True or False

Unit 2

( ) 1. All of mutation can be passed between generations , that makes mutation important in evolution.

( ) 2. Mitotic division generates identical cell copies.

( ) 3. Chromosomes condense before cell division.

( ) 4. Sexual life cycles include mitosis, meiosis, and fertilization.

( ) 5. A dividing cell must first duplicate its genome, which may consist of one or more chromosomes.

( ) 6. In Mitosis,DNA Replicates Once,but the Nucleus Divides Twice.

( ) 7. Sexual reproduction typically cannot create or maintain this genetic diversity, but asexual reproduction can.

( ) 8. Of the 23 chromosome pairs in a human cell, 22 pairs consist of autosomes and a pair of the sex chromosomes.

( ) 9. Translation occurs in 4 steps.

( ) 10. Transcription occurs in 4 steps.

( ) 11. A gene is a portion of DNA whose sequence of nucleotides (A,C,G,and T)encodes a protein.

( ) 12. A male has two X chromosomes,whereas a female has one X and one Y.

( ) 13. RNA molecules must turn into DNA molecules.

( ) 14. RNA molecules must encode the cell wall.

Unit 3

( ) 1. Natural selection theory is delivered by Charles Darwin.

( ) 2. Nevertheless,it is important to realize that natural selection itself is a random process.

( ) 3. Natural selection does have a goal.

( ) 4. At Hardy-Weinberg equilibrium, mutation occur of course.

( ) 5. At Hardy-Weinberg equilibrium, allele frequencies change.

( ) 6. Migration is one common way that gene drift occurs

( )7. Genetic drift is inevitable.

( ) 8. RNA molecules must turn into DNA molecules.

( ) 9. RNA molecules must encode the cell wall.

( )10.The term microevolution describes these large,complex changes in life.

( )11. The root cause of extinction is always the same:Species die out if evolution fails to meet the pace of environmental change.

( )12. Early life changed Earth forever.

Unit 4

( )1. Bacteria are often collectively described as "extremophiles" because scientists originally found them in places that were extremely hot,acidic,or salty .

( )2. Bacteria and archaea can be used in wastewater treatment.

( ) 3. Plants are autotrophs.

( ) 4. Flowers and fruits are unique to the gymnosperm life cycle.

( )5. Fungi are decomposers in ecosystems.
( )6. Like bacteria, fungi are prokaryotes.
( )7. Animals are multicellular organisms with eukaryotic cells with cell walls.
( )8. Animal life began in the water.
( )9. Reptiles were the first vertebrates to thrive on dry land.
( )10. Birds are warm, feathered reptiles.

Multiple Choice Questions

Unit 2

1.The DNA double helix resembles a twisted ladder. The ladder's rungs are ( ) base pairs joined by hydrogen bonds.
A.A–T B. G–C C. A–U D. U–A

2.Protein synthesis requires 2 processes as transcription and ( )
A.fertilization B. chromosomes condense C. DNA replication D. translation

3.RNA is central to the flow of genetic information. ( ) types of RNA interact to synthesize proteins.
A.1 B. 2 C. 3 D. 4

4.Transcription occurs in three stages:( )
A.translation B. initiation C. elongation D. termination

5.When the DNA template strand is transcribed to RNA, the ladder's rungs are ( ) base pairs joined by hydrogen bonds.
A.A–T B. G–C C. A–U D. U–A

6.What are the types of mutations？（ ）
A.Substitution B. Nonsense C. Insertion D. Deletion

7.Transcription copies a _____ to a complementary _____ molecule.( )
A.chromosome; DNA B. genome; RNA
C.gene; RNA D. DNA sequence; ribosome

8.If adenine in the tenth nucleotide position of a gene mutates to cytosine, then the ( ) amino acid in the protein encoded by this gene could change.
A.first B.fourth C. tenth D. thirtieth

9. If a DNA sequence is 3'-AAAGCAGTACTA-5', what is the corresponding amino acid sequence? ( ) (Refer to the Table1)
A Lys-Ala-Val-Leu B Pro-Ser-Gly-Asn C Phe-Arg-His-Asp D Ser-Cys-Tyr-Leu

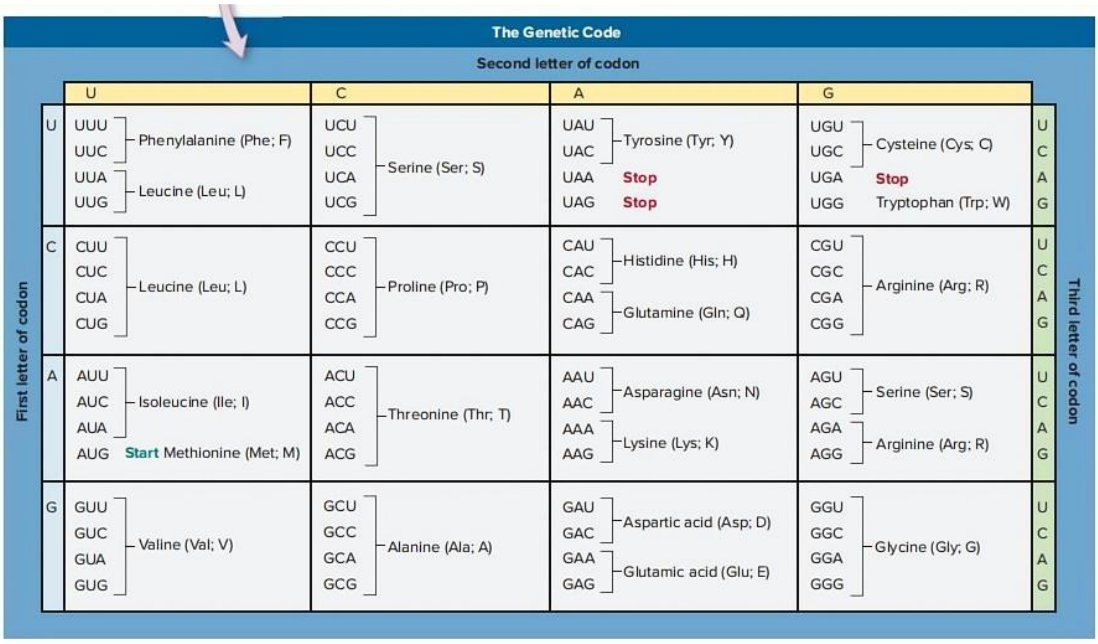
10.Suppose that a substitution mutation replaces the first A in the following mRNA sequence with a U:5′-AAAGCAGUACUA-3′.How many amino acids will be in the polypeptide chain? (Refer to the Table1) ( )

A 4 B 3 C 2 D 0

11.How many different three-codon sequences encode the amino acid equence Phe-Val-Ala? ( )(Refer to the Table1)

A 1 B 4 C 8 D 32

Table 1



12 In the list of four terms below,which term is the second most inclusive?（ ）

A.Genome B.Allele C.Chromosome D.Gene

13.( ) divide by binary fission.

Animals B. Eukaryotes C Plants D Prokaryotes

14.( ) are the three main events of the cell cycle?

A. Interphase B. Cytokinesis C.Cell division D. Chromosomes condense

15.How many cytosines are in the strand that is complementary to the following DNA sequence? 5′-TCAATACCGATTAT-3′ ( )

A 1 B 3 C 5 D 6

16.A cell that has completed interphase contains __ times as much DNA as a cell at the start of interphase. ( )

A 1 B 2 C 4 D 6

17. A type of fish called a carp has gametes comtaining 52 chrommosomes.Howmany

chromosomes are in a carp's somatic cells? （ ）
A 26 B 52 C 104 D 23

18. A cell that is entering prophase I contains__times as much DNA as one daughter cell at the end of meiosis.( )
A 1 B 2 C 3 D 4

19.Compared to other forms of reproduction,the unique feature of sex is ( )
A.the ability of a cell to divide. B.the production of offspring.
C.the ability to generate new genetic combinations. D.All of the above are correct.

20.Which of the following is not a mechanism that contributes todiversity among the offspring from two parents? ( )
A.Random fertilization B.Crossing over
C.Cytokinesis D.Random chromosome orientation during metaphase I

21.Meiosis results in ( ).
A.two unique diploid cells. B. two identical haploid cells.
C. four identical haploid cells. D. four unique haploid cells.

22.If Mendel mated a true-breeding tall plant with a heterozoygous tall plant. what percentage of the offspring would also be tall?（ ）

A 25% B 50% C75% D 100%

23.According to the ABO classification system, the phenotype of human blood is IA IB, and the recessive is i. A Type：IAIA, IAi; B Type：IBIB, IBi; AB Type：IA IB；O Type：i i
A father with type A blood and a mother with type AB blood, their child cannot have that blood type? （ ）
A. A type B. B type C. AB type D. O type

24.Mendel called the masking trait ( );the trait being masked was called ( ).
A.dominant; recessive B.recessive;dominant C.haploid; diploid D.diploid; haploid

25.Which of the following is a possible gamete for an individual with the genotype PP rr? （ B ）
A.P p B. P r C. p r D. r r

26.In a species of ladybug,one gene controls whether the beetle has spots or not,with the allele conferring spots being dominant.Suppose you find a swarm consisting of 1000 ladybugs;250 of them lack spots.What are the frequencies of the dominant and recessive alleles? （ ）
A 25% B 50% C75% D 100%

27.Assume that 1 in 3000 Caucasian babies in the United States is born with cysticfibrosis ,a disease caused by a recessive allele.The value of q2 is therefore 1/3000=0.0003; q is the square root of 0.0003,or 0.018.Use this information to estimate the frequency of heterozygotes (symptomless carriers)in the American Caucasian population. ( )

A 3.5% B 0.3% C18% D 2.5%

Unit 3

1.Natural selection can shape populations in many ways, such as ( ).

A.random mating B. disruptive selection

C.stabilizing selection D.directional selection

2.Evolution occurs in several additional ways, such as ( ).

A.mutation B. genetic drift C. nonrandom mating D.gene flow

3.Darwin observed that different types of organisms live on either side of a geographical barrier.Such barriers prevent ( )

A.gene flow. B.genetic drift. C.sexual selection. D.mutation.

4.The biological species concept defines species based on ( )

A.external appearance.

B.the number of adaptations to the same habitat.

C.ability to interbreed.

D.DNA and protein sequences.

5. A mule is the offspring of a male donkey and a female horse.Mules are unable to produce offspring.What reproductive barrier separates horses and donkeys?( )

A.Mechanical isolation B.Gametic isolation

C.Hybrid inviability D.Hybrid infertility

6.A mountain range separates a population of gorillas.After many generations,the gorillas on one side of the mountains cannot produce viable,fertile offspring with their counterparts on the other side.What has happened? ( )

A.Sympatric speciation B.Allopatric speciation

C.Parapatric speciation D.Adaptive radiation

7.Any interruption in courtship, fertilization,embryo formation,or offspring development can be a ( )

A.reproductive barrier B. interbreed C.gene pool D. species

8.Biologists divide the many mechanisms of reproductive isolation into two broad groups: prezygotic and ( ).

A.postzygotic B. interbreed C.hybrid inviability D. reproductive barrier

9.In the list of four terms below,which term is the most inclusive?( )
A.Phyla B. Kingdoms C.Domain D. Species

Unit 4

1.What is a prion? ( )
A.A highly wound circle of RNA
B.A virus that has not yet acquired its envelope
C.A protein that can alter the shape of a second protein
D.The protein associated with a latent virus

2.Which of the following is NOT a feature associated with viruses? ( )
A.Cytoplasmc. B. Protein coat C..Genetic information D.Envelope

3.Which of the following is the largest?( )
A.HIV B. E.coli cell C. RNA molecule D. Human T cell

4.At which stage in viral replication does the genetic information enter the host cell? ( )
A.Penetration B. Assembly C.Synthesis D.Release

5.The two viral replication strategies in bacteriophages are called ( ) infections.
A.penetration and assembly B. lytic and lysogenic
C.synthesis and .release D. prezygote and postzygote

6.A prokaryotic cell is one that ( )
A.Lacks DNA. B.has membrane-bounded organelles.
C. lacks a nucleus. D.lacks a plasma membrane.

7.A prokaryote is a single-celled organism that lacks a nucleus and membrane bounded organelles. DNA sequences and other lines of evidence suggest the existence of two prokaryotic domains:Bacteria and ( )
A.Bacteria B. Archaea C. Protists D. Virus

8.Which is not the structure of prokaryotes' cell. ( )
A.Cell wall B. Ribosome C. Cell membrane D. Protein coat

9.Prokaryotes can be classified by the methods by which organisms acquire carbon and energy. One is autotrophs and ( ).
A. heterotrophs B. archaea C. phenotype D. bacteria

10.Which of the following is NOT a characteristic of all protists? ( )
A.Unicellular B. Cells containing membrane-bounded organelles

C. Cells containing a nucleus D. Eukaryotic

11.Why are DNA sequences useful in the classification of protists? ( )
A. Because only protists have DNA
B. Because genetic sequences have confirmed the traditional categories of protists
C. Because DNA reveals evolutionary relationships,even among organisms that look different
D. All of the above are correct.

12.Photosynthetic cells affected early Earth by ( )
A.adding O_2 to the atmosphere.
B.increasing the amount of hydrogen sulfide in the early oceans.
C.depleting the ozone layer.
D.changing the pH of the early oceans.

13.Which of the following is NOT a similarity between land plants and green algae? ( )
A. Photosynthesis
B. Starch as a storage form of energy
C. Cellulose cell walls
D. The presence of a cuticle and stomata

14.Biologists use some of these features to organize land plants into four main groups: ( )
A. bryophytes B. seedless vascular plants C. gymnosperms D. angiosperms

15.Since a whale is a mammal,it must ( )
A.have scales. B.have gills. C.produce milk. D.All of the above are correct.

Write It Out

Unit 2

1. How do transcription and translation use genetic information? (7)

2. What are the three types of RNA, and how does each contribute to protein synthesis?(7)

3. What is a mutation? What causes mutations? What are the types of mutations?(7)

4. Why do we consider that the mutations are important?(7)

List the sequences of the mRNA molecules transcribed from the following template DNA sequences: (7)

a.T G A A C T A A G G T A C C A T A C
b.G C A C T A A A G A T C T G A C C A

5. **Describe two functions of apoptosis. (8)**

6. **In what ways are mitosis and meiosis different?(9)**

7. **In what ways are mitosis and meiosis similar?(9)**

8. **In rose bushes,red flowers (FF or Ff)are dominant to white flowers (ff).A true-breeding red rose is crossed with a white rose. What will be the most common genotype of the F_1 generation?(Use the Punnett Square) (10)**

9. **What Does"Survival of the Fittest"Really Mean?(12)**

10. **List and describe FOUR mechanisms of evolution. (12)**
11. **What type of reproductive barrier applies to each of these scenarios?**
12. **How do microbes form vital links in ecosystems?**
13. **How have plants changed the world?**