

NLN – AHAT Sample Test II

Directions: Read each question carefully and consider all possible answers. Some questions may have more than one correct answer.

1. Phenotypic expression
 - a. always involves only one pair of genes
 - b. may involve many pairs of genes
 - c. is partly a function of environmental influences
 - d. refers specifically to the composition of genes
 - e. refers to the appearance of a trait

2. Which of the following is/are true?
 - a. XX is usually female
 - b. XY is usually male
 - c. Birds and butterflies do not have sex chromosomes.
 - d. Hermaphrodites are XX or XY
 - e. XXY is usually male

3. Linked genes are
 - a. inseparable
 - b. generally on the same chromosomes
 - c. in separate homologous chromosomes
 - d. in different chromatids
 - e. always separated during crossing over

4. Which of the following applies if two pure-breeding P generation plants are used to ultimately produce an F2 generation with flower colors in a ratio of 1 red: 2 pink: 1 white? (R is a gene for red; r = white)
 - a. all F1 plants were Rr
 - b. F plants were red and white
 - c. At least one P generation parent was pink
 - d. F2 genotypic ratio is 3:1
 - e. F2 genotypic ratio is 1:2:1

R and r are genes for flower color. Homozygous dominant and heterozygous genotypes both have red flowers; the homozygous recessive genotype has white flowers. T and t are genes that control plant height. Homozygous dominant plants are tall, heterozygous plants are medium height, and homozygous recessive plants are short. Genes for flower color and height are on different chromosomes. Use these data and the following list to answer questions 5-13. Construct Punnet Squares as needed.

- | | | | |
|---------|----------------|-----------------|-----------------|
| a. RRTT | f. rrtt | k. :2:4:2:1:2:1 | p. pink, medium |
| b. RrTt | g. 1:1 | l. red, tall | q. pink, short |
| c. Rrtt | h. 1:2:1 | m. red, medium | r. white, tall |
| d. rrTT | i. 9:3:3:1 | n. red, short | s. white, tall |
| e. rrTt | j. 1:2:1:1:2:1 | o. pink, tall | t. white, short |

Questions 5-8 pertain to the following cross: Rrtt x rrTT

5. What are the genotypes and phenotypes of the parents?
6. What are the genotypes and phenotypes of the offspring?
7. What is the genotypic ratio among offspring?
8. What is the phenotypic ratio among offspring?

Questions 9-13 pertain to all possible combinations of crosses between all genotypes in the offspring that resulted from the cross above (Rrtt x rrTT)

9. What are the genotypic and phenotypic ratios among offspring?
 10. What are all of the phenotypes among offspring?
 11. What are the listed genotypes found among offspring?
 12. What are the genotypes found among the offspring that are not in the list?
 13. What would the phenotypic ratio among offspring be if both flower color and height genes had exhibited incomplete dominance?
14. Which of the following would be true if hairy toes happened to be a recessive X-linked trait?
- a. all men would have hairy toes
 - b. no women would have hairy toes
 - c. Parent with hairy toes could have a child without hairy toes
 - d. More women than men would have hairy toes.
 - e. More men than women would have hairy toes
15. The study of human genetics relies mainly on
- a. pedigrees
 - b. punnet squares
 - c. fetal karyotypes
 - d. distribution of a trait in a population
 - e. nondisjunction
16. Congenital defects
- a. are acquired in infancy
 - b. may be inherited
 - c. may be produced by the environment
 - d. are present at birth
 - e. are only expressed when alleles are homozygous
17. Amniocentesis involves
- a. examination of maternal blood
 - b. insertion of a needle into the uterus
 - c. examination of fetal cells
 - d. examination of karyotypes
 - e. appraisal of paternal abnormalities

18. A person with Klinefelter Syndrome will

- a. have small testes
- b. be female
- c. have two X chromosomes
- d. have a Barr body

19. A person with Down Syndrome will likely

- a. have 47 chromosomes
- b. have trisomy 21
- c. be born of a mother in teens
- d. have a father with Down Syndrome

20. OO genotypes for blood group ABO could safely give blood to

- a. OO
- b. AA
- c. BB
- d. BO
- e. AB

21. A person with blood type AB could safely give blood to

- a. OO
- b. AA
- c. BB
- d. BO
- e. AB

22. That Earth's physical features were formed over long periods of time by a series of gradual changes was proposed by

- a. Aristotle
- b. Lamarck
- c. Darwin
- d. Wallace
- e. Lyell

23. The individual who simultaneously concluded that organisms evolve as nature selects the fittest was

- a. Aristotle
- b. Lamarck
- c. Darwin
- d. Wallace
- e. Lyell

24. That tulip trees are found only in the eastern United States, Japan, and China is probably due to
- past land bridge
 - similar climates
 - migrations
 - long range dispersal
 - two centers of origin
25. The first comprehensive theory of evolution, which proposed that the mechanism was an inner drive for improvement, was proposed by
- Aristotle
 - Lamarck
 - Darwin
 - Wallace
 - da Vinci
26. Organs of different organism that have a similar form due to common origin are
- analogous
 - artifacts
 - homologous
 - usually vestigial
 - found in fossils but never contemporary forms
27. The first to formally propose that organisms change over time as the result of natural phenomena rather than divine intervention was
- Aristotle
 - Lamarck
 - Darwin
 - Wallace
 - Lyell
28. The humerus in a bird and human are
- analogous but not homologous
 - homologous but not analogous
 - neither analogous nor homologous
 - both analogous and homologous
 - probably derived from a common ancestor
29. The wings of a butterfly and a bat are
- analogous but not homologous
 - homologous but not analogous
 - neither analogous nor homologous
 - both analogous and homologous
 - probably derived from a common ancestor

30. Evolution of organisms occurs by means of

- a. changes in individual organisms
- b. uniformitarianism
- c. changes in gene frequencies in the gene pool
- d. extinctions
- e. changes in populations

31. When an organism's body part is trapped in sediment and is not completely decomposed, the resulting fossil is called a/an

- a. cast
- b. petrification
- c. impression
- d. compression
- e. index fossil

32. When a fossil consists of minerals that have replaced an organism's tissues, it is called a/an

- a. cast
- b. petrification
- c. impression
- d. compression
- e. index fossil

33. The first large organic polymers (e.g. proteins, nucleic acids) most likely formed

- a. in the atmosphere
- b. in shallow seas
- c. in coacervates
- d. from monomers
- e. on clay surfaces

34. Experimenters that simulated conditions thought to have existed on early Earth found that these conditions could produce

- a. DNA
- b. RNA
- c. Nucleotide bases
- d. Proteins
- e. Amino acids

35. The Earth is thought to be about how many years old?

- a. 10-20 billion
- b. 4,000
- c. 3.5 billion
- d. 4.6 billion
- e. 10-20 million

36. About how many years passed between the Earth's formation and the appearance of recognizable cells?
- 10 million
 - 100 million
 - One billion
 - Five billion
 - 10 billion
37. The basic requirements for chemical evolution include
- DNA
 - Oxygen
 - Energy
 - Water
 - Time
38. Which of the following is/are listed in order from taxa of greatest diversity of taxa of least diversity?
- phylum, order, genus
 - family, class, order
 - class, family, genus
 - family, genus, species
 - class, order, division
39. Which one of the following differs most?
- animals and plants
 - fungi and animals
 - algae and animals
 - prokaryotes and eukaryotes
 - plants and fungi
40. Eukaryote and prokaryota are distinguished by the presence or absence of
- cell walls
 - cell membrane
 - membrane-bound
 - DNA as the hereditary material
 - True nuclei
41. Humans are placed in the phylum chordate because they have
- hair
 - an embryonic notochord
 - mammary glands
 - an opposable digit
 - a backbone

42. The types of cells in xylem include

- a. tracheids
- b. vessel element
- c. parenchyma
- d. sieve tube members
- e. fiber cells

43. The first part of the plant to emerge during germination is the

- a. radicle
- b. embryonic root
- c. coleoptile
- d. proembryo
- e. shoot

44. Hairlike outgrowths of plant epidermis are called

- a. periderm
- b. fiber elements
- c. lateral buds
- d. trichomes
- e. companion cells

45. The cell type found throughout the plant body that often functions in photosynthesis and storage is called

- a. sclerenchyma
- b. collenchyma
- c. parenchyma
- d. companion cells
- e. a tracheid

46. The types of cells in phloem include

- a. tracheids
- b. vessel elements
- c. parenchyma
- d. sieve tube members
- e. a tracheid

47. All plant cells have

- a. cell walls
- b. secondary growth
- c. the capacity to form a complete plant
- d. primary cell walls
- e. secondary cell walls

48. The principal sources of energy in the human diet are

- a. Proteins
- b. Lipids
- c. Carbohydrates
- d. Starches and sugars
- e. Meat

49. Glucose can result from

- a. glycogenesis
- b. glycogenolysis
- c. gluconeogenesis
- d. glycolysis
- e. B-oxydation

50. Which of the following would likely be used for energy as a last resort?

- a. carbohydrate
- b. lipid
- c. protein
- d. glycogen
- e. fatty acid

51. Some important functions of minerals include their role in/as

- a. cofactors
- b. nerve impulses
- c. maintaining fluid balance
- d. digestive hormones

52. Which of the following is true of vitamins in human nutrition?

- a. some are needed in large quantities
- b. megadoses can be harmful
- c. antibiotics may cause a vitamin deficiency
- d. vitamin A can be stored in fat tissue
- e. vitamin D must be ingested

53. The amount of water vapor that air can contain at a given temperature is the

- a. precipitation point
- b. dew point
- c. relative humidity
- d. saturation value
- e. hydrologic index

54. It takes a large amount of energy to heat water because off

- a. currents
- b. its high specific heat
- c. evaporation
- d. water temperature decreases rapidly
- e. the cooling effect on condensation

55. A major ocean current that moves northward along the west coast of South America

- a. warms coastal Europe
- b. Warms the U.S.
- c. cools South America
- d. is called the Gulf Stream
- e. is called the Humboldt current

56. The zone of soil that contains water and no air is the

- a. water table
- b. anaerobic zone
- c. zone of aeration
- d. zone of saturation
- e. hygroscopic zone

57. Activities performed by microorganisms involved in the nitrogen cycle include

- a. liberation of nitrogen from nitrate
- b. oxidization of ammonia to nitrates
- c. production of ammonia from proteins, urea, or uric acid
- d. fixation of molecular nitrogen
- e. continuous cycling of nitrogen

58. The major roles of organism sin a community are

- a. producers
- b. nitrogen fixers
- c. phosphorous fixers
- d. consumers
- e. decomposers

59. The totality of an organism's adaptations, its use of resources, and the lifestyle to which it is fitted are all embodied in the term

- a. ecosystem
- b. community
- c. food web
- d. pyramid
- e. niche

60. Which of the following would be positioned at the top of a typical pyramid?

- a. producers
- b. consumers
- c. the trophic level with the greatest biomass
- d. trophic level with the least numbers
- e. trophic level with the least energy

61. An association of different species of organisms interacting and living together is a/an

- a. ecosystem
- b. community
- c. food web
- d. pyramid
- e. niche

62. What are the differentiating factors for potential and kinetic energy?

- a. properties – physical or chemical
- b. state – solid or liquid
- c. temperature – high or low
- d. activity – in motion or in storage

63. How many calories are required to change the temperature of 2000 grams of H₂O from 20 °C to 38 °C?

- a. 36 calories
- b. 24 calories
- c. 18 calories
- d. 12 calories

64. Which of the following kinds of radiation is most penetrating?

- a. alpha
- b. beta
- c. gamma
- d. X rays

65. It has a half-life of eight days. A 100-milligrams sample of this radioactive element would decay to what amount after eight days?

- a. 50 milligrams
- b. 40 milligrams
- c. 30 milligrams
- d. 20 milligrams

66. Because of the relationship between temperature and the rate of reaction, a person with a fever would be expected to have
- an increase in pulse rate
 - a decrease in pulse rate
 - no change in pulse rate
 - any one of the above
67. Which of the following bodily substances is a catalyst?
- bile
 - hemoglobin
 - enzyme
 - mucous
68. What is the molecular weight of NaOH? (atomic weights:Na=23; O=16; H=1)
- 40×1
 - 40×10
 - 40×100
 - 40×1000
69. Which of the following causes malaria?
- a bacterium
 - a protozoan
 - a mosquito
 - bad air
70. The basic inorganic raw materials for photosynthesis are
- water and oxygen
 - water and carbon dioxide
 - oxygen and carbon dioxide
 - sugar and carbon dioxide
71. Production of Salk vaccine against polio depended upon discovery of a method for
- growing the polio virus outside the human body
 - killing the polio virus
 - observing the polio virus in the human body
 - producing a polio antitoxin
72. Ringworm is caused by a(n)
- alga
 - bacterium
 - fungus
 - protozoan

73. The process responsible for the continuous removal of carbon dioxide from the atmosphere is
- respiration
 - metabolism
 - oxidation
 - photosynthesis
74. One of the functions of bile in the digestive processes is to
- deaminate proteins
 - hydrolyze starches and fats
 - neutralize acidity of food from the stomach
 - catalyze vitamin A and vitamin D
75. Glycogenesis occurs primarily in the
- blood cells and spleen
 - pancreas and gallbladder
 - small intestines and stomach
 - liver and muscles
76. The end-products of the Krebs Cycle are
- carbon dioxide and water
 - urea and bile pigments
 - lactic acid and pyruvic acid
 - ketones and acetones
77. The functional unit (or nephron) of the human kidney consists of?
- Bowman's capsule and veins
 - Bowman's capsule, the glomerulus
 - The ureter and renal tubule
 - The ureter, urethra, and renal tubule
78. An organ that functions both as an endocrine and an exocrine gland is the?
- salivary gland
 - gall bladder
 - thyroid gland
 - pancreas
79. Aerobic oxidation of glucose occurs in two major stages; these are
- glycolysis and reduction
 - synthesis and the Krebs Cycle
 - glycolysis and the Krebs Cycle
 - degradation and hydrolysis

80. The chemical reaction that supplies immediate energy for muscular contractions can be summarized as

- a. ATP ----- ADP + P
- b. Lactic acid ----- CO₂ + H₂O
- c. Lactic acid ----- glycogen
- d. Glycogen ----- ATP

81. Which of the following is related to the cause of heart disease?

- a. absence of serum transaminase
- b. accumulation of urea nitrogen
- c. decreased levels of bilirubin
- d. increased levels of blood cholesterol

82. The endocrine glands in the body have the function of

- a. purifying the blood
- b. regulating bodily activities
- c. controlling the blood distribution
- d. preventing antigenic action

83. The basic unity of the lung tissue is

- a. lacunae
- b. nephron
- c. alveolus
- d. cyton

84. Hemorrhoids, commonly called piles, affect which of the following structures

- a. pyloric sphincter
- b. rectal sphincter
- c. urethral orifice
- d. mitral orifice

85. The speech processes are primarily controlled by which area of the brain

- a. frontal
- b. cerebellum
- c. parietal
- d. occipital

86. In the circulating system, oxygenated blood is pumped out of the heart from the

- a. right ventricle
- b. left ventricle
- c. right atrium
- d. left atrium

87. Vascular plants contain tissues called xylem and

- a. cambium
- b. phloem
- c. meristem
- d. lenticels

88. Stored food for the embryo of a bean seed is found in the

- a. plumule
- b. hypocotyl
- c. cotyledons
- d. testa

89. In the structure of a flower, the stigma is most closely positioned to the

- a. style
- b. ovary
- c. sepal
- d. ovule

90. Of the following animal phyla, the one probably more varied and abundant now than in previous geological periods is the

- a. Protozoa
- b. Bryozoa
- c. Brachiopoda
- d. Echiurodermata

91. Rod-shaped bacteria are classified as

- a. bacilli
- b. cocci
- c. vibrios
- d. spirilla

92. A stain used in classifying bacteria is

- a. Grams's
- b. Wright's
- c. Loeffler's
- d. Giemsa

93. Of the following, vitamin B₁₂ is most useful in combating

- a. pernicious anemia
- b. night blindness
- c. rickets
- d. goiter

94. Both malaria and yellow fever are
- caused by protozoan's
 - cured with antibiotics
 - prevented by vaccination
 - controllable by swamp drainage or hormonal insecticides
95. Of the following electrical devices found in the home, the one that develops the highest voltage is the
- electric broiler
 - radio tube
 - television picture tube
 - electric steam-iron
96. Cholesterol is
- A basic part of bone structure
 - An alcohol formed in the body
 - A substance found in blood
 - The cause of colitis
97. One-celled animals belong to the group of living things know as?
- protozoan's
 - poriferans
 - annelids
 - arthropods
98. The lightest element known on earth is
- hydrogen
 - helium
 - oxygen
 - air
99. Of the following gases in the air, the most plentiful is
- argon
 - nitrogen
 - oxygen
 - carbon dioxide
100. Of the following kinds of clouds, the kind that occurs at the greatest height is called
- cirrus
 - cumulus
 - nimbus
 - stratus

101. The usual vector in the transmission to humans of rickettsial diseases is

- a. birds
- b. rodents
- c. arthropods
- d. snails

102. Passive immunity to diphtheria may be achieved by taking an infection of a(n)

- a. vaccine
- b. toxin
- c. toxoid
- d. antitoxin

103. Of the following, the only safe blood transfusion would be

- a. group A blood into a group O person
- b. group B blood into a group A person
- c. group O blood into a group AB person
- d. group AB blood into a group B person

104. If the following human trait, the one under both genetic and hormonal control is

- a. hemophilia
- b. color blindness
- c. baldness
- d. blood type

105. The vitamin that helps coagulation of the blood is

- a. C
- b. D
- c. E
- d. K

106. The nuclei of pollen grains are similar in chromosome number to all except

- a. egg
- b. sperm
- c. cell of a plant embryo
- d. spore

107. Bacilli are bacteria that are shaped like

- a. chains of beads
- b. isolated spheres
- c. rods
- d. spirals

108. All of the following mechanisms affect the amount of glucose in the blood except

- a. adrenalin secretion
- b. insulin secretion
- c. level of oxygen intake
- d. level of physical activity

109. Among vertebrates the embryonic ectoderm gives rise to which of the following?

- a. nervous system
- b. digestive system
- c. skeletal system
- d. respiratory system

110. The functions of plant roots may normally include all of the following except

- a. photosynthesis
- b. food storage
- c. absorption
- d. support

111. In humans, any hereditary defects caused by a gene on the Y chromosomes would occur

- a. only in males
- b. only in females
- c. only if the gene were recessive
- d. about equally in males and females

112. There is no oxidation-reduction in a reaction involving

- a. single replacement
- b. double replacement
- c. simple decomposition
- d. direct combination of elements

113. Man's first defense to organisms is/are

- a. skin
- b. gland
- c. gland
- d. vaccine

114. Active immunity is obtained through

- a. infection antibodies
- b. infection of dead or weakened
- c. infection of antibiotic
- d. infection of insulin

115. Which of the following is not a communicable disease?
- chicken pox
 - cold
 - diabetes
 - mumps
116. During _____ growth rate is high permanent teeth erupt, bladder and bowel control established
- adulthood
 - childhood
 - adolescence
 - senescence
117. Density is defined as
- $F=mg$
 - $D=m/v$
 - $KE=1/2 mv^2$
 - $V=RI$
118. A deficiency in thiamine could cause
- rickets
 - scurvy
 - beri beri
 - anemia
119. A deficiency in calcium could lead to
- rickets
 - scurvy
 - osteoporosis
 - anemia
120. Boyle's law is defined as
- $$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$
 - $$\frac{P_1 V_1}{T_1} = \frac{P_2 V_2}{T_2}$$
 - $P_1 V_1 = P_2 V_2$

ANSWER KEY

1.	B,C,E	41.	B	81.	D
2.	A,B,E	42.	A,B,C,E	82.	B
3.	B	43.	A,B	83.	C
4.	A,E	44.	D	84.	B
5.	C/N & D/R	45.	C	85.	A
6.	B/M & E/S	46.	C,D,E	86.	B
7.	G	47.	A,D	87.	B
8.	G	48.	C,D	88.	C
9.	BOTH;	49.	B,C	89.	A
10.	L,M,N,R,S,T	50.	C	90.	A
11.	B,C,D,E,F	51.	A,B,D	91.	A
12.	Rr TT	52.	B,C,D	92.	A
13.	J	53.	D	93.	A
14.	E	54.	B	94.	D
15.	A,D	55.	C,E	95.	C
16.	B,C,D	56.	D	96.	C
17.	B,C,D	57.	A-E	97.	A
18.	A,D	58.	A,D,E	98.	A
19.	A,B,C	59.	E	99.	B
20.	A-E	60.	B,D,E	100.	A
21.	E	61.	B	101.	C
22.	E	62.	D	102.	D
23.	C,D	63.	A	103.	C
24.	A	64.	C	104.	C
25.	B	65.	A	105.	D
26.	C	66.	A	106.	C
27.	A	67.	C	107.	D
28.	B,E	68.	A	108.	C
29.	A	69.	B	109.	A
30.	C,E	70.	B	110.	A
31.	D	71.	A	111.	A
32.	B	72.	C	112.	B
33.	D,E	73.	D	113.	A
34.	C,E	74.	C	114.	B
35.	D	75.	D	115.	C
36.	C	76.	A	116.	B
37.	C,D,E	77.	B	117.	B
38.	A,C,D	78.	D	118.	C
39.	D	79.	C	119.	C
40.	C,E	80.	A	120.	C