**Score:**

25

**COLLEGE ADMISSION CHALLENGE REVIEW**

**DIAGNOSTIC TEST IN BIOLOGY**

**Name:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Date:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Directions:** Each of the questions or statements below is accompanied by five choices. For each question, blacken the circle that corresponds to your answer.

A B C D E



1. **Which of the following statements about mitochondria is NOT correct?**
2. They serve as sites for cellular respiration.
3. They are enclosed by a double membrane
4. They are the sites where most of the cell’s ATP is produced
5. They are found in animal cells only; plant cells have chloroplasts instead
6. They are found in eukaryotic cells but not in prokaryotic cells

A B C D E



1. **Which of the following statements is CORRECT?**
2. The product of transcription is DNA.
3. The product of transcription is mRNA.
4. The product of transcription is a polypeptide
5. The product of translation is mRNA
6. The product of translation is DNA

A B C D E



1. **If a molecule of DNA is composed of approximately 16.2% adenine (A) and 33.4% guanine (G), the percentages of thymine (T) and cytosine (C) must be approximately**
2. 16.3% T and 16.3% C
3. 34.1% T and 34.1% C
4. 34.1% T and 16.3%C
5. 16.3 T and 34.1% C
6. 33.4% T and 16.2 C

A B C D E



1. **Which of the following often distinguishes plant cells from animal cells?**
2. centrioles
3. nucleus
4. chromatin
5. rough ER
6. bilayer plasma membrane

A B C D E



1. **Which of the following statements about meiosis is CORRECT?**
2. The result of meiosis is a zygote.
3. Only somatic cells undergo meiosis
4. Meiosis restores the original diploid condition of a population.
5. Meiosis typically results in genetic variation among the gametes produced.
6. The products of meiosis are always four cells identical to the parent cell.

**Questions 6 & 7 refer to the following breeding experiment. The researcher’s goal was to develop white mice with short tails.**

P brown mice with short tails x white mice with long tails

F1 all offspring are brown and have long tails

F2 292 mice are brown with long tails

97 mice are brown with short tails

103 mice are white with long tails

36 mice are white with short tails

A B C D E



1. **The results of the above cross indicate that among the original parents (P-generation) \_\_\_\_\_\_\_\_**
2. both were heterozygous for coat color and tail
3. one was homozygous dominant for coat color and tail length, whereas the other was homozygous recessive for both traits
4. one was homozygous dominant for coat color and homozygous recessive for tail length, whereas the other was homozygous recessive for coat color and homozygous dominant for tail length
5. one was homozygous dominant for both traits, whereas the other was heterozygous for both traits
6. one was homozygous recessive for both traits, whereas the other was heterozygous for both traits

A B C D E



1. **Based on the results, how many genes control the four traits observed among the F2 progeny (brown coat color, white coat color, short tail, long tail)?**
2. one
3. two
4. four
5. eight
6. sixteen

A B C D E



1. **A cooperative unit of many cells with similar form and function is known as a(n) \_\_\_\_**
2. tissue
3. organ
4. organ system
5. organelles
6. colonial cells

A B C D E



1. **The role of oxygen in aerobic respiration is**
2. to couple with C to form CO2 in chemioosmosis
3. to form ATP
4. to contribute H+ to the Kreb’s cycle
5. to make PGAL
6. to accept electrons from the Electron Transport Chain (ETC)
7. **For the DNA strand 5’-ACC-GTG-ACA-TTG-3’, the correct compliment DNA would be**

A B C D E



1. 3’-TGG-CAC-TGT-AAC-5’
2. 5’-TGG-CAC-TGT-AAC-3’
3. 3’-UGG-CAG-UGU-AAC-5’
4. 5’-ACC-GUG-ACA-UUG-3’
5. 3’-TCC-GAG-TGT-AAC-5’

A B C D E



1. **An mRNA is 429 nucleotides long. The number of amino acids in the polypeptide chain formed from this mRNA is**
2. 143
3. 142
4. 141
5. 429
6. 428

A B C D E



1. **The plant hormone responsible for fruit ripening is**
2. absissic acid
3. auxin
4. cytokinin
5. ethylene
6. gibberellin

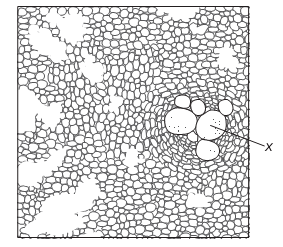
A B C D E



1. **Which of the following is the CORRECT sequence for human circulation?**
2. heart –vein—capillary—artery-heart
3. heart—artery—lung—vein—body systems-heart
4. heart—artery—lungs—vein—heart—body systems
5. body systems—lungs—heart—vein—capillary—artery
6. heart—artery—lungs—body systems—vein--heart

A B C D E



1. **How many possible gametes can an individual with *AaBbCcDdEe* genetic make-up produce?**
2. 4
3. 8
4. 16
5. 32
6. 64

**Number 15 is about a cross section of a monocot root at the right.**

A B C D E



1. **What is the structure marked with an X?**
2. xylem
3. cortex
4. phloem
5. endodermis
6. pericycle

A B C D E



1. **Insulin is an important hormone that serves to decrease one’s blood sugar. Glucagon has the opposite effect through \_\_\_\_\_\_\_\_\_**
2. the conversion of glycogen to glucose
3. the secretion of glucose by cells
4. causing gluconeogenesis
5. storing calcium
6. the secretion of adrenaline
7. **Striated and voluntary muscle is \_\_\_\_\_\_\_\_\_**

A B C D E



1. skeletal
2. cardiac
3. smooth
4. arrector pili
5. both B and C

A B C D E



1. **After birth, the structure of the bone necessary for its continued growth is the \_\_\_\_\_\_**
2. epiphysis
3. metaphyseal membrane
4. epiphyseal plate
5. diaphysis
6. femoral trochanter

A B C D E



1. **A heartbeat produces the familiar “lubb-dupp” sounds (*Korotkoff* sounds) as the chambers contract and the valves close. When the valves are defective, swishing sounds may be heard and it is called heart murmurs. Supposed you are a health professional in a clinic. Using a sthetoscope you hear a “lubb-dupp-swishh” sounds. What valves are most probably ineffective in closing the chambers?**
2. atrioventricular valves
3. semilunar valves
4. venous valve
5. sinoatrial node
6. both A and B

A B C D E



1. **Which of the following enzymes acts on protein?**
2. pepsin
3. ptyalin
4. amylase
5. maltase
6. sucrase

A B C D E



1. **Lichens are composed of both fungal and algal components. The fungal component absorbs water and nutrients for both organisms, while the algal component manufactures food for both organisms through photosynthesis. This type of symbiotic relationship is referred to as \_\_\_\_\_\_\_\_\_\_\_.**
2. Parasitism
3. Commensalism
4. Predation
5. Mutualism
6. Interspecific competition

**Questions 22 & 23 refer to the following population in Hardy-Weinbergequilibrium:**

***Within the squirrel population at James City Park, 16% show the recessive phenotype of a curled tail (tt).***

A B C D E

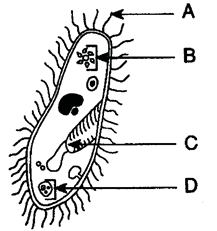


1. **What is the frequency of the dominant allele (T) in the population?**
2. 0.40
3. 0.16
4. 0.26
5. 0.60
6. 0.32
7. **What is the frequency of the heterozygotes in the population?**

A B C D E



1. 0.08
2. 0.24
3. 0.36
4. 0.48
5. 0.64

**Questions 24 & 25 refer to diagram below**

A B C D E



1. **The diagram above represents a freshwater protist. Which letter indicates a structure that prevents the accumulation of excess water?**
2. D
3. C
4. B
5. A
6. None of the above

A B C D E



1. **The organism depicted above is a \_\_\_\_\_\_\_\_\_**
2. ciliate and a prokaryote
3. flagellate and a protozoan
4. ciliate and a protozoan
5. sporozoan and a ciliate
6. zoospore and a sporozoan

**Key to Correction**

1. D
2. B
3. D
4. A
5. D
6. C
7. B
8. A
9. E
10. A
11. B
12. D
13. C
14. D
15. A
16. A
17. A
18. C
19. B
20. A
21. D
22. D
23. D
24. C
25. C

A B C D E

