NUNAVUT BIOLOGY 30 · UNIT C · 25 QUESTIONS

Cell Division, Genetics & Molecular Biology — Practice Test

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **The diploid chromosome number in dogs is 78. A skin cell of a dog divides by mitosis. The number of chromosomes in each daughter cell is**

- A 39
- B 78
- C 156
- D 23

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2

In organisms that reproduce sexually, the primary purpose of meiosis is

A to produce genetically identical body cells

B to repair damaged chromosomes

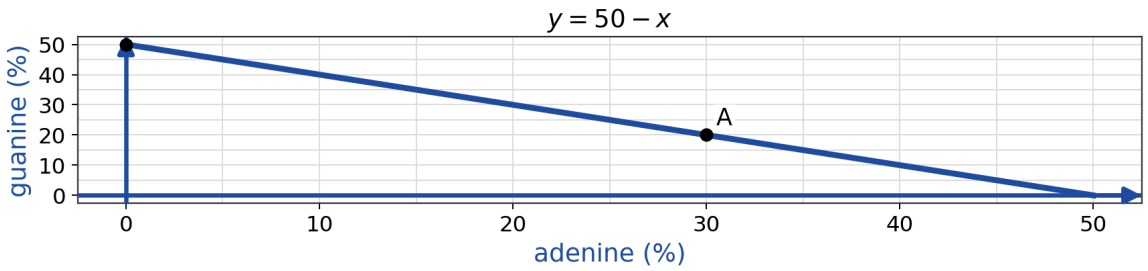
C to produce gametes with half the chromosome number

D to double the chromosome number before fertilization

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3 **The graph shows the percentage of guanine in DNA for different percentages of adenine. Point A marks the position for a DNA molecule with 30% adenine. The percentage of the bases that are guanine is**



A 20%

B 30%

C 25%

D 70%

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4 **In pea plants, the allele for tall stems (T) is dominant to the allele for short stems (t). A heterozygous tall plant is crossed with a short plant. The probability that an offspring will be short is**

- A 0.00
- B 0.25
- C 0.75
- D 0.50

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5 **A segment of the template strand of a gene has the base sequence TAC TTT. The base sequence of the mRNA transcribed from this segment is**

- A ATG AAA
- B AUG AAA
- C UAC UUU
- D AUG UUU

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6 **The phase of mitosis during which sister chromatids separate and move toward opposite poles of the cell is**

A prophase

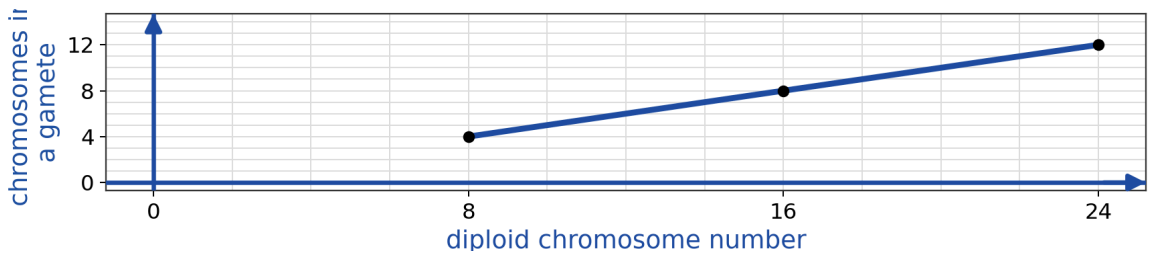
B metaphase

C anaphase

D telophase

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7 **The graph shows chromosomes in a gamete for species with different diploid numbers. A grasshopper has a diploid chromosome number of 24. The number of chromosomes in a grasshopper gamete is ____. Record your answer as a number.**



ANSWER _____

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8 **In guinea pigs, black coat colour (B) is dominant to brown coat colour (b). A black guinea pig is crossed with a brown guinea pig, and half of the offspring are brown. The genotype of the black parent is**

A Bb

B BB

C bb

D cannot be determined

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9 **In snapdragons, flower colour shows incomplete dominance. A red flower (CR CR) crossed with a white flower (CW CW) produces pink offspring. When two pink snapdragons are crossed, the probability that an offspring will be white is**

A 0.00

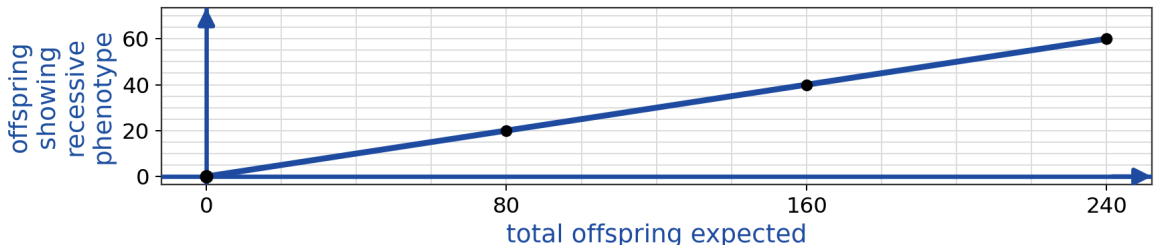
B 0.50

C 0.75

D 0.25

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10 **The graph shows the expected number showing the recessive phenotype for two heterozygous parents (Aa × Aa). If 240 offspring are expected, the expected number showing the recessive phenotype is ____. Record your answer as a number.**



ANSWER _____

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11 **Red-green colour-blindness is an X-linked recessive disorder. A woman who is a carrier (XN Xⁿ) and a man with normal vision (XN Y) have children. The probability that a son of this couple will be colour-blind is**

A 0.50

B 0.25

C 0.00

D 1.00

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12 **Two genes assort independently. In a cross between two double heterozygotes (AaBb × AaBb), the probability that an offspring will show the dominant phenotype for both traits is**

A 1

B 9

C 3

D 6

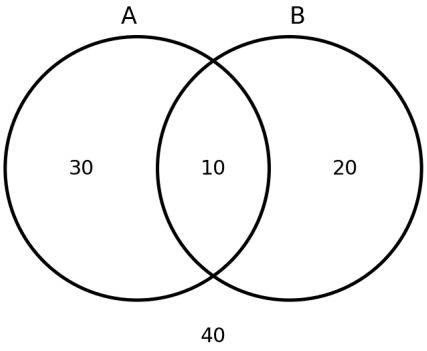
Understand It with Pulse | Flag a mistake

13 **In the dihybrid cross AaBb × AaBb, 160 offspring are expected. The expected number of offspring that will show the recessive phenotype for both traits is**

ANSWER _____

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14 **The Venn diagram shows, for 100 people, who has the A antigen (set A) and who has the B antigen (set B). How many people in the sample have the A antigen?**



A 30

B 40

C 10

D 20

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15 **A woman with genotype IA i and a man with genotype IA IB have children. The blood type that their children could NOT have is**

- A type A
- B type B
- C type AB
- D type O

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16 **Hemophilia is an X-linked recessive disorder. A woman whose father had hemophilia marries a man with normal blood clotting. The probability that their first child will have hemophilia, as a decimal, is**

ANSWER _____

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17 **In mice, coat colour is controlled by two genes. Mice with genotype B_ produce black pigment, and mice with genotype bb produce brown pigment. A second gene determines whether pigment is deposited in the fur: E_ allows deposition, while ee blocks deposition and produces a cream coat. In a cross BbEe × BbEe, the probability that an offspring will be brown is**

A 3

B 1

C 9

D 4

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18 **A section of mRNA has the base sequence AUG UUU GGC UAA. Use the following codon information: AUG = methionine (start), UUU = phenylalanine, GGC = glycine, and UAA = stop. The amino acid sequence produced from this section of mRNA is**

A phenylalanine-glycine-methionine

B methionine-phenylalanine-glycine

C methionine-glycine-phenylalanine

D phenylalanine-methionine-glycine

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19 **A mutation in a gene changes a codon in the mRNA from UGU, which codes for the amino acid cysteine, to UGA, which is a stop codon. This mutation is classified as a**

A silent mutation, because the amino acid sequence is unchanged

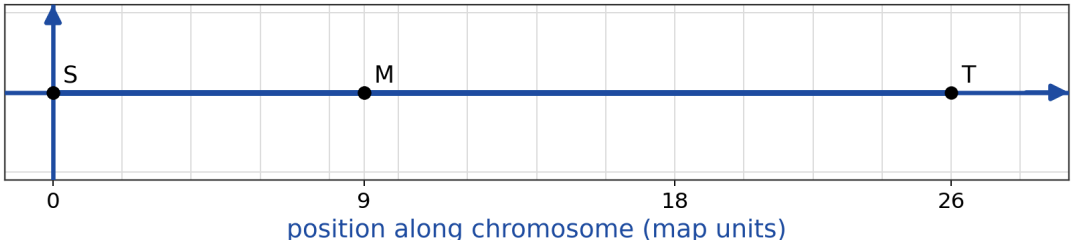
B missense mutation, because one amino acid is replaced by another

C nonsense mutation, because translation stops early and the protein is shortened

D frameshift mutation, because the reading frame of the gene is shifted

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20 **The diagram shows the positions of genes S, M and T along a chromosome. The distance, in map units, between gene M and gene T is ____. Record your answer as a number.**



ANSWER _____

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21 **To produce bacteria that make human insulin, scientists cut both a bacterial plasmid and the human insulin gene with the same restriction enzyme. The same enzyme is used so that**

A. both DNA molecules have complementary sticky ends that can join together

B. the insulin gene is cut into the smallest possible fragments

C. introns are removed from the human insulin gene

D. the plasmid is prevented from closing back on itself

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22 **Nondisjunction of one pair of sister chromatids occurs during meiosis II of spermatogenesis. The proportion of the sperm produced that will contain an extra chromosome is**

A 1.00

B 0.75

C 0.50

D 0.25

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23 **A man with type AB blood and a woman with type O blood have children. The probability that a child of this couple will have type A blood, as a decimal, is**

ANSWER _____

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24 **Two unaffected parents have a child who has an autosomal recessive metabolic disorder. The probability that their unaffected son is a carrier of the disorder allele is**

- A $\frac{1}{}$
- B $\frac{2}{}$
- C $\frac{1}{}$
- D $\frac{1}{}$

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25 **A karyotype of a newborn baby shows 47 chromosomes, including an XXY set of sex chromosomes. This karyotype indicates that the baby is**

- A a female with Turner syndrome
- B a male with an extra Y chromosome
- C a male with Klinefelter syndrome
- D a female with Down syndrome

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ANSWER KEY

1. B
2. C
3. A
4. D
5. B
6. C
7. 12
8. A
9. D
10. 60
11. A
12. B
13. 10
14. B
15. D
16. 0.25
17. A
18. B
19. C
20. 17
21. A
22. D
23. 0.5
24. B
25. C

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