ARADA SUB CITY EDUCATION BUREAU

BIOLOGY MODEL EXAMINATION FOR GRADE 12 STUDENTS

APRIL, 2024

TIME ALLOWED: 2HOURS

GENERAL DIRECTIONS

IN THIS EXAMINATION THERE IS TOTAL OF 100 MULTIPLE CHOICE QUESTIONS. CAREFULLY SELLECT THE BEST ANSWER AND BLACKEN ONLY THE LETTER OF YOUR CHOICES ON THE SPARATE ANSWER SHEET PROVIDED.

FOLLOW THE INSTRUCTION ON THE ANSWER SHEET AND THE EXAMINATION PAPER CAREFULLY.

USE ONLY A PENCIL TO MARK YOUR ANSWER. YOUR ANSWER MARK SHOULD BE HEAVY AND DARK, COVERING THE ANSWER SPACE COMPLETELY.

YOU ARE ALLOWED TO WORK ON THE EXAM FOR 2:00HOURS. WHEN TIME IS CALLED YOU MUST IMMIDIATELY 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 CANCELATION 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 OVER UNTIL YOU ARE TOLD TO DO SO.

1. Which one of the following term and its definition is not correct?
   A. Hypothesis→ statement that explain observed facts and predicts new outcomes
   B. Journal → special magazine were scientists research published
   C. Peer review → the use of scientific research to meet human desires
   D. Scientific method →the process by which scientists approach their work
2. Which one of the following disease is not correctly matched with its causative agent?

   A. Tuberculosis→Mycobacterium tuberculosis
   B. Gastroenteritis →Rota viruses
   C. Cholera → Vibrio cholera
   D. Chancroid→ Trepomema pallidum

3. What is the field of Ethiopian biologist Tewolde Berhan Gebre Egzabher?
   A. Marine biology
   B. Conservation biology
   C. Genetics
   D. Microbiology

4. What is the purpose of using antiseptics in controlling microorganisms?
   A. To inhibit microbial growth in food products
   B. To control microorganisms on inanimate surfaces
   C. To sterilize equipments and media
   D. To control microorganisms on living tissue

5. What is the foremost goal of gene therapy in modern biotechnology?
   A. To cure genetic diseases by replacing defective gene
   B. To produce vaccine against infectious disease
   C. To create genetically modified organism
   D. To produce cloned organism

6. What is the role of enzymes in traditional biotechnology?
   A. To encode specific trait in an organism
   B. To catalyze biochemical reaction of in fermentation
   C. To modify gene of an organism
   D. To cut DNA into specific gene

7. If pea plant with the genotype Rr is crossed with rr genotype, what is the phenotypic ratio of their offspring?
   A. 1:1
   B. 2:1
   C. 3:1
   D. 1:2:1

8. Mendel's law of segregation states that:-
   A. Alleles of different genes assort independently during meiosis
   B. Alleles of the same gene separated into different during meiosis
   C. The expression of one gene influenced by expression of other gene
   D. Genes located on the same chromosome are inherited together

9. Which of the following nervous system is responsible for controlling involuntary action such as heart rate?

A. Central nervous system
C. Autonomous nervous system
B. Peripheral nervous system
D. Somatic nervous system

10. Which part of the human eye control the amount of light enters into the pupil?

A. Retina
C. Iris
B. Lens
D. Cornea

11. Which part of human ear is responsible for maintaining balance and equilibrium?

A. Cochlea
C. Eardrum
B. Semicircular canals
D. Auditory nerve

12. Which gland produces insulin and glucagon responsible for controlling blood sugar level?

A. Thyroid gland
C. Pituitary gland
B. Adrenal gland
D. Pancreas gland

13. Which of the following statement correctly explain homeostasis?

A. Dilation of blood vessels in cold temperature
C. Constrict blood vessels in hot temperature
B. Decrease heart rate during physical exercise
D. Decrease breathing rate during sleep

14. What is the purpose of conducting experiments in the scientific method?

A. To gather data and evidence
C. To prove a hypothesis
B. To confirm personal trust
D. To support predetermined idea

15. What is a key threat of biodiversity in Ethiopia?

A. Strict conservation policies
C. Large scale reforestation attempt
B. Abundant protected areas
D. Climate change and desertification

16. How do organisms acquire adaptation over time?

A. Through direct manipulation of their environment
C. Through random mutation of their genes
B. Through artificial manipulation of their genes
D. Through conscious decision making

17. Which of the following describes a structural adaptation in plants?

A. Hibernate to survive cold season
C. Camouflage to avoid predator
B. Shedding leaves to conserve water during drought
D. Produce energy by photosynthesis

18. All of the following explain the contribution of reforestation to conserving natural resource in Ethiopia except?

A. Decrease carbon emission
C. Decrease desertification
B. Decrease wildlife
D. Decrease soil erosion

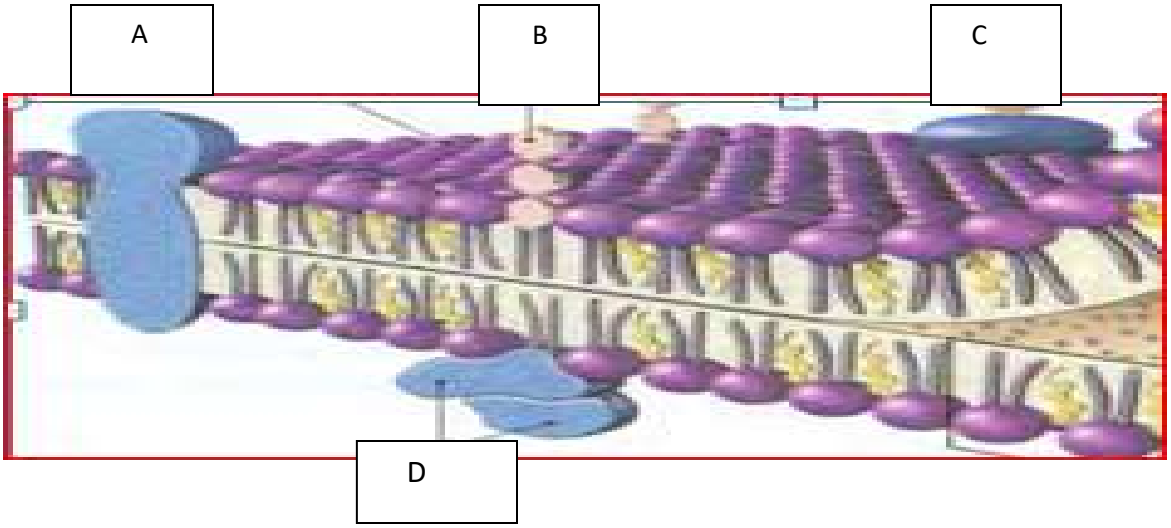
19. What is the term that describes plant response towards touch or physical contact?

A. Thigmotropism
C. Phototropism
B. Hydrotropism
D. Chemotropism

20. Which of the following plant hormone is responsible inducing seed dormancy?

A. Gibberellins
C. Abscisic acid
B. Auxin
D. Cytokinin

Question n$_0$ 21 and 22are based on the following figure



21. Which of the following alternative contains correct list of cell membrane proteins?

A. A: glycoprotein and B: peripheral protein, C: integral protein and D: glycolipid,
B. A: integral protein, B: glycolipid, C: peripheral protein and D: glycotien
C. A: integral protein, B: glycolipid, C: glycoprotein and D: peripheral protein
D. A: glycolipid, B: glycoprotein, C: integral protein and D: integral protein

22. Type of membrane protein on the cell surface which plays a key role in the body's immune response is represented by what letter?

A. D
C. B
B. A
D. C

23. What is the role of ethylene hormone in plant growth and development?

A. Initiate seed germination C. Induce seed dormancy

B. Ripening fruit D. Elongate cells

24. Which of the following cell structure and its function is not correct?

A. Rough endoplasmic reticulum→ synthesize lipid C. Peroxisome → metabolize fatty acid

B. Smooth endoplasmic reticulum → digest debris D. Golgi body → modify proteins

25. Which of the following does not describe acquired (adaptive) immune system?

A. Relies on mechanisms that exist before infection C. Second line of response

B. Relies on mechanisms that adapt after infection D. Handled by T- and B- lymphocytes

26. Which of the following enzyme is crucial in C3 plants for carbon dioxide fixation into C3 compound?

A. PEP C. Malate

B. RubBP D. Oxaloacetate

27. Which of the following is not correct about anarebic respiration /fermentation/ in animals?

A. Cramping appear due to lack of the ATP to pump Ca^{++} ions back that enable muscle relax

B. The accumulation of lactate in a muscle fiber makes the cytoplasm more acidic

C. During fermentation, glucose is broken down to lactate

D. People who train accumulate more lactate than those who do not train

28. In all the following condition diffusion is faster except;

A. With higher concentration difference C. At high temperature

B. For smaller molecules D. Over long distance

29. Which one of the following animal possess pouch for completing the development of the embryo?

A. Placental C. Egg laying
B. Marsupial D. Non placental

30. Which of the following factor that affect photosynthesis is not correct?

A. Light intensity limit light dependent reaction by reducing e^- in chlorophyll

B. Temperature limit enzyme action in photosynthesis

C. Oxygen limit the amount of carbohydrate produced in photosynthesis

D. Carbon dioxide limit the initial reaction of light independent

Question $n_{\underline{0}}$ 31 is based on the given table below

Table 1 Tonicity of solution

Solution	**Cell behavior when placed in solution**
A	Cell swells
B	Cell size doesn't change
C	Cell shrinks

31. Based on the above table, which of the following is correct?

A. Solution A is hypotonic, solution B is hypertonic and solution C is isotonic

B. Solution A is isotonic, solution B is hypotonic and hypertonic and solution

C. Solution A is hypotonic, solution B is isotonic and solution C is hypertonic

D. Solution A is hypertonic, solution B is hypotonic and solution C is isotonic

32. From the following which one is a biotic component of the ecosystem?

A. Parasite C. Disease
B. Competition D. Oxygen

33. Which of the following properties of enzymes makes it possible that a single enzyme molecule can act on many substrate molecules?

A. Enzymes lower the energy of activation C. Enzymes are proteins

B. Enzymes are reused over and over again D. Enzymes are substrate specific

34. In which type of solution is the water potential more negative than in the cells?

A. Hypotonic C. Isotonic

B. Hypertonic D. Equivalent solution

35. What will happen to the cell, if the size of a cell increases?

A. Surface area to volume ratio gets smaller C. The surface area gets smaller

B. Volume to surface area ratio gets bigger D. The volume gets smaller

36. Which of the following blood vessels contain valves to prevent backflow of blood?

A. Capillaries C. Veins

B. Arteries D. Venules

37. Under what conditions C4 plants have more photosynthetic efficiency than C3 plants?

A. Low water supply C. Low temperature

B. Low light intensity D. Low CO_2 concentration

38. All of the following produce by yeast during fermentation except;

A. Lactate C. ATP

B. Carbon dioxide D. Alcohol

39. The scientific name of a house fly is:

A. *Musca domestica* C. *Zea mays*

B. *Canis familiaris* D. *Felis domesticus*

40. What is the function of mucus in the respiratory system?

A. Transporting oxygen C. Remove debris

B. Produce sound D. Exchange gas

41. Which of the following is not correct in the mechanism of normal breathing in or inhalation?

A. The intercostal muscle between ribs relax C. Ribs move up and out

B. The volume of thorax increases D. Diaphragm muscle contract

42. If a sample fruit juice and some drops of Benedict's solution obtain a brick – red precipitate up on warming the mixture, what does the juice contain?

A. Starch C. Sucrose

B. Protein D. Reducing sugar

43. Assume the amino acid coding region in mRNA is 1800 nucleotides long, how long is the protein in terms of amino acid number?

A. 1200 amino acids C. 600 amino acids

B. 400 amino acids D. 300 amino acids

44. At which level of structural organization do proteins have the alpha-helix shape?

A. Primary structure C. Tertiary structure

B. Secondary structure D. Quaternary structure

45. When an enzyme is denatured by heat or extreme pH, which one of the following does it lose?

A. Quaternary structure C. Secondary structure

B. Primary structure D. Tertiary structure

46. Which of the following taxonomic rank is broader than order but narrower than phylum?

A. Kingdom C. Phylum

B. Class D. Family

47. Who is considered as a father of modern taxonomy?

A. Charles Darwin C. Carolus Linnaeus

B. Gregor Mendel D. Louis Pasteur

48. Which of the following taxonomic rank is correct from largest taxa to smallest?

A. Kingdom→ phylum →class→ family→ order→ genus→ species

B. Kingdom → phylum→ class→ order→ family→ genus → species

C. Kingdom → phylum→ order→ class → family → genus → species

D. Kingdom→ order → phylum→ class → family→ genus→ species

49. Which one of the following enzyme and its function is not correct?

A. Ligase → joining of nucleotide to form DNA C. Pepsin→ digesting proteins

B. Catalase → breaking down peroxide D. Lipase → digesting lipids

50. What are the environmental advantages of using enzymes in industry?

A. It helps high production with supply of more heat and emission of more CO_2

B. It makes high production possible with less input of heat

C. It makes high production possible with high input of heat

D. It makes high production possible with emission of more CO_2

51. Biological tool that is used to separate components of different molecular weight is known as;

A. Transect C. Quadra

B. GPS D. Centrifuge

52. Identify the illegal drug that is known for its strong hallucinogen feature

A. Cannabis C. Lysergic acid diethyl amide

B. Heroin D. Cocaine

53. Choose the correct letter that contains the correct order of ossicles found in middle ear from the biggest to the smallest.

A. Hammer, incus and stapes C. Incus, hammer and stapes

B. Stapes, hammer and incus D. Hammer, stapes and incus

54. In which of the following mitosis cell division occurs slowly?

A. RBC C. Skin cells

B. Nerve cells D. WBC

55. What is the role of hypodermis skin layer?

A. Contain sensory receptors and help in thermoregulation

B. Act as waterproof and prevent entry of pathogens

C. Act as energy store and insulation layer

D. Act as energy store and prevent entry of pathogens

56. If FSH produced by pituitary gland, what will happen to female gonad?

A. The ova become developed and oestrogen produced

B. The ova become developed and progesterone produced

C. The ova released from ovary and oestrogen produced

D. The ova released from ovary and progesterone produced

57. Which of the following is not physiological method of controlling temperature when temperature goes up in homoeothermis?

A. Vasodilation C. Painting

B. Piloerection D. Licking

58. As compared to saturated fat, unsaturated fat contains less?

A. Fatty acid C. Hydrogen

B. Glycerol D. Oxygen

59. Which of the following is not describes why biodiversity loss is concerned at the moment?

A. Food insecurity C. Health problem

B. Worsening social interaction D. Food security

60. Which of the following is not considered as characteristics of inbreeding?

A. Increase homozygosity C. Reduce fertility

B. Reduce disease resistance D. Increase disease resistance

61. In the Miller and Urey simulation experiment to study organic molecules formation in the primeval atmosphere of the earth all of the following gases were used except :

A.ammonia C.methane

B.oxygen D. nitrogen

62. Rabbits ear can be either short or floppy where short ears are dominant over floppy ears, in the populations of rabbits there are 653 individuals ,104 rabbits have floppy ears and 549 have short ears.find the frequency of dominant allele(P) and recessive allele (Q) in the population respectively?

A.P=0.36 and Q=0.16 C.P=0.16 and Q=0.6

B.P=0.6 and Q=0.4 D.P=.36 and Q=0.4

63. Which of the following combination is known as Neo Darwinism?

A. natural selection and Mendel law of inheritance

B. Natural selection and acquired characters

C. Acquired characters and Mendel law of inheritance

D. Natural selection and Lamarck theory of evolution

64.Which of the following term is used for fungal infection of the nails?

A. Tineabarbae C.Tineapedis

B. Tineaungum D.Tineacorporis

65. Which of the following bacteria produces acetic acid and does not cause food poisoning?

A. Staphylococcus aureus C.Bacillus cereus

B. Acetobacteraceti D. Campylobacter jeluni

66.Which of the following consists of only spirit products?

A. Whisky, gin ,brandy and vodka C. Wine , brandy ,gin and vodka

B. Gin ,brandy, beer and whisky D. Wine ,beer, gin and vodka

67. Yoghurt is made made by adding to milk microbes known as

A. Fusarium venenatum C. Lactobacillus bulgaricus

B. Streptococcus thermophilus D. B and C

68. Which of the following is not external part of the leaf?

A. Midrib C. Lamina

B. Petiole D. Mesophyll tissue

69. Which of the following absorb different wavelength of light?

A. Pigments C. Nutrients

B. Enzymes D. Minerals

70. Which part of plant leaf contain large number of chloroplasts that carry out most of the photosynthetic activity?

A. Palisade mesophyll C. Guard cells
B. Spongy mesophyll D. Epidermal cells

71. Which of the following is not a photoautotroph?

A. Purple sulphur bacteria C. Nitrogen fixing bacteria

B. Cyanobacteria D. Multicellular algae

72.Which part of white light is very important to drive photosynthesis mostly?

A. Green C.Blue

B. Yellow D. Orange

73.Which of the following is produced during light dependent reaction of photosynthesis?

A. glucose, NADPH and ATP C. ATP, glucose and oxygen

B. oxygen, NADPH and ATP D. NADPH , glucose and oxygen

74. In the calvin cycle which of the following compound is produced in C_3 plants first?

A. Glyceraldehyde-3-phosphate C. Fructose 6 phosphate

B.Glucose -6-phosphate D. Glucose, 1, 6 bisphosphate

75. Which of the following comparison of anabolic & catabolic path way is not correct?

Anabolism	**Catabolism**
A. Simple substance joined molecules to from simple substances	- Complex macromolecules broken down Together to from macro
B. The process release energy	- The process absorb energy
C. occur in photosynthesis	- Occur in respiration
D. Construction process of metabolism	- destruction phase of metabolism

76. From which of the following gene mutations does sickle cell anemia result?

A. Substitution C. Deletion

B. Addition D. Inversion

77. Which of the following organism add flavor by fermenting meats such a salami, summer sausage & Lebanon bologna?

A. Saccharomyces cerevisiae C. Lactobacillus plantarium

B. Streptococcus cremoris D. Methylophilusmethylophilus

78. Which of the following involve extracting and obtaining energy from their environment by enzyme mediated chemical reaction?

A. Sunlight C. Water

B. Soil D. living things

79. Which one of the following does not involve the practical applications of transgenic technology in livestock?

A. increasing feed utilization & growth rate

B. Improving milk production & composition

C. Increasing environmental degradation

D. Increasing disease resistance in animals

80. Which of the following stages of aerobic respiration does not produce ATP?

A. The electron transport chain C. The kreb cycle

B. Glycolysis D. The link reaction

81. Identify the alternatives that contain a pair of energy storage compounds of carbohydrate:

A. Cellulose & Starch C. Cellulose & Glycogen

B. Starch & Glycogen D. Chitin & Cellulose

82. Which of the following process does not require energy from ATP to occur?

A. Transmission of nerve impulse

B. Initial reaction of respiration

C. synthesis of macromolecules

D. Diffusion of oxygen into the cell

83. Homologus structures are evidence of evolution produced from:

A. comparative anatomy C. Comparative biochemstry

B. Comparative embryology D. Paleontology

84. The normal microbiota population that occupy or live in our bodies temporarily known as

A. Pathogenic organisms C. Transient microbiota

B. Resident microbiota D. infectious microbes

85. Fungi show filamentous growth and branches to from a network mass of fungus vegetative body known as

A. Spore C. hyphae

B. Sporangia D. mycellium

86. Which of the following organism transmits Africa sleeping sickness Trypanosomiasis?

A. Sand fly C. Tsetse fly

B. Mosquito D. Housefly

87. Which group of archaebacterial are called salt loving bacteria?

A. Halophiles C. Thermophiles

B. Methanogens D. Acidophilus

88. Which of the following is chromosomal mutation?

A. Substitution C. Deletion

B. Inversion D. Addition

89. Hummus & chimpanzees, both evolved from a common ancestor that lived about

A. 20 million years ago C. 10 million years ago

B. 15 Million years ago D. 6 million years ago

90. A larger brain allows humans all accept

A. run faster & moves in upright posture B. Develop arboreal life

C. plan in advance & avoid attack D. Develop and use tools & weapons

91. Which of the following is a viral disease that show symptom of the swollen and painful parotid glands & pain in chewing and swallowing?

A. Measles C. Mumps

B. Polio D. AIDS

92. Ammonium compounds are oxidized to nitrate by

A. nitrogen fixing bacteria C. ammonifying bacteria

B. denitrifying bacteria D. nitrifying bacteria

93. Which of the following protozoan disease causes blindness, mental retardation & multi system organ familiarity?

A. Toxoplasmosis C. Trypanosomes

B. Leishmaniasis D. Malaria

94. Which one of the following is not explained by the theory of natural selection?

A. Over reproduction

B. Variation in individual member of the species

C. In heritance of acquired characters

D. Survival of the fittest.

95. Which one of the following is not correct about lactic acid fermentation

A. pyruvate converted to lactic acid

B. Takes place in muscle cell & bacterial cell

C. Oxygen is being used up

D. Reduced NAD generate oxidized NAD

96. Which one of the following Lamarckian theory of evolution was correct?

A. The inheritance of acquired characters

B. Vestigial organs determine relatedness of different speies

C. Use & disuse theory

D. traits acquired individual life time could be passed onto its offspring's

97. In which of the following features are eukaryotic cells distinguished from prokaryotic cells?

A. They have mitochondria

B. They have smaller ribosomes

C. Their nuclei lack membrane

D. They lack membrane bounded organelle

98. The use of microbe to extract metals from ores is known as

A. Bioremediation C. Biogas Production

B. Bio hydrometallurgy D. Biofuel production

99. Which of the following is not an industrial use of bacteria?

A. Recycling of minerals through ecosystems

B. Food processing

C. Genetic engineering

D. Waste water treatment

100. In the processes of photosynthesis light is necessary to:

A. Split carbon dioxide

B. Releases energy

C. Combine CO_2 and H_2O

D. produces ATP and a reducing substance