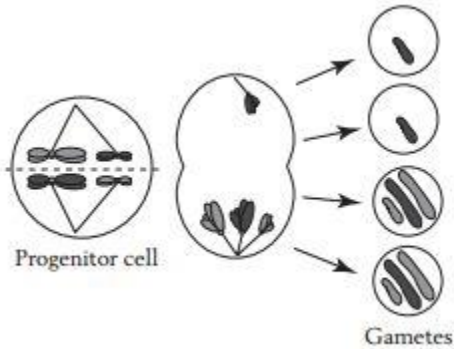


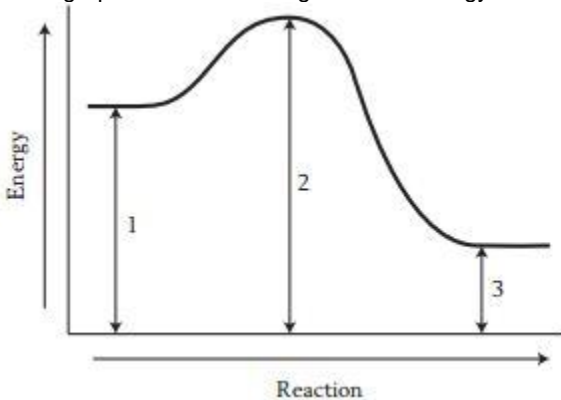
## SAT BIOLOGY PRACTICE PAPER

1. The phenomenon depicted in the diagram is known as



- A. linkage
- B. independent assortment
- C. crossing over
- D. nondisjunction
- E. mutation

2. The graph shows the changes in free energy before, during, and after a biochemical reaction.



Which describes the effect of a catalytic enzyme on this reaction?

- A. Energy decreases at point 1.
- B. Energy increases at point 1.
- C. Energy decreases at point 2.
- D. Energy increases at point 2.
- E. Energy decreases at point 3.

3. A cell that receives more than the normal number of chromosomes can be called all of the following EXCEPT

- A. aneuploid
- B. gametic
- C. monosomic

- D. polyploid
- E. trisomatic

4. People with an A-positive blood type may safely donate blood to those with which blood type?

- A. A negative
- B. B positive
- C. O negative
- D. AB positive
- E. AB negative

5. An allele that codes for all actin molecules to be synthesized in linear chains would result in

- A. immovable muscles
- B. smooth muscle tissue
- C. normal sarcomere structure
- D. degeneration of muscle tissue
- E. muscle tendons that cannot attach

6. A horse has 64 chromosomes, while a zebra has 46. In rare cases, it is possible to cause these two species to hybridize, creating offspring that are

- A. fertile, with 46 chromosomes
- B. fertile, with 55 chromosomes
- C. sterile, with 46 chromosomes
- D. sterile, with 55 chromosomes
- E. sterile, with 64 chromosomes

7. A genetic mutation that adds a nucleotide to a protein-coding sequence of DNA creates an early stop codon. How will this influence the resulting protein?

- A. The primary structure of the protein will be unaffected.
- B. The secondary structure of the protein will be unchanged.
- C. The protein will not be translated at all.
- D. The protein will be complete but function abnormally.
- E. The protein will be synthesized normally up to the mutation.

8. What are the three structural components of a nucleotide?

- A. A carboxyl, a sugar, and a phosphate
- B. A phosphate, an amino acid, and a carboxyl
- C. An amino acid, a carboxyl, and a phosphate
- D. A sugar, a phosphate, and a nitrogenous base
- E. A nitrogenous base, an amino acid, and a sugar

9. Human immunodeficiency virus (HIV) is a retrovirus that integrates its own DNA into a host cell's genome using

- A. DNA polymerase
- B. helicase
- C. primase
- D. ligase
- E. reverse transcriptase

10. How will the function of a neuron be affected if the potassium channels of the membrane remain open?

- A. It will continue to function normally.
- B. It will function inconsistently.
- C. It will no longer function due to sodium leakage.
- D. It will continue to function but not transmit any impulses.
- E. It will no longer function due to an overly positive charge.

11. Which can affect the primary structure of a protein?

I. Genetic mutation

II. Increase in temperature

III. Decrease in pH

- A. I only
- B. I and II
- C. I and III
- D. II and III
- E. I, II, and III

12. Which type of bond is broken by the helicase enzyme?

I. Covalent bonds

II. Hydrogen bonds

III. Ionic bonds

- A. I only
- B. II only
- C. III only
- D. I and II
- E. I, II, and III

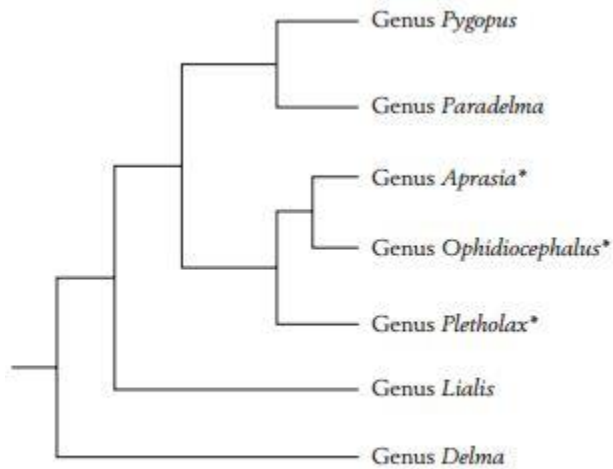
13. A sample of DNA is sequenced and is found to consist of 32% guanine. Which conclusion can be drawn about the composition of the DNA sample?

- A. It consists of 18% cytosine and 18% thymine.
- B. It consists of 18% adenine and 18% cytosine.
- C. It consists of 32% cytosine and 18% thymine.
- D. It consists of 32% adenine and 18% cytosine.
- E. It consists of 32% thymine and 18% adenine.

14. During mitosis, a checkpoint ensures that all chromosomal kinetochore proteins, present at the centromere of each sister chromatid, are attached to spindle fibers. Kinetochore proteins that are unattached produce a signal that prevents mitosis from proceeding to the next stage. This checkpoint occurs at the transition from

- A. anaphase to telophase
- B. prophase to metaphase
- C. metaphase to telophase
- D. prophase to anaphase
- E. metaphase to anaphase

15. Scientists constructed a phylogenetic tree of modern lizard genera based on DNA sequences, shown below.

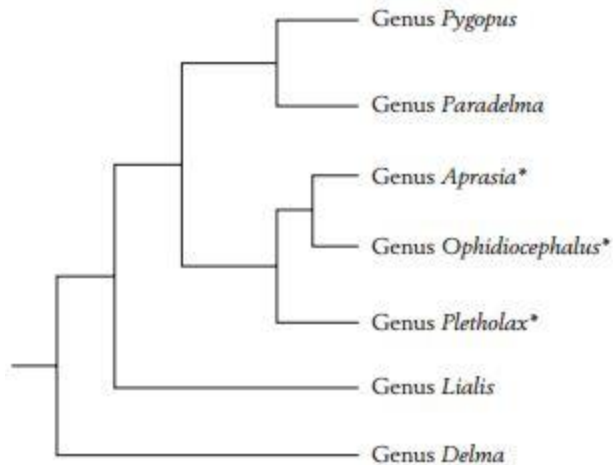


\*Diminished external ear

Which genus can be identified as the closest relative of the genus *Pletholax*?

- A. *Delma*
- B. *Aprasia*
- C. *Paradelma*
- D. *Lialis*
- E. *Pygopus*

16. Scientists constructed a phylogenetic tree of modern lizard genera based on DNA sequences, shown below.

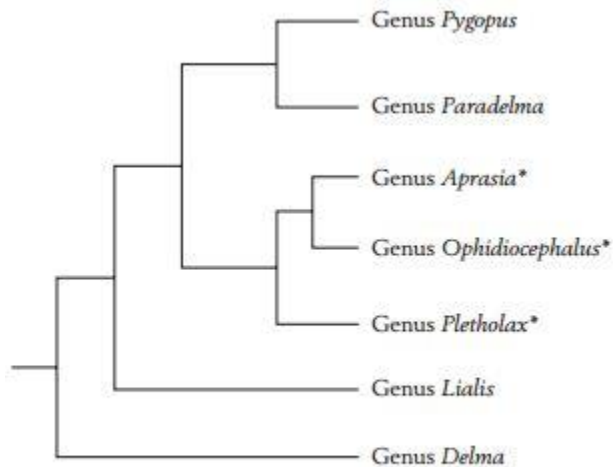


\*Diminished external ear

Lizards from which two genera most likely have the greatest number of noncoding DNA differences between them?

- A. Aprasia and Ophidiocephalus
- B. Pygopus and Ophidiocephalus
- C. Lialis and Aprasia
- D. Pygopus and Pletholax
- E. Lialis and Delma

17. Scientists constructed a phylogenetic tree of modern lizard genera based on DNA sequences, shown below.



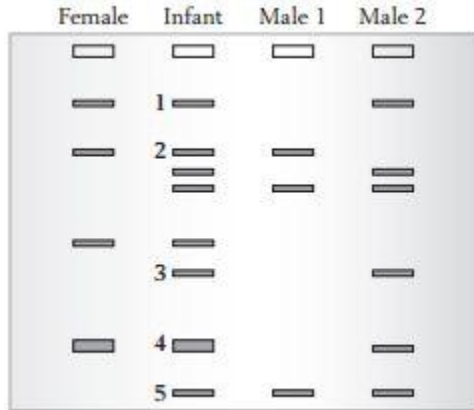
\*Diminished external ear

Within this group of lizards, several genera have evolved characteristics similar to those found in snakes. One mutation contributed to a diminished external ear in the genera indicated by an asterisk. What is the most recent point at which this mutation most likely occurred?

- A. After Aprasia diverged from Paradelma
- B. After Lialis diverged from Pletholax
- C. When Aprasia and Pletholax last shared a common ancestor

- D. When Lialis and Pygopus last shared a common ancestor
- E. After Apsidians diverged from Ophidiocephalus

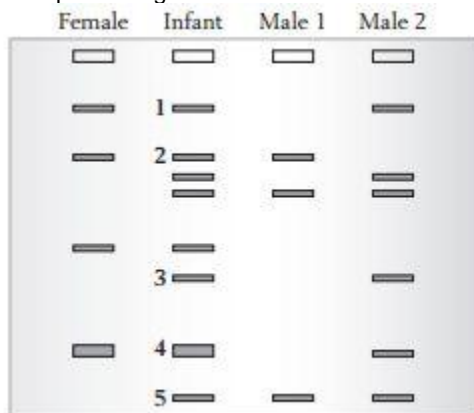
18. A female chimpanzee recently gave birth to an infant while in captivity. Because the paternity of the infant is unclear, scientists tested the DNA from two male chimpanzees, along with the female and infant. The resulting electrophoresis gel is shown.



Which labeled DNA fragment is largest?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

19. A female chimpanzee recently gave birth to an infant while in captivity. Because the paternity of the infant is unclear, scientists tested the DNA from two male chimpanzees, along with the female and infant. The resulting electrophoresis gel is shown.

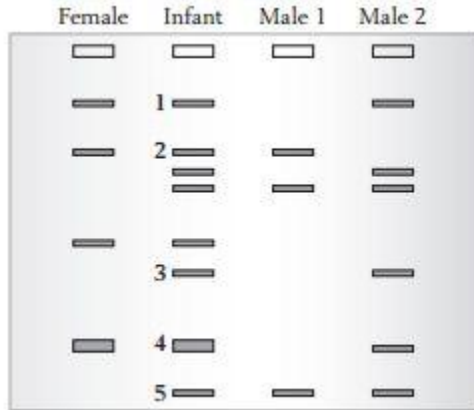


Which fragments must the infant have received from its father?

- A. 1 and 2
- B. 2 and 5
- C. 3 and 4

- D. 3 and 5
- E. 4 and 5

20. A female chimpanzee recently gave birth to an infant while in captivity. Because the paternity of the infant is unclear, scientists tested the DNA from two male chimpanzees, along with the female and infant. The resulting electrophoresis gel is shown.

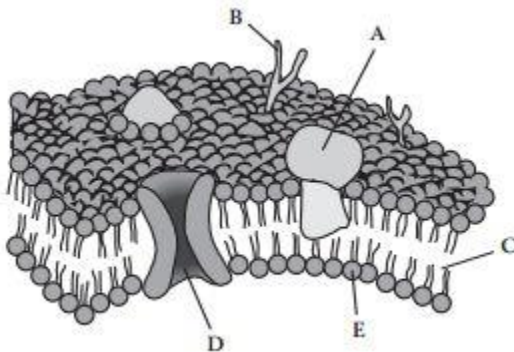


Based on the gel electrophoresis result, what can be concluded?

- I. Male 1 could possibly be the parent.
- II. Male 1 can be ruled out as the parent.
- III. Male 2 could possibly be the parent.
- IV. Male 2 can be ruled out as the parent.

- A. II only
- B. I and III
- C. I and IV
- D. II and III
- E. II and IV

21. Question below refers to the following cell membrane diagram.

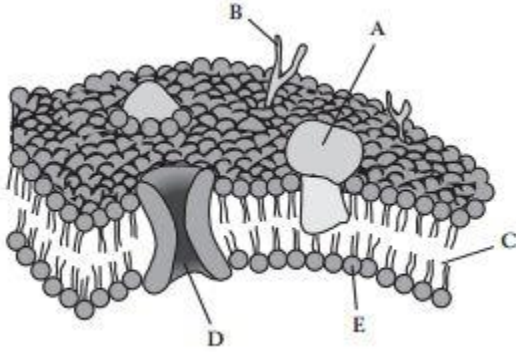


This molecular structure is composed of lipid chains.

- A.
- B.

- C.
- D.
- E.

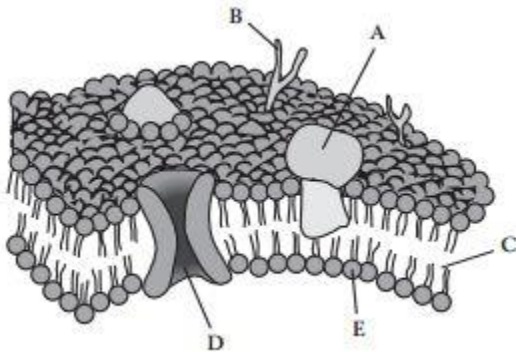
22. Question below refer to the following cell membrane diagram.



This structure is involved in facilitated diffusion.

- A.
- B.
- C.
- D.
- E.

23. Question below refer to the following cell membrane diagram.



This molecular structure is hydrophilic.

- A.
- B.
- C.
- D.
- E.

24. This nucleic acid carries genetic information to the site of translation.



- A. DNA
- B. mRNA
- C. rRNA
- D. snRNA
- E. tRNA

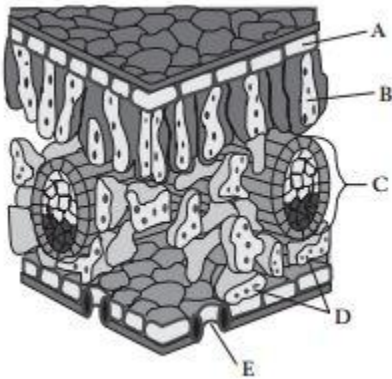
25. This nucleic acid contains an anticodon.

- A. DNA
- B. mRNA
- C. rRNA
- D. snRNA
- E. tRNA

26. This nucleic acid is associated with histone proteins.

- A. DNA
- B. mRNA
- C. rRNA
- D. snRNA
- E. tRNA

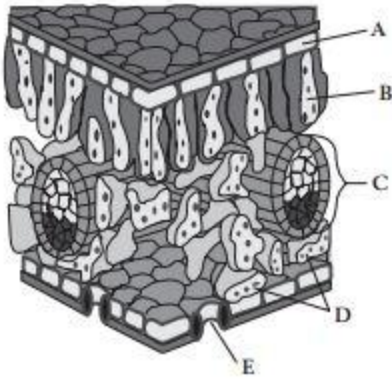
27. Question below refers to the following leaf diagram.



Photosynthesis primarily occurs in this tissue.

- A.
- B.
- C.
- D.
- E.

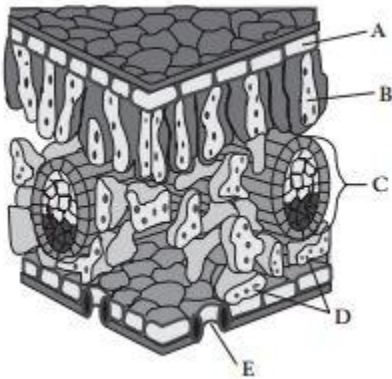
28. Question below refers to the following leaf diagram.



These cells regulate gas exchange in the leaf.

- A.
- B.
- C.
- D.
- E.

29. Question below refers to the following leaf diagram.



This tissue is composed of xylem

- A.
- B.
- C.
- D.
- E.

30. This lymphocyte matures in the thymus gland.

- A. B cell
- B. Fibrinogen
- C. Pathogen

- D. Phagocyte
  - E. T cell
31. This produces antibodies specific to an infecting agent.

- A. B cell
- B. Fibrinogen
- C. Pathogen
- D. Phagocyte
- E. T cell

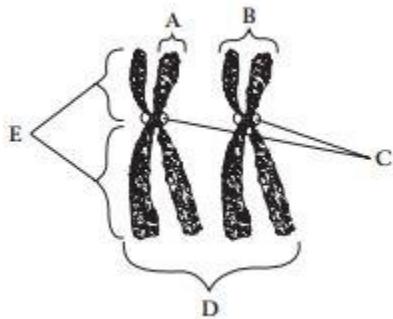
32. This produces antigens in the body.

- A. B cell
- B. Fibrinogen
- C. Pathogen
- D. Phagocyte
- E. T cell

33. This cell type is involved in nonspecific immunity.

- A. B cell
- B. Fibrinogen
- C. Pathogen
- D. Phagocyte
- E. T cell

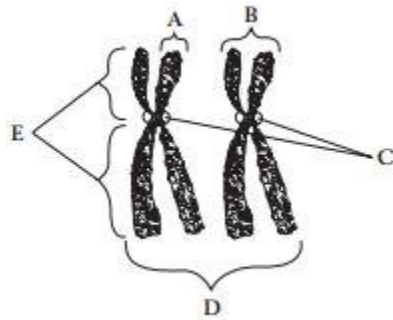
34. Question below refers to the following diagram.



A single chromosome

- A.
- B.
- C.
- D.
- E.

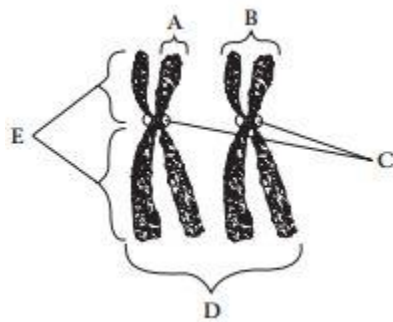
35. Question below refers to the following diagram.



A pair of sister chromatids

- A.
- B.
- C.
- D.
- E.

36. Question below refers to the following diagram.



Crossing over occurs between this pair.

- A.
- B.
- C.
- D.
- E.

37. This can result in stabilizing selection in a population.

- A. Founder effect
- B. Heterozygote advantage
- C. Population bottleneck
- D. Random mating
- E. Reproductive isolation

38. This is a characteristic of a population in Hardy-Weinberg equilibrium.

- A. Founder effect
- B. Heterozygote advantage
- C. Population bottleneck
- D. Random mating
- E. Reproductive isolation

**39.** This is required for speciation to occur.

- A. Founder effect
- B. Heterozygote advantage
- C. Population bottleneck
- D. Random mating
- E. Reproductive isolation

**40.** Which muscle type lines the interior walls of hollow organs?

I. Cardiac

II. Smooth

III. Striated

- A. I only
- B. II only
- C. III only
- D. I and II
- E. II and III