more vulnerable to HIV attack? The presence of\_\_\_\_\_.

- A. cell membrane  
B. DNA on the chromosomes surface  
C. CD4 on the membrane surface  
D. pores in the cell membrane

**58)** If a new anti-HIV drug is to be developed to prevent the virus from entering the host cell, which one of the following processes should the drug target?

- A. Reverse transcription  
B. Binding of Gp120 and CD4  
C. Integration of viral DNA into host DNA  
D. Assembly of viral parts into a whole virus

**59) Which one of the following principles are most of the anti-HIV drugs currently in use working?**

- A. Inhibition of enzyme action  
B. Degradation of viral RNA  
C. Digesting of the viral particles  
D. Phagocytosis of the virus



- 60) Which of the following is the major killer of AIDs patient?
- A. Pneumonia
  - B. Anaemia
  - C. Malnutrition
  - D. Opportunistic infection
- 61) One of the following is true about viruses except.
- A. all virions contain a protein shell or capsid.
  - B. all virions contain either DNA or RNA as the genetic material but no chromosomes.
  - C. all virions contain enzymes inside the capsid.
  - D. all viruses are obligate intracellular parasites.
- 62) In nitrogen cycle, what is the bacteria that increase free nitrogen gas in the atmosphere?
- A. nitrogen-fixing bacteria.
  - B. ammonifying bacteria.
  - C. nitrifying bacteria.
  - D. denitrifying bacteria.
- 63) During carbon cycle process, the amount of carbon dioxide in the atmosphere is reduced by\_.
- A. photosynthesis.
  - B. respiration.
  - C. fossilisation.
  - D. combustion.
- 64) What is the important role played by bacteria and fungi in the ecosystem?
- A. Antibiotic reproduction
  - B. Forming organic substances
  - C. Recycling of nutrients
  - D. Supplying energy to the ecosystem
- 65) Which component of soil fertility is improved when farmers grow legumes in crop rotation?
- A. Phosphorus
  - B. Nitrogen
  - C. Sulphur
  - D. Carbon
- 66) Which form of nitrogen absorbed from the soil by plants?
- A. Nitrite
  - B. Nitrate
  - C. Ammonia
  - D. Protein
- 67) Which of the following microorganism obtain their food from other dead or living organisms using extracellular digestion?
- A. Bacteria
  - B. Fungi
  - C. Viruses
  - D. Protozoa
- 68) Which one of the following has a unidirectional flow in an ecosystem?
- A. Nitrogen
  - B. Carbon dioxide
  - C. water
  - D. Energy
- 69) Which of the following plants would likely colonize bare land first?
- A. Annual herbs
  - B. Mosses
  - C. Lichens
  - D. Perennial herbs

- 2012 E.C.

- 78)** In which stages of meiosis crossing over occurs and genetic material is exchanged?
- Prophase I
  - Anaphase II
  - Metaphase I
  - Anaphase I
- 79)** A plant has a genotype AABb. There is no linkage of the genes. The gametes it will produce:
- AB & ab
  - B. Aa & Bb
  - AB, Ab, AB & Ab
  - AB, Ab, aB & ab
- 80)** In a cross between heterozygous, what proportion is expected to be homozygous recessive?
- 25%
  - 50%
  - 75%
  - 100%
- 81)** Which of the following is not true about the gene called SRY?
- Testes develop in its presence
  - It determine maleness
  - It is found on the Y-chromosome
  - Females have two copies of this gene
- 82)** One of the four siblings is blood group A, the second is B, the third is O, and the fourth is AB. Their parents must have blood type is \_\_\_\_.
- A and B
  - AB and O
  - AB and AB
  - A and AB
- 83)** Before making crosses, which part of flower did Mendel remove to avoid self-pollination?
- Stigma
  - Ovule
  - Ovary
  - Stamens
- 84)** Which of the following is not an example of codominance?
- A child of parents with blood type A and B, who has AB blood type
  - A calf of a red cow & a white cow, which has a roan coat consisting of red & white hairs
  - A child of a parent with blue eyes and a parent with brown eyes, who has brown eyes
  - A flower offspring of red and white flowers, which has both red white petals
- 85)** Genes found only on the "Y" chromosome determine:
- degenerative retinitis pigmentosa.
  - a gene controlling red-green colour blindness.
  - a gene controlling one form of haemophilia.
  - they are more common among males than in female.
- 86)** Suppose in monohybrid cross 200 F<sub>2</sub> plants were produced, what is the number of plants that are expected to have the dominant and recessive phenotypes respectively?
- 150 dominant, 50 recessive
  - 160 dominant, 40 recessive
  - 80 dominant, 120 recessive
  - 100 dominant, 100 recessive

- 87) DNA is a very stable molecule at normal temperatures due to:
- A. hydrogen bond and Phosphodiester bond.
  - B. hydrogen bond and glycosidic bond.
  - C. peptide bond and ionic bond.
  - D. single strand of nucleotides.
- 88) If it is known that the total number of the purine bases account for 50% of a DNA molecule and if each of the remaining bases are known to have the same proportion, what proportion is accounted for by thymine alone in the same molecule?
- A. 25%
  - B. 50%
  - C. 75%
  - D. 100%
- 89) Which of the following is a recently developed active area of research in biology?
- A. Taxonomic study
  - B. Study about the cell theory
  - C. Ecological research
  - D. Stem cell research
- 90) Which process produces mRNA during protein synthesis?
- A. Translation
  - B. Replication
  - C. Mutation
  - D. Transcription
- 91) Which characteristic of RNA makes it suitable for moving out of the nucleus?
- A. Inability to replicate
  - B. Absence of thymine
  - C. Its unstable nature
  - D. smallness of its size
- 92) If the genetic code on DNA triplets' base is GTA, what is the complementary codon on mRNA?
- A. CAT
  - B. CUA
  - C. CAU
  - D. GUA
- 93) If a cell having 80 chromosomes divides by meiosis, how many chromosomes are expected in the daughter cells?
- A. 60
  - B. 30
  - C. 40
  - D. 30
- 94) In DNA replication, enzyme breaks hydrogen bonds and 'unwinds' part of the helix of the DNA by:
- A. DNA helicase enzyme.
  - B. DNA polymerase.
  - C. ligase enzyme.
  - D. transcriptase.
- 95) Suppose the amino acid coding region in mRNA is 2400 nucleotides long. How long is the protein in terms of amino acid number?
- A. 1200 amino acids
  - B. 600 amino acids
  - C. 800 amino acids
  - D. 400 amino acids

- 96) Which of the following is removed from eukaryotic mRNA during post transcriptional modification?
- A. Intron
  - B. Transcriptase
  - C. promoter
  - D. Exon
- 97) Which of the ff terms refers to the failure of sister chromatids to separate from one another during anaphase?
- A. Non-disjunction
  - B. Replication
  - C. Deletion
  - D. Double inversion
- 98) What is the process called when the plasmid is absorbed from a dead bacterium and exchange their genetic information?
- A. Conjugation
  - B. Transformation
  - C. Co-transformation
  - D. Transduction
- 99) Which of the type of mutation is responsible for sickle cell Anaemia?
- A. Addition of a base pair
  - B. Substitution a base pair
  - C. Deletion a base pair
  - D. Frameshift of genetic code
- 100) What is the type of mutation that arises from a change in the nucleotide sequence of the DNA at a particular locus of the chromosome?
- A. Gene mutation
  - B. numerical mutation
  - C. structural mutation
  - D. chromosomal mutation