

EOC Practice (genetics)

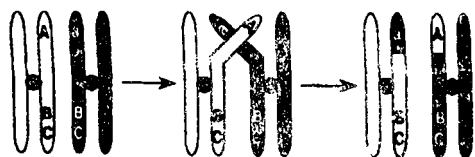
Name: _____

Date: _____

1. One difference between budding and binary fission in unicellular organisms is that in budding the

- A. genetic material is unequally divided
- B. genetic material is equally divided
- C. cytoplasm is unequally divided
- D. cytoplasm is equally divided

2. Which process is illustrated in the diagram?

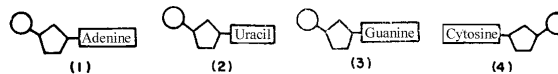


- A. segregation
- B. replication
- C. crossing-over
- D. nondisjunction

3. All nucleotides of DNA and RNA contain a

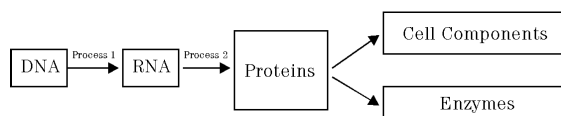
- A. uracil base
- B. thymine base
- C. ribose sugar
- D. phosphate group

4. Which structure pairs with the adenine nucleotide during the formation of messenger RNA?



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

5. Within which organelle does process 1 occur?



- A. ribosome
- B. nucleus
- C. centriole
- D. lysosome

6. Messenger RNA molecules are formed as a result of

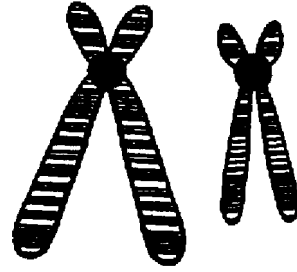
- A. process 1, only
- B. process 2, only
- C. both process 1 and process 2
- D. neither process 1 nor process 2

7. Within a living cell, which organelles are necessary for process 2 to occur?

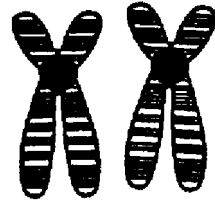
- A. centrioles
- B. lysosomes
- C. Golgi bodies
- D. ribosomes

8. Which diagram represents a pair of homologous chromosomes?

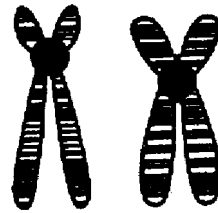
A.



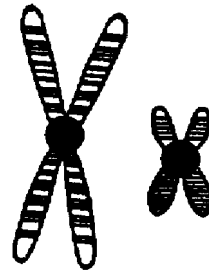
B.



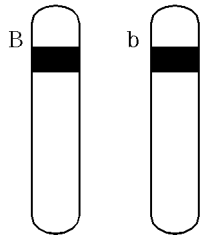
C.



D.

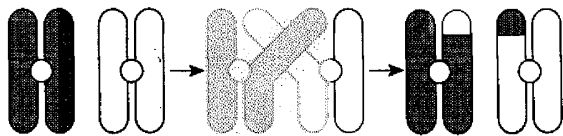


9. The diagram shown represents a pair of homologous autosomes. The letters *B* and *b* represents genes for a certain trait. These letters also represent



- A. an allelic pair of genes
 B. linked genes
 C. genes for sex determination
 D. homozygous genes

10. Which process is illustrated by the diagram shown?



- A. crossing-over
 B. nondisjunction
 C. sex determination
 D. independent assortment

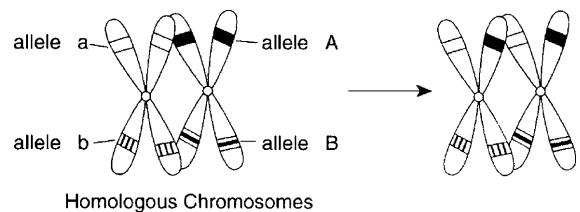
11. Which cross could produce a child with blood type A?

- A. $I^A i \times ii$ B. $I^A I^A \times I^B I^B$
 C. $I^A i \times I^B I^B$ D. $I^B I^B \times ii$

12. The greatest degree of genetic variation would be found in offspring that result from

- A. binary fission B. fertilization
 C. regeneration D. grafting

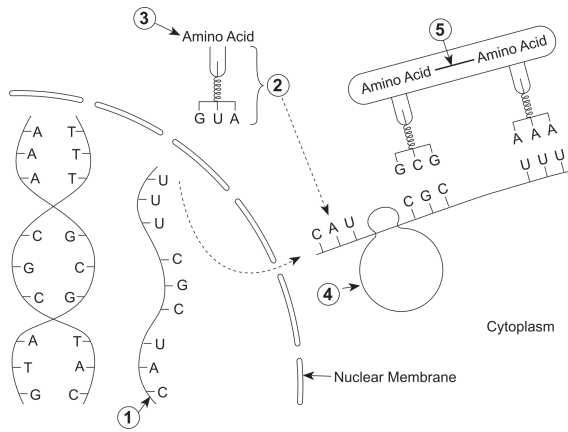
13. The results of a genetic process are represented in the diagram.



Which process most likely produced these results?

- A. chromosomal mutation during mitosis
 B. nondisjunction during meiosis
 C. independent assortment during mitosis
 D. crossing-over during meiosis

14. Base your answer(s) to the following question(s) on the diagram below, which represents some biochemical reactions involved in a cellular process, and on your knowledge of biology.



What is an example of a molecule produced by this type of process?

- A. glucose B. glycogen
C. a fatty acid D. a protein

15. Base your answer(s) to the following question(s) on the information and diagram below and on your knowledge of biology.

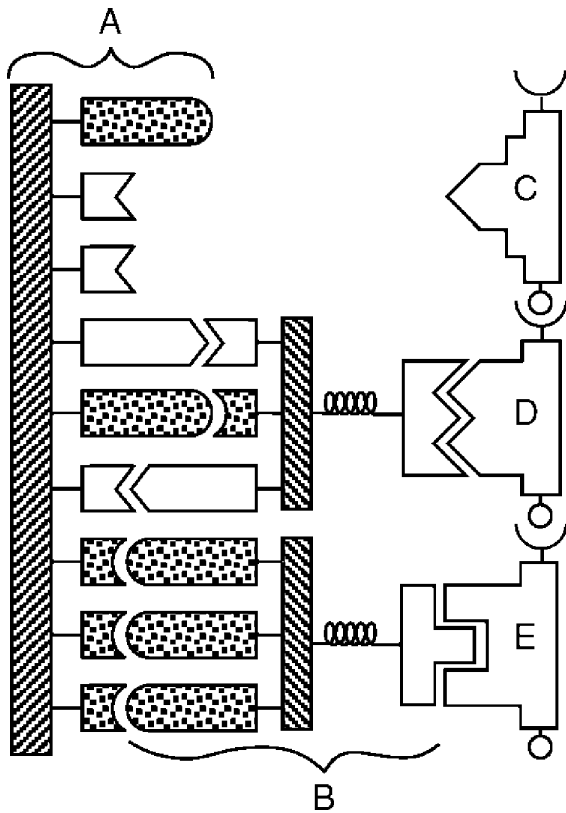
In cats, gene *E* produces yellow fur and gene *B* produces black fur. A cat that inherits both of these genes has patches of yellow and black fur and is known as a calico. The alleles for black or yellow are located on the X-chromosome. The cross $X^B Y \times X^B X^E$ is illustrated in the square below.

	X^B	Y
X^B	①	②
X^E	③	④

Yellow male offspring are represented by

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

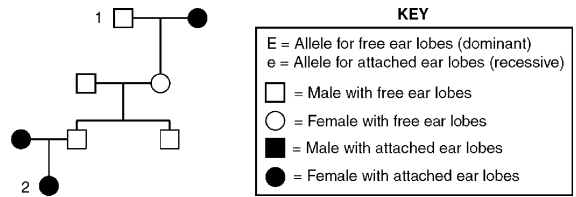
16. Base your answer(s) to the following question(s) on the diagram below, which represents some components involved in cellular protein synthesis, and on your knowledge of biology.



Molecules C, D, and E will combine to form part of

- A. a polypeptide B. a polysaccharide
C. DNA D. RNA

17. Base your answer(s) to the following question(s) on the pedigree chart below, which shows a history of ear lobe shape, and on your knowledge of biology.



The genotype of individual 1 could be

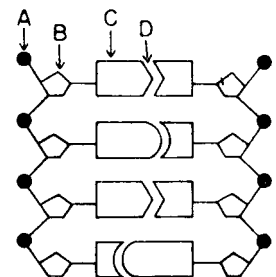
- A. *EE*, only B. *Ee*, only
C. *ee* D. *EE* or *Ee*

18. The genotype of individual 2 could be

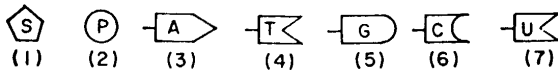
- A. *EE*, only B. *Ee*, only
C. *ee* D. *EE* or *Ee*

19. At which point would hydrogen bonding between two nitrogenous bases normally occur?

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



20. The symbols shown illustrate components of nucleic acids. Which combination represents a single nucleotide?



- A. 1,2,4 B. 2,3,4 C. 1,6,7 D. 4,5,7

21. The symbols shown illustrate components of nucleic acids. When replication occurs, a double-stranded molecule of DNA separates between

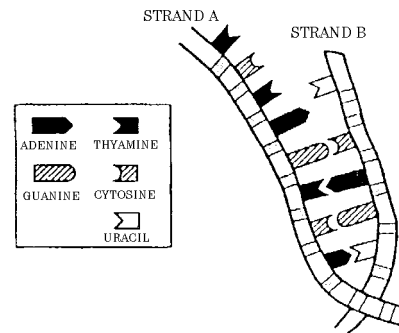
- A. 1 and 4 B. 2 and 3
C. 3 and 7 D. 5 and 6

22. Select the nucleic acid molecules, *chosen from the list below*, that is best described by the statement shown.

May transport amino acids

- A. DNA molecules, only
B. RNA molecules, only
C. Both DNA and RNA molecules

23. If strand A represents a portion of a DNA molecule, its complementary sequence of nitrogenous bases on messenger RNA would normally be



- A. A-G-A-T-C-A-G-T B. T-C-T-A-G-T-C-T
C. A-G-A-U-C-A-G-U D. U-G-U-A-G-U-C-U

24. If strand B represents messenger RNA, it would transport the genetic code from the

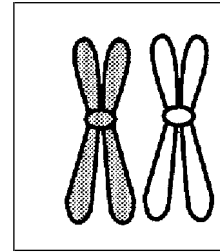
- A. ribosome to the nucleus
B. nucleus to the ribosome
C. mitochondria to the nucleus
D. nucleus to the mitochondria

25. Strand A would normally be found in the

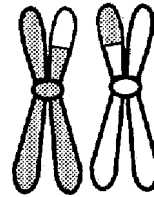
- A. plasma membrane B. ribosome
C. vacuole D. nucleus

26. A researcher investigating mutagenic agents would most likely study the effects of
- A. fertilizers on plant growth
 - B. X rays on fruit flies
 - C. enzymes on substrates
 - D. light on reproductive cycles of birds

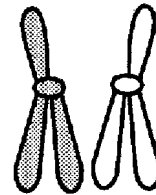
27. The diagram shown represents a pair of chromosomes. Which diagram best represents the chromatids if *only* crossing-over has occurred?



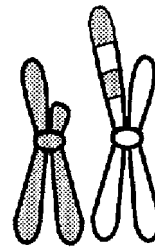
A.



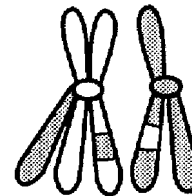
B.



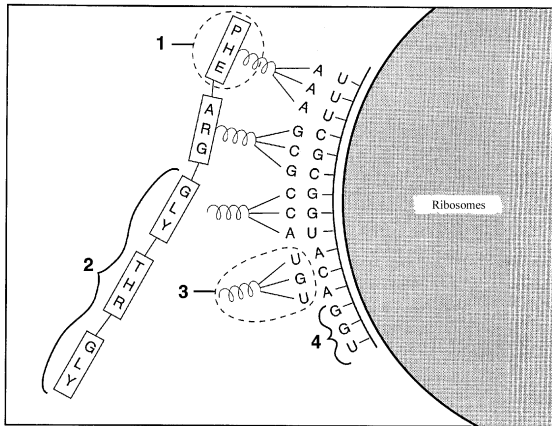
C.



D.



28. The DNA code for structure 1 is



- A. U-U-U B. T-T-T
 C. A-A-A D. P-H-E

29. Which illustration of a chromosomal change best represents a chromosome mutation known as a deletion?

- A. ABCDEFG → ABCDEF
 B. ABCDEFG → ABCDEFGH
 C. ABCDEFG → ABCDEFG
 D. ABCDEFG → ABCDEFGKMN

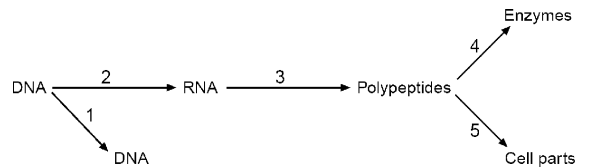
30. In the portions of the DNA molecules below, X represents the base sequence of strand I in the original DNA molecule, and Y represents the base sequence of strand I in the newly formed DNA molecule.

X: A-T-G-C-C-A-T-A-G
 Y: A-T-G-C-C-A-A-T-G

The base sequences in Y is an example of

- A. polyploidy
 B. a chromosome deletion
 C. a gene mutation
 D. translocation

31. Base your answer(s) to the following question(s) on the diagram below, which contains arrows representing different processes occurring in a cell, and on your knowledge of biology.



Which processes occur in the nucleus?

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

32. Process 1 is known as

- A. replication
- B. mutation
- C. nondisjunction
- D. translocation

33. What is the product of process 3?

- A. a strand of DNA
- B. two complementary strands of DNA
- C. a strand of RNA
- D. a chain of amino acids

34. The diagram shown represents a cell that will undergo mitosis. Which diagrams below best illustrate the nuclei of the daughter cells that result from a normal mitotic cell division of the parent cell shown?



- A. +
- B. +
- C. +
- D. +

35. Normally, a complete set of chromosomes ($2n$) is passed on to each daughter cell as a result of

- A. reduction division
- B. mitotic cell division
- C. meiotic cell division
- D. nondisjunction

36. The diploid chromosome number in a certain species of fish is 20. How many chromosomes would normally be found in bone cell of this fish?

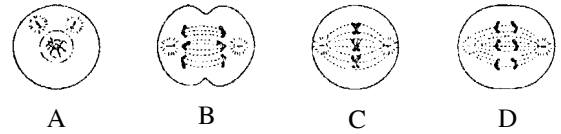
- A. 10
- B. 20
- C. 23
- D. 40

37. Which diagram most correctly represents the process of mitosis?

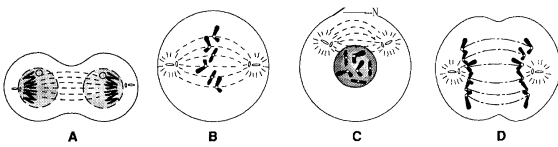
- A.
- B.
- C.
- D.

38. Which is the correct sequence for the stages of mitotic cell division represented by the diagrams shown?

- A. $A \rightarrow B \rightarrow C \rightarrow D$ B. $A \rightarrow C \rightarrow D \rightarrow B$
 C. $B \rightarrow A \rightarrow D \rightarrow C$ D. $B \rightarrow C \rightarrow D \rightarrow A$

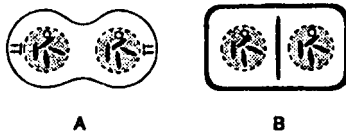


39. The diagrams shown represent stages of a cellular process. Which is the correct sequence of these stages?



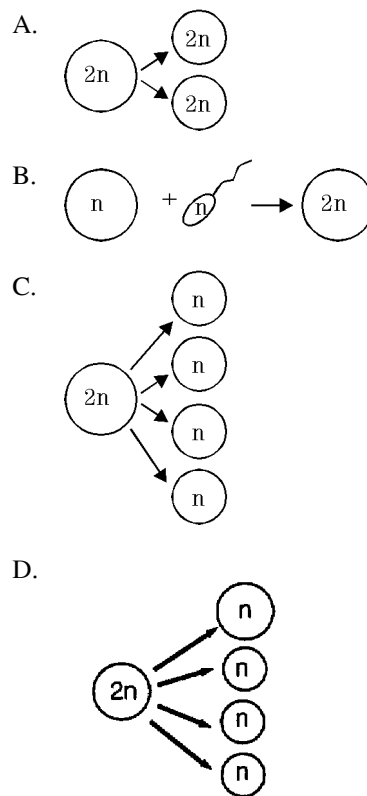
- A. $A \rightarrow B \rightarrow C \rightarrow D$ B. $B \rightarrow D \rightarrow C \rightarrow A$
 C. $C \rightarrow B \rightarrow D \rightarrow A$ D. $D \rightarrow B \rightarrow A \rightarrow C$

40. In the diagrams of mitotic cell division shown, which structure is present in diagram B but *not* in diagram A?



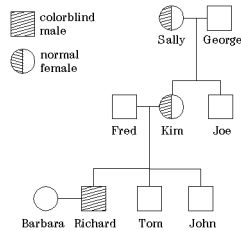
- A. centriole B. cell plate
 C. cell membrane D. cytoplasm

41. Which diagram best represents mitotic cell division?



42. Meiotic cell division in animals is directly responsible for the
- formation of gametes
 - fertilization of an egg
 - growth of a cell
 - production of muscle cells

43. Shown is a pedigree chart. The chart shows that Sally is a carrier for red-green color blindness.



Which is most likely the chromosomal makeup of George's body cells?

- 11 pairs of autosomes and one *X*-chromosome
- 11 pairs of autosomes and one *Y*-chromosome
- 22 pairs of autosomes and two *X*-chromosomes
- 22 pairs of autosomes, an *X*-chromosome, and a *Y*-chromosome

44. Which statement best describes Sally?
- She has no genes for color blindness.
 - She has one gene for color blindness located on an *X*-chromosome.
 - She has one gene for color blindness located on a *Y*-chromosome.
 - She has two genes for color blindness.

45. Richard is colorblind because he inherited the trait from his
- father, Fred
 - grandfather, George
 - mother, Kim
 - uncle, Joe

46. When a mouse with black fur is crossed with a mouse with white fur, all F_1 generation offspring have grey fur. Which phenotypic results can be expected in the F_2 generation?
- 100% grey
 - 25% black, 75% white
 - 50% black, 50% white
 - 25% black, 50% grey, 25% white

47. During egg cell production in a human female, the 21st pair of chromosomes may fail to separate. This failure to separate is known as

- A. crossing-over
- B. gene mutation
- C. polyploidy
- D. nondisjunction

48. Which is the result of normal meiosis and fertilization in humans?

- A. multiple alleles
- B. new gene combinations
- C. a chromosome number of 92
- D. a polyploid condition

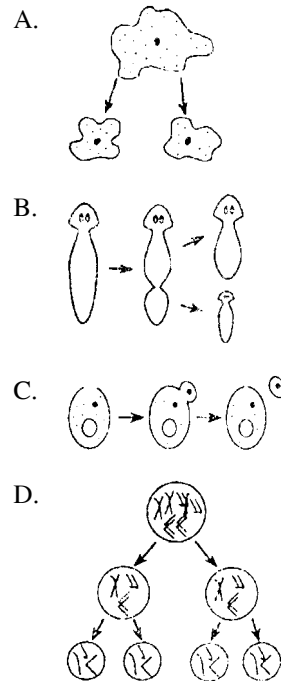
49. A person with type O blood marries a person with type AB blood. Possible blood genotypes of their children are

- A. $I^A i$ and $I^B I^B$
- B. $I^B I^B$ and $I^A I^A$
- C. $I^A i$ and $I^B i$
- D. $I^A I^B$ and ii

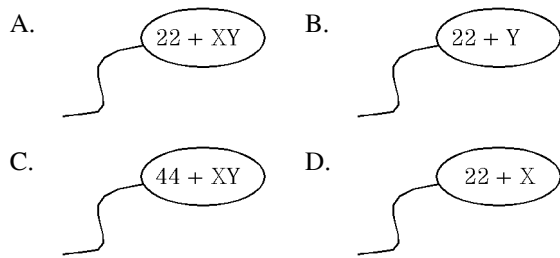
50. A couple had four children. Each child had a different blood type in the ABO group. The genotypes of the parents were most probably

- A. $I^A I^B \times I^A I^B$
- B. $I^A I^B \times I^A i$
- C. $I^A i \times ii$
- D. $I^A i \times I^B i$

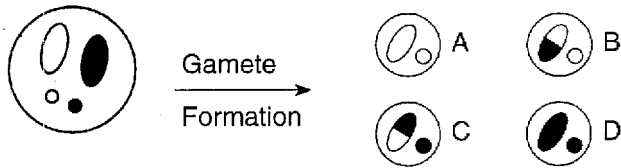
51. Which illustration represents a process that results in the production of gametes?



52. Which diagram represents a sperm that can unite with a normal egg to produce a zygote that will develop into a normal human male embryo?

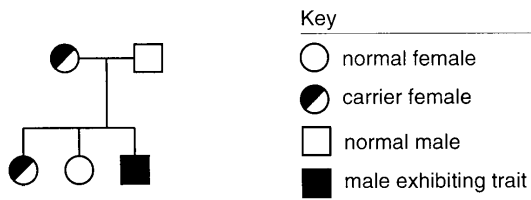


53. In the diagram shown, which type of change most likely caused the new combination of traits in gametes B and C?



- A. an alteration in the chemical composition of a gene
- B. a change in the chromosome number due to nondisjunction
- C. a change in the chromosome composition due to crossing-over
- D. an alteration in the number of sugars in DNA

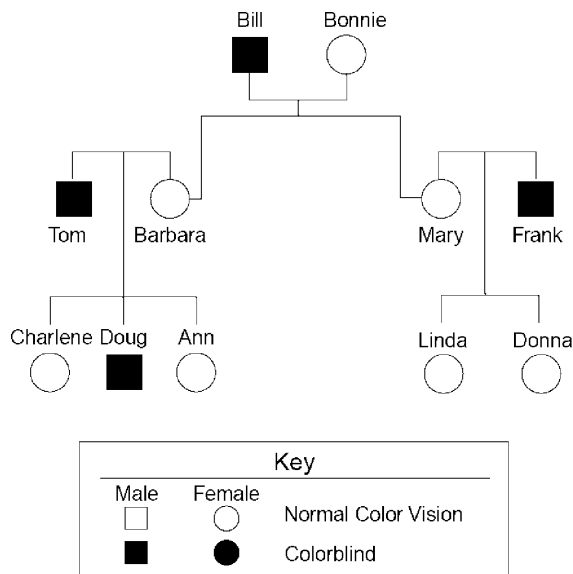
54. The pedigree chart shows the pattern of inheritance for a sex-linked trait.



If this couple has another son, what is the probability that he will exhibit this sex-linked trait?

- A. 0% B. 25% C. 50% D. 100%

55. Base your answer(s) to the following question(s) on the pedigree chart below and on your knowledge of biology. The pedigree chart represents the inheritance of color blindness through three generations.



Barbara is expecting another child. What is the probability that the new baby will be colorblind?

- A. 0% B. 25% C. 50% D. 100%

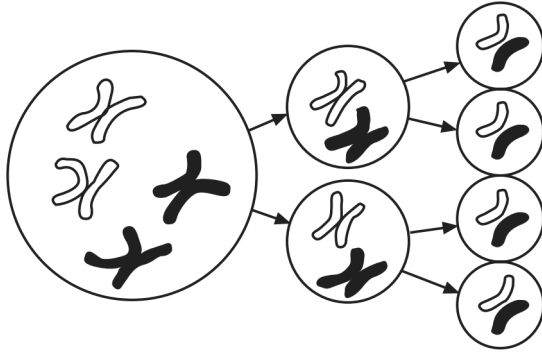
56. The allele for color blindness is carried on

- A. the *Y*-chromosome, only
 B. the *X*-chromosome, only
 C. both the *X*- and *Y*-chromosomes
 D. neither the *X*- nor the *Y*-chromosome

57. Which statement about the genotype of Linda and Donna regarding color blindness is correct?

- A. Both carry one recessive allele.
 B. Linda is a carrier, and Donna is homozygous dominant.
 C. Both are homozygous recessive.
 D. Linda is homozygous dominant, and Donna is a carrier.

58. The distribution of chromosomes in one type of cell division is shown in the diagram below.



Which process is represented in the diagram?

- A. asexual reproduction
- B. meiosis
- C. mitosis
- D. vegetative propagation

59. Base your answer(s) to the following question(s) on the information and diagram below and on your knowledge of biology.

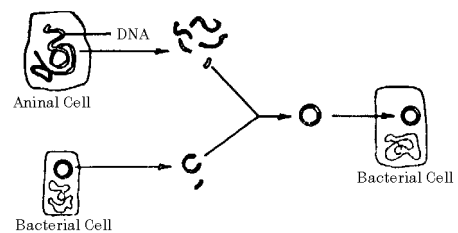
In cats, gene *E* produces yellow fur and gene *B* produces black fur. A cat that inherits both of these genes has patches of yellow and black fur and is known as a calico. The alleles for black or yellow are located on the X-chromosome. The cross $X^B Y \times X^B X^E$ is illustrated in the square below.

	X^B	Y
X^B	①	②
X^E	③	④

Calico coat color is most likely due to

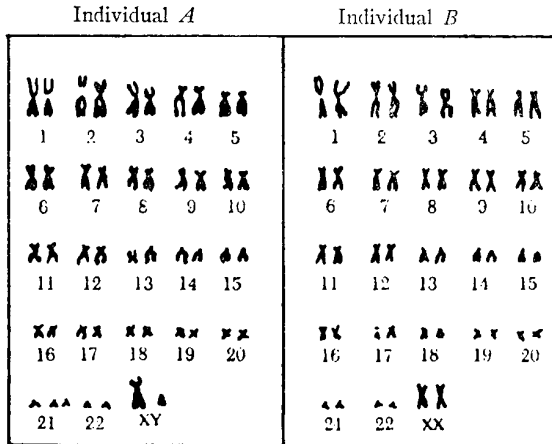
- A. codominant autosomal genes
- B. codominant sex-linked genes
- C. recessive autosomal genes
- D. recessive sex-linked genes

60. The technique shown in the diagram represents



- A. amniocentesis
- B. the formation of a karyotype
- C. animal cloning
- D. the formation of recombinant DNA

61. The charts show human chromosomes arranged in pairs.



The chromosome numbered 1 through 22 are known as

- A. ribosomes B. lysosomes
C. centrosomes D. autosomes

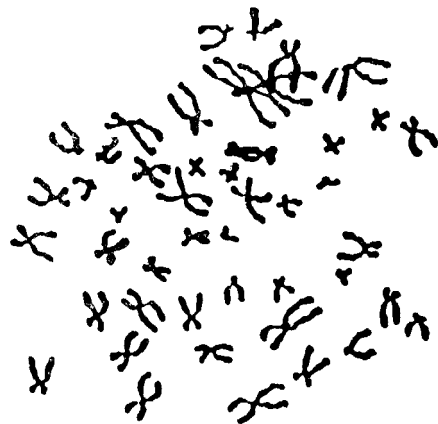
62. The preparation of these charts for individuals A and B is known as

- A. microsurgery B. karyotyping
C. blood typing D. chemical screening

63. Which genetic disorder in individual A is indicated by the number of chromosomes labeled 21?

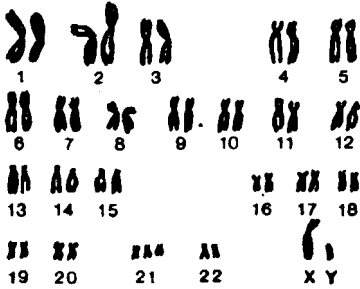
- A. phenylketonuria (PKU)
B. Tay-Sachs
C. sickle-cell anemia
D. Down's syndrome

64. The diagram shown represents a photographic enlargement of replicated chromosomes from a fetal cell. For which technique would this photograph be used to determine if the chromosomes of the fetus exhibit any genetic abnormalities?



- A. cleavage B. plasmolysis
C. chemosynthesis D. karyotyping

65. The diagram represents a



- A. deletion
- B. synapsis
- C. karyotype
- D. disjunction

66. The chromosomes are arranged to show

- A. homologous pairs
- B. tetrads
- C. independent assortment
- D. nucleotides

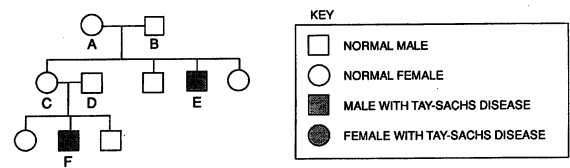
67. The individual from whom these chromosomes were taken is a

- A. male
- B. female
- C. hermaphrodite
- D. polyploid

68. This chromosomal arrangement indicates that the individual has

- A. phenylketonuria
- B. Down syndrome
- C. sickle-cell anemia
- D. Tay-Sachs disease

69. The chart represents the inheritance of Tay-Sachs disease in a family.



Answer the following question(s) based on the chart shown and on your knowledge of biology.

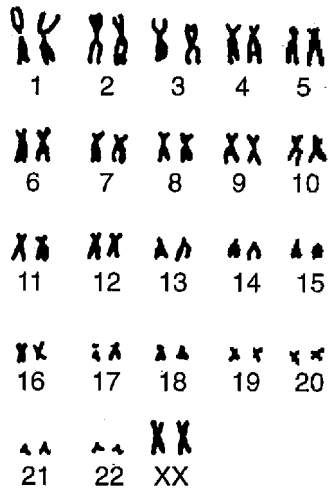
If individuals *C* and *D* have another child, what is the chance this child will exhibit Tay-Sachs disease?

- A. 0%
- B. 25%
- C. 50%
- D. 100%

70. What are the genotypes of individuals *A* and *B* with regard to Tay-Sachs disease?

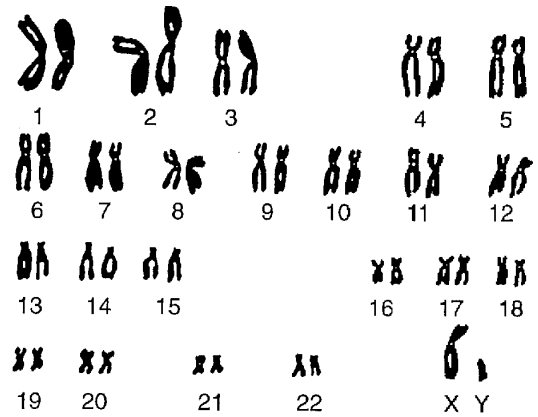
- A. One must be homozygous dominant and the other must be homozygous recessive.
- B. One must be homozygous dominant and the other must be heterozygous.
- C. Both must be homozygous.
- D. Both must be heterozygous.

71. Which phrase best describes a human with the chromosomes represented in the diagram shown?



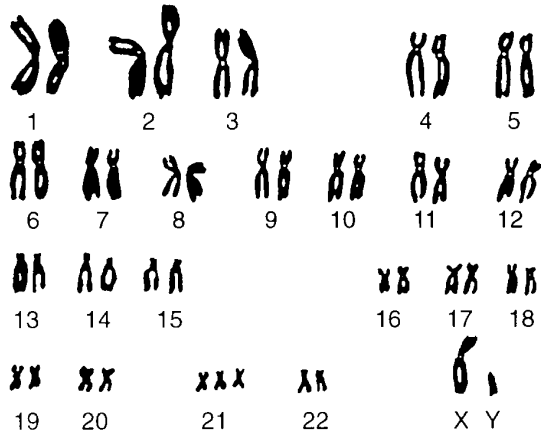
- A. a female who exhibits Down syndrome
- B. a male who exhibits Down syndrome
- C. a female who does *not* exhibit Down syndrome
- D. a male who does *not* exhibit Down syndrome

72. Genetic information is shown in the diagram. This type of diagram is used to



- A. reveal chromosome disorders
- B. determine the number of genes in a human genotype
- C. detect sickle-cell anemia
- D. correct the disorder known as PKU

73. Base your answer on the diagram of paired homologous chromosomes shown and on your knowledge of biology. The genetic disorder shown in the diagram most likely resulted from



- A. crossing-over B. nondisjunction
C. polyploidy D. segregation

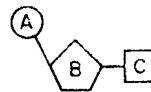
74. The Hardy-Weinberg principle of population genetics can be applied to a population that can reproduce only

- A. by budding B. by binary fission
C. asexually D. sexually

75. According to the Hardy-Weinberg principle, the gene pool of a population will remain stable if

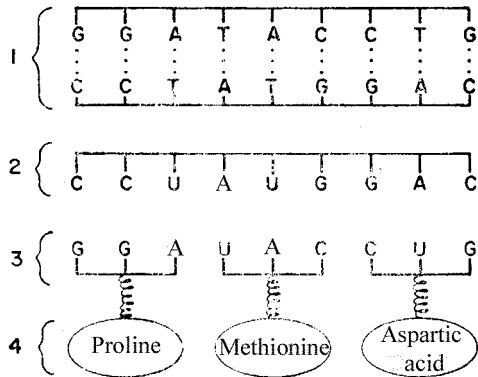
- A. no mutations occur
B. the population is small
C. individuals migrate into and out of the population
D. nonrandom mating occurs by artificial selection

76. Which is the correct identification of the parts of the DNA nucleotide in the diagram shown?



- A. A=uracil, B=deoxyribose, C=thymine
B. A=phosphate, B=ribose, C=uracil
C. A=thymine, B=ribose, C=uracil
D. A=phosphate, B=deoxyribose, C=thymine

77. The messenger RNA codon for methionin is

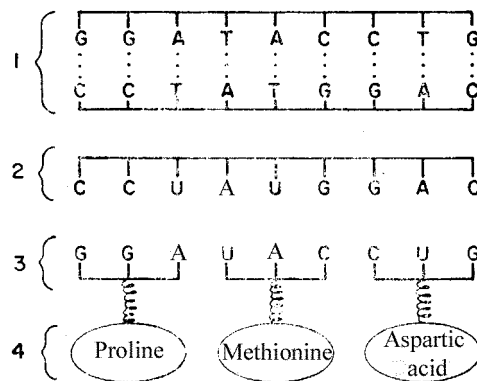


- A. TAC B. UAC C. ATG D. AUG

78. A DNA molecule with the base sequence A-G-C-T-C-A was used as a template for the synthesis of a messenger RNA molecule. Which base sequence correctly represents the corresponding portion of this RNA molecule?

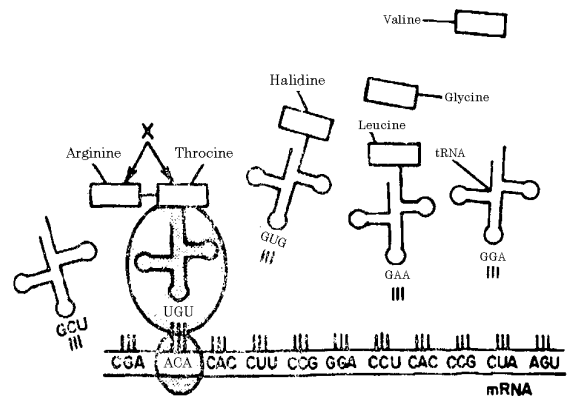
- A. T-C-A-G-C-A B. U-C-G-A-G-U
C. A-G-C-U-C-A D. A-T-G-A-C-T

79. A portion of a messenger RNA molecule is represented by



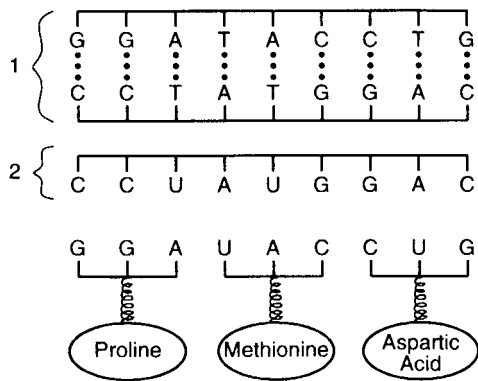
- A. 1 B. 2 C. 3 D. 4

80. The process represented in the diagram occurs on the cell organelle known as a



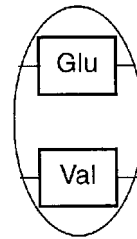
- A. vacuole B. ribosome
C. chloroplast D. mitochondrion

81. The diagram shown represents molecular structures involved in protein synthesis. Structure 2 is synthesized in the



- A. nucleus B. vacuole
 C. ribosome D. lysosome

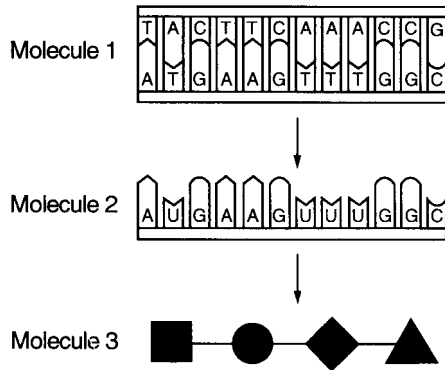
82. The difference in amino acids indicated in the circle portion of the diagram shown causes a change in the shape of red blood cells. What is the probable cause of this difference in the hemoglobin molecules?



Amino Acids
Glu = glutamic acid
His = histadine
Leu = leucine
Lys = lysine
Pro = proline
Thr = threonine
Val = valine

- A. the inability to synthesize a specific enzyme, causing an accumulation of fat
 B. the substitution of one kind of nucleotide for another in a DNA molecule
 C. an abnormal metabolism of phenylalanine
 D. a recessive allele located on an X-chromosome

83. The diagram represents molecules involved in protein synthesis.



The building blocks of molecule 3 are known as

- A. amino acids
- B. DNA molecules
- C. fatty acids
- D. RNA molecules

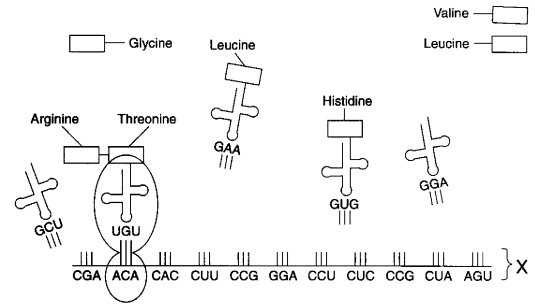
84. Where do the chemical reactions that are coded for by molecule 2 take place?

- A. in the vacuole
- B. on the plasma membrane
- C. in the lysosome
- D. at ribosomes

85. In plant cells, molecule 1 is found in the

- A. centriole
- B. nucleus
- C. cell wall
- D. lysosome

86. The synthesis of structure X occurred in the



- A. nucleus
- B. cytoplasm
- C. lysosome
- D. vacuole

87. *Messenger RNA (mRNA) Codes for Selected Amino Acids*

Amino Acid	mRNA Code
Leucine	C-C-A
Arginine	C-G-A
Phenylalanine	U-U-U
Valine	G-U-U
Lysine	A-A-A

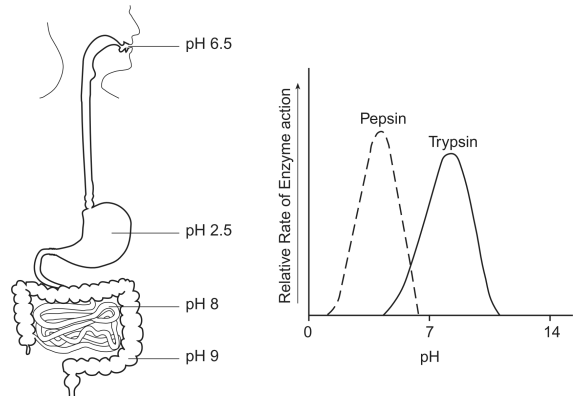
Which base sequence of a DNA molecule produces a codon on an mRNA molecule that will allow the amino acid arginine to be incorporated into a protein?

- A. C-G-A
- B. G-C-T
- C. C-G-U
- D. G-C-U

88. Which amino acid will be carried to a ribosome by a transfer RNA molecule containing the triplet code A–A–A?

- A. valine
- B. lysine
- C. leucine
- D. phenylalanine

89. Base your answer(s) to the following question(s) on the diagram and graph below and on your knowledge of biology. The diagram represents the human digestive system. Pepsin and trypsin are human digestive enzymes.



Pepsin and trypsin are classified as

- A. sugars
- B. carbohydrates
- C. lipids
- D. proteins

EOC Practice (genetics) 4/22/2018

- | | | | |
|---------|---|---------|---|
| 1. | | 21. | |
| Answer: | C | Answer: | D |
| 2. | | 22. | |
| Answer: | C | Answer: | B |
| 3. | | 23. | |
| Answer: | D | Answer: | C |
| 4. | | 24. | |
| Answer: | B | Answer: | B |
| 5. | | 25. | |
| Answer: | B | Answer: | D |
| 6. | | 26. | |
| Answer: | A | Answer: | B |
| 7. | | 27. | |
| Answer: | D | Answer: | A |
| 8. | | 28. | |
| Answer: | B | Answer: | C |
| 9. | | 29. | |
| Answer: | A | Answer: | A |
| 10. | | 30. | |
| Answer: | A | Answer: | C |
| 11. | | 31. | |
| Answer: | A | Answer: | A |
| 12. | | 32. | |
| Answer: | B | Answer: | A |
| 13. | | 33. | |
| Answer: | D | Answer: | D |
| 14. | | 34. | |
| Answer: | D | Answer: | A |
| 15. | | 35. | |
| Answer: | D | Answer: | B |
| 16. | | 36. | |
| Answer: | A | Answer: | B |
| 17. | | 37. | |
| Answer: | D | Answer: | B |
| 18. | | 38. | |
| Answer: | C | Answer: | B |
| 19. | | 39. | |
| Answer: | D | Answer: | C |
| 20. | | 40. | |
| Answer: | A | Answer: | B |

41.
Answer: A

42.
Answer: A

43.
Answer: D

44.
Answer: B

45.
Answer: C

46.
Answer: D

47.
Answer: D

48.
Answer: B

49.
Answer: C

50.
Answer: D

51.
Answer: D

52.
Answer: B

53.
Answer: C

54.
Answer: C

55.
Answer: C

56.
Answer: B

57.
Answer: A

58.
Answer: B

59.
Answer: B

60.
Answer: D

61.
Answer: D

62.
Answer: B

63.
Answer: D

64.
Answer: D

65.
Answer: C

66.
Answer: A

67.
Answer: A

68.
Answer: B

69.
Answer: C

70.
Answer: D

71.
Answer: C

72.
Answer: A

73.
Answer: B

74.
Answer: D

75.
Answer: A

76.
Answer: D

77.
Answer: D

78.
Answer: B

79.
Answer: B

80.
Answer: B

81.
Answer: A

82.
Answer: B

83.
Answer: A

84.
Answer: D

85.
Answer: B

86.
Answer: A

87.
Answer: B

88.
Answer: D

89.
Answer: D