

OROMIA EDUCATION BUREAU

2017/2025 BIOLOGY MODEL EXAM FOR GRADE 12

TIME ALLOWED: 2 HOURS

GENERAL DIRECTIONS:

THIS BOOKLET CONTAINS BIOLOGY **MODEL EXAM** FOR **GRADE 12**. IN THIS BOOKLET, THERE ARE A TOTAL OF 100 MULTIPLE CHOICE QUESTIONS.

THERE IS ONLY ONE BEST ANSWER FOR EACH QUESTION. CHOOSE THE BEST ANSWER FROM THE GIVEN ALTERNATIVES AND WRITE THE LETTER OF YOUR CHOICE ON THE ANSWER SHEET PROVIDED.

YOU ARE ALLOWED TO WORK ON THE EXAM QUESTIONS FOR **2 HOURS ONLY**. WHEN TIME IS CALLED, YOU MUST IMMEDIATELY STOP WORKING ON THE QUESTIONS AND PUT DOWN YOUR PEN/PENCIL AND WAIT FOR WHAT YOU MIGHT BE TOLD TO DO.

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

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

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

Model Exam for Biology Grade 12, 2017 E.C/2025

Time allowed: 2 hours

Choose the best answer for the following question from the given alternatives

1. Which form of nature engineers mimics to make injection needle technology?
 - A. Spiders web
 - B. Mosquito proboscis
 - C. Termites mound
 - D. Wings of birds and bats
2. Which of the following technological tools have been used as a guide for our destination, mapping and to collect biological data?
 - A. Geographical position system
 - B. Spherical densitometers
 - C. Field microscope
 - D. Tape measures
3. One of listed statement best describes unethical treatments in animals
 - A. Reduce the number of animals based experiments
 - B. Follow less invasive techniques, better medical care, and better living conditions
 - C. Advancement of animal based research to solve human related problems
 - D. Replacing experiment on animals with other systems
4. Which one of the following statement shows mismatch concerning the characteristics of animals and its term
 - A. Ability to move independently----Motility
 - B. Respond to stimuli quickly---- Sensitivity
 - C. Body made-up of many cells-----multicellular
 - D. Expel solid, fluid or gaseous materials-----secretion

5. This item is based on the following table which shows the contrast of invertebrate and vertebrate animals.

No	Invertebrate	Vertebrate
1	lack exoskeleton	have exoskeleton
2	have radial symmetry	lack bilateral symmetry
3	have closed circulatory system	lack closed circulatory system
4	lack complex and specialized organ system	have complex and specialized organ system

9. One of the following is **NOT** the characteristics of innate behavior?
- A. Programmed by genes
 - B. Modified by experience
 - C. Highly stereotyped
 - D. Specific to species
10. The term “territoriality” in animals refers to:
- A. An activity that precede and results in mating and reproduction.
 - B. Showing acts of fighting without any physical contact.
 - C. The act of establishing and defending spaces by an animal.
 - D. Behavioral pattern of animals to meet the needs of reproduction.
11. A self-regulatory process by which animals maintain a stable internal condition in their bodies despite external changes is
- A. Homeostasis
 - B. An effector
 - C. Receptors
 - D. Stimulus
12. When we compare poikilothermic with homoeothermic animals. Which of the following characteristics best refers homoeothermic animals?
- A. They are ectodermic animals whose body temperature vary with the environment
 - B. They can keep its internal body temperate constant despite the external environment
 - C. They use vasoconstriction in response to the hottest environment
 - D. They use behavioral adoptions to manage their body temperature
13. Animals utilize behavioral and physiology strategies to regulation of subsistence in the body. Which of the following statement is **WRONGLY** stated?
- A. Insulin released by pancreas when blood glucose level is high
 - B. Diurnal animals reduce water loss by avoid day time
 - C. Vasodilatation increase heat loss trough the surface of the skin
 - D. Desert animals produce dry fecal matter to conserve water

14. Which of the following DOES **NOT** show the nature of enzymes?
- A. Are reversible
 - B. Are substrate specific
 - C. Play a catabolic and anabolic role
 - D. Less sensitive to temperature
15. The physical properties of an enzyme encompass a process of breaking the intra and inter-molecular non covalent bonds that distort its functional structure and state is:
- A. Denaturation
 - B. Solubility
 - C. Molecular weight
 - D. Reversibility
16. A biologist prepare an enzyme substrate model. One of the model he prepared have a highly fixable structure which lets the enzyme active site changes the shape slightly as substrate binds to form enzyme substrate complex. Which model a biologist developed?
- A. Lock and key model
 - B. Kinetics model
 - C. Induced fit model
 - D. Michaelis-menten model
17. Which form of enzyme inhibitor binds only to the enzyme substrate complex, but not to the free enzyme?
- A. Noncompetitive inhibitor
 - B. Uncompetitive inhibitor
 - C. Irreversible inhibitor
 - D. Reversible inhibitor
18. Which type of enzymes is responsible to change the molecular form of the substrate?
- A. Isomerases
 - B. Lyases
 - C. Transferases
 - D. Ligases
19. What happens to enzymes activity when the temperature goes beyond the optimum level?
- A. Low temperature has no effect on the activity of enzymes
 - B. Enzymes can functions well even at higher temperature
 - C. Low or higher temperature causes an enzyme to loss its activity
 - D. Enzymes can also be denatured at the optimum range of temperature

- | No | Mendelian inheritances | Non mendelian inheritances |
|----|--|--|
| 1 | Determined by multiple genes | Determined by single gene |
| 2 | Follow the pattern of dominance and recessive allele | Not follow the pattern of dominance and recessive allele |
| 3 | Predictable phenotypic ratio of traits in offspring | Phenotypic ratio are difficult to predict |
| 4 | Have a display of incomplete dominance | Have a display of complete dominance |

In the above table, which row contain **WRONGLY** stated statements with respect to the type of inheritances?

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

25. Inheritance of the same alleles of gene from each of parents refers:

- A. Heterozygous
- B. Homozygous
- C. Genotype
- D. Phenotype

26. When two heterozygous parents crossed in a monohybrid cross the genotypic ratio of the offspring would be:

- A. 3:1
- B. 1:3:1
- C. 1:2:1
- D. 1:1

27. When an individual with an unknown genotype (Y) is crossed with a heterozygous trait (Tt) individual and the offspring show a 3:1 phenotypic ratio of dominant to recessive traits, what is the likely genotype of the unknown individual?

- A. Heterozygous (Tt)
- B. Homozygous recessive (tt)
- C. Homozygous (TT)
- D. Not determinable

28. In a pedigree sex linked recessive disease, in a family of four including a normal mother, a normal father, two carrier daughters and two normal sons, who do you think has the defective "X" gene other than the affected daughters?

- A. The father
- B. The normal sons
- C. The mother
- D. The affected daughters

29. It is way of examining the genetic material and tells to an individual about the likelihood and risk of passing genetic disorders onto the children is:

- A. Huntington's disease
- B. Genetic testing
- C. Gene therapy
- D. Chromosomal disorder

30. In a plant breeding, a process that involves picking and growing plants with desirable traits over multiple generations to produce genetically homologous line is:

- A. Mass selection
- B. Pure line selection
- C. Bulk selection
- D. Hybridization

31. Which of the following is **NOT** a function of the skeleton?
- | | |
|------------------------------|---------------------------------|
| A. Production of blood cells | C. Stores minerals like calcium |
| B. Protects internal organs | D. Generates heat |
32. One of the following is convert chemical energy into mechanical energy during muscle contraction
- | | |
|---------------|---------------|
| A. Myosin | C. Actin |
| B. Perimysium | D. Sarcolemma |
33. Of the following alternatives, one is used to attach muscle to bone.
- | | |
|--------------|--------------|
| A. Fascia | C. Ligaments |
| B. Cartilage | D. Tendon |
34. Which of the following alternatives is used to break down bones?
- | | |
|---------------------|--------------------|
| A. Osteoprogenitor | C. Osteocyte cells |
| B. Osteoblast cells | D. Osteoclasts |
35. Of the following alternatives, one is allow movement in all directions.
- | | |
|------------------------------|-------------------|
| A. Hinge joints | C. Pivot joints |
| B. The ball and socket joint | D. Gliding joints |
36. Which male reproductive structure is used to secrete an alkaline buffer into the semen?
- | | |
|-------------------|-----------------|
| A. Prostate gland | C. Vas deferens |
| B. Testes | D. Epididymis |
37. Which one is used to holds the fetus in place during pregnancy?
- | | |
|------------|------------|
| A. Vagina | C. Cervix |
| B. Ovaries | D. Fimbria |
38. The tube that connects ovary to uterus is:
- | | |
|------------|-------------------------|
| A. Cervix | C. Seminiferous tubules |
| B. Urethra | D. Oviduct |
39. Which of the following is **Incorrect** about the causes of infertility in females?
- | | |
|----------------------------|---------------------|
| A. Sterilization | C. Thyroid problems |
| B. Cervical mucus problems | D. Vasectomy |

40. One of the following is used to produce sperms
- | | |
|------------------|------------|
| A. Vas deference | C. Penis |
| B. Testes | D. Scrotum |
41. Which changes happen during puberty on boys and girls?
- | | |
|----------------------|------------------------|
| A. Hips widen | C. Underarm hair grows |
| B. Facial hair grows | D. Sperm production |
42. Of the following sexually transmitted infection (STI) which one is **Not** caused by bacteria?
- | | |
|--------------|--------------|
| A. Gonorrhea | C. Chlamydia |
| B. Syphilis | D. Scabies |
43. One of the following is used to solve the problem of underage marriage of girls.
- | | |
|-------------------------|------------------------------|
| A. Awareness creation | C. Gender-based violence |
| B. Stop educating woman | D. Female genital mutilation |
44. Of the following one is the function of the human male reproductive system
- | |
|--|
| A. Grow and develop baby |
| B. Produce egg and deliver egg to female |
| C. Internal fertilization |
| D. Produce sperm and deliver sperm to female |
45. Which part of the female reproductive system is the site of fertilization?
- | | |
|-----------|-------------------|
| A. Uterus | C. Fallopian tube |
| B. Ovary | D. Cervix |
46. Which hormone triggers the release of an egg from the ovary during the menstrual cycle?
- | | |
|------------------------|---------------------------------|
| A. Estrogen | C. Progesterone |
| B. Leutenizing Hormone | D. Follicle stimulating hormone |
47. Which hormone is responsible for thickening the uterine lining during the menstrual cycle?
- | | |
|------------------------|---------------------------------|
| A. Estrogen | C. Progesterone |
| B. Luteinizing hormone | D. Follicle-stimulating hormone |
48. If a woman started her menstrual cycle on 1st April, when will her ovulation be?
- | | |
|-------------|-------------|
| A. 7 April | C. 14 April |
| B. 16 April | D. 30 April |

49. In Ethiopian farmers which of the following methods most often used to select livestock with desirable traits?
- Based on growth rate, body size, behavior and resistance to disease
 - Based on an improved exotic breed with high productivity
 - Random selection regardless of breed type and fertility
 - Selecting calm animals regardless of productivity
50. Which of the following deals the interaction and change that affect the distribution and abundance of organisms in the environment?
- Community
 - Population
 - Ecosystem
 - Biosphere
51. An ecologist went to estimate the population size of rodents in a certain grass land area. An ecologist captured and marked 200 rodents in the first day of his study. On the second day, 250 rodents were captured, 50 of which are already marked. Using this data, the estimated population size of the rodent is?
- 2000
 - 800
 - 1000
 - 1050
52. Which of the following best compare exponential and logistic growth in populations?
- Exponential population growth produces a S-shaped curve, while in logistic growth produce is J-shaped curve
 - Exponential growth presumes infinite resource, conversely logistic growth consider resource limitation
 - Exponential growth more realistic in a natural environment than logistic growth
 - In exponential growth the growth of population checked by the carrying capacity, while in logistic growth is not
53. Which of the following is density independent factor?
- Predation
 - Natural disaster
 - Competition
 - Waste accumulation
54. One of following negatively affects conservation of natural resource
- Protect and conserve natural resources
 - Build up recycling and waste reduction effort
 - Develop sustainable resource management practice
 - Over exploitation of natural resources

55. Ethiopia endowed with renewable natural resources for that if a city planning to switch from using gas/diesel powered vehicles to electric vehicle. Which of the following environmental benefit primarily gain?
- A. Electric vehicles produce Zero emissions, which can help reduce pollution and improve air quality
 - B. Electric car decreases the demands to use natural resources and have more effect on climate change
 - C. Importing electric vehicles are better since uses less fossil fuel than gas powered vehicles
 - D. The environmental benefit of electric car less as compared gas powered vehicles
56. Which of the following human activity characterized by clearing of forest for agriculture which leads to soil erosion, flooding and biodiversity loss?
- A. Applying pesticide
 - B. Deforestation
 - C. Burning of natural gas
 - D. Afforestation
57. Which of the following is the least method to reduce traffic based accident on wildlife?
- A. Construct underpasses to promote habitat connectivity
 - B. Install wildlife warning signs along the road to alert drivers
 - C. Consider wildlife habitat when roads are constructed
 - D. Permit hunting those wildlife's exist along the road
58. Which area of biotechnology would most likely create ethical issues with human society?
- A. Insulin production by bacteria
 - B. Genetic engineering to improve agriculture yields
 - C. Organ cloning for use in trans plants
 - D. DNA and forensic testing of crime scene evidence
59. When DNA is manipulated and moved from one source to another it is known as
- A. Genetic engineering
 - B. Gene therapy
 - C. Genetically modified organisms
 - D. Electrophoresis
60. An organism that contains genes from other organisms is:
- A. Polygenic
 - B. Transgenic
 - C. Mutagenic
 - D. Donors

61. Which part of a bacterial cell could be primarily attacked and destroyed by antibiotics?
- | | |
|--------------|------------------|
| A. DNA | C. Cell Membrane |
| B. Cytoplasm | D. Cell Wall |
62. One of the following is used to investigate crime by using blood, saliva and hair.
- | | |
|---------------------|---------------------|
| A. Health science | C. Physical science |
| B. Forensic science | D. Ecology |
63. The main goal of using biological warfare in modern conflict is:
- | |
|--|
| A. Promote peace and cooperation. |
| B. Improve public health in the affected area. |
| C. Provide medical aid to the enemy. |
| D. Kill the enemy using disease- causing microorganisms or their toxins. |
64. One of the following makes more difficult treating viral infection than bacterial infection
- | |
|--|
| A. Viruses are smaller in size than bacteria |
| B. Viruses have no cell wall |
| C. Viruses have fewer targets for drugs. |
| D. Bacteria have peptidoglycon. |
65. Which one of the following protozoan disease is more common in Ethiopia
- | | |
|---------------|--------------------|
| A. Malaria | C. Trichuriasis |
| B. Amoebiasis | D. Trypanosomiasis |
66. Which One of the following is a beneficial microorganism to make bread?
- | | |
|-----------------|----------------|
| A. Bread mould | C. Penicillium |
| B. Asperigillus | D. Yeast |
67. One of the following organisms is grouped under the evolutionary line of bacteria.
- | | |
|------------------|------------------|
| A. Entamoebae | C. Spirochetes |
| B. Methanococcus | D. Microsporidia |

68. Which of the following is correct about gram-positive bacteria?
- A. Have extensive periplasmic space
 - B. Have porein proteins.
 - C. Have thinner cell wall.
 - D. Gram-positive results purple color
69. Which one of the following is the correct sequence in gram staining?
- A. Fixation---- Iodine treatment-----Crystal violet-----Decolonization-----Staining with Safranin
 - B. Fixation---- Staining with Safranin -----Crystal violet-----Decolonization----- Iodine treatment
 - C. Fixation-----Crystal violet-----Iodine treatment-----Decolonization----- Staining with Safranin
 - D. Fixation-----Iodine treatment-----Crystal violet----- Staining with Safranin-----Decolonization
70. Tetanus is a bacterial disease caused by:
- A. *Treponema pallidum*
 - B. *Salmonella typhi*
 - C. *Clostridium tetani*
 - D. *Bordetella pertusis*
71. Bacteria that live in very cold environment are:
- A. Acidophiles
 - B. Psychrophiles
 - C. Halophiles
 - D. Thermophiles
72. Which of the following fungi belongs to Zygomycota?
- A. Rusts
 - B. Smut
 - C. Water molds
 - D. Rhizopus
73. One of the following is **Not** economic importance of a fungi?
- A. Mushrooms that serve as a source of food
 - B. Fungi a major role in nutrient recycling
 - C. *Asperigillus* species that produce oxalic acid
 - D. Molds that cause deterioration of leather
74. Thrush is a fungal disease caused by:
- A. *Trichophyton rubrum*
 - B. *Asperigillus fumigatus*
 - C. *Candida albicans*
 - D. *Microsporum canis*

75. African sleeping sickness is a disease transmitted by:
- A. Sand fly
 - B. Tsetse fly
 - C. Sexual contact
 - D. Mosquito
76. Which one of the following is a characteristic of virus?
- A. Nucleic acid of a viral genome contains either DNA or RNA.
 - B. They can be grown on artificial cell free media.
 - C. They are affected by antibacterial antibiotics
 - D. Viruses are active outside the host cell.
77. Salmonellosis is a disease transmitted by
- A. Eating contaminated food
 - B. Drinking contaminated water
 - C. Direct body contact
 - D. Blood-to-blood contact
78. Which of the following is correct about anabolism?
- A. It is occur during cellular respiration
 - B. It is the destructive phase of metabolism
 - C. It is an exergonic reaction
 - D. It is the constructive phase of metabolism
79. One of the following is the correct equation for photosynthesis?
- A. $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + \text{energy}$
 - B. $6CO_2 + 6H_2O \longrightarrow 6O_2 + C_6H_{12}O_6$
 - C. $C_6H_{12}O_6 + 6CO_2 \longrightarrow 6O_2 + 6H_2O$
 - D. $C_6H_{12}O_6 + 6H_2O \longrightarrow 6O_2 + 6CO_2$

80. The final electron acceptor of aerobic respiration is:
- A. Oxygen
 - B. Carbon dioxide
 - C. Water
 - D. NAD⁺
81. Which process does **Not** occur in aerobic conditions?
- A. Oxidative Phosphorylation
 - B. Pyruvate Oxidation
 - C. Citric Acid Cycle or Krebs cycle
 - D. Fermentation
82. During photosynthesis the light-dependent reactions takes place in the
- A. Thylakoid
 - B. Mitochondria
 - C. Stroma.
 - D. Rubisco
83. One of the following shows the correct sequence of cellular respiration
- A. Krebs cycle, Glycolysis and Electron transport chain
 - B. Electron transport chain, Krebs cycle, and Glycolysis
 - C. Glycolysis, Krebs cycle and Electron transport chain
 - D. Glycolysis, Electron transport chain and Krebs cycle
84. In which reaction do Acetyl CoA is formed?
- A. Link reaction
 - B. Glycolysis
 - C. Lactic acid fermentation
 - D. Kreb's cycle
85. Which one is ATP production is coupled to the exergonic transfer of electron from food to oxygen?
- A. Substrate –level phosphorylation
 - B. Oxidative phosphorylation
 - C. Electron transport chain
 - D. Hydrolysis
86. Which of the following stages of the aerobic respiration responsible for production of both FADH and NADH?
- A. Citric acid cycle
 - B. Glycolysis
 - C. Link reaction
 - D. Chemiosomosis

95. Which one of the following is **INCORRECT** about the Calvin cycle?
- A. Produce NADP^+
 - B. Produce carbon dioxide
 - C. Use the light reactions products
 - D. Produce a three carbon sugar (G3P)
96. In cellular respiration, high-energy electrons that move down the electron transport chain ultimately provide the energy needed to
- A. Transport water molecules across the membrane
 - B. Convert ADP molecules in to ATP molecules
 - C. Convert carbon dioxide into water molecules
 - D. Break down glucose into pyruvic acid molecules
97. How many NADH molecules are produced by a molecule of glucose through Krebs cycle?
- A. Two
 - B. Four
 - C. Three
 - D. Six
98. In which of the following organelle does aerobic cellular respiration happen?
- A. Nucleus
 - B. Mitochondria
 - C. Chlorophyll
 - D. Chloroplast
99. The electrons that transfer energy to pump protons across the inner mitochondrial membrane were supplied by
- A. ATP and NADPH
 - B. Water and oxygen
 - C. NADH and FADH_2
 - D. CO_2 and water
100. Which of the following processes takes place in the cytoplasm of a cell?
- A. Glycolysis
 - B. Krebs cycle
 - C. Electron transport
 - D. Acetyl CoA formation