K/U Knowledge/Understanding T/I Thinking/Investigation C Communication A Application

For each question, select the best answer from the four alternatives.

1. What is the name of Beadle and Tatum's original hypothesis? (7.1) K/U
   (a) one gene–one sequence hypothesis
   (b) one gene–one enzyme hypothesis
   (c) one gene–one peptide hypothesis
   (d) one gene–one polypeptide hypothesis
2. What is the sequence of information transfer, as outlined by the central dogma? (7.1) K/U
   (a) DNA → tRNA → mRNA → polypeptide
   (b) DNA → mRNA → tRNA → polypeptide
   (c) DNA → mRNA → rRNA → polypeptide
   (d) DNA → rRNA → tRNA → polypeptide
3. Where is the TATA box found? (7.2) K/U
   (a) in the termination sequence that stops DNA polymerase
   (b) in the termination sequence that stops RNA polymerase
   (c) in the promoter that enables the binding of DNA polymerase
   (d) in the promoter that enables the binding of RNA polymerase
4. What happens during capping and tailing? (7.2) K/U
   (a) A methyl 5′ tail and a poly(A) cap are added.
   (b) A methyl 3′ tail and a poly(A) cap are added.
   (c) A methyl 5′ cap and a poly(A) tail are added.
   (d) A methyl 3′ cap and a poly(A) tail are added.
5. How is tRNA different from mRNA? (7.3) K/U
   (a) It binds 5′→3′.
   (b) It is generally smaller.
   (c) It forms a cloverleaf shape.
   (d) all of the above
6. Which anticodon pairs with the DNA sequence 5′-ACA-3′? (7.3) K/U
   (a) 3′-UGU-5′
   (b) 3′-ACA-5′
   (c) 5′-UGU-3′
   (d) 5′-ACA-3′
7. How is the *lac* operon inhibited? (7.4) K/U
   (a) The *lac* repressor is not synthesized by the *lacI* gene.
   (b) RNA polymerase is inhibited by high concentrations of allolactose.
   (c) The *lac* repressor is inhibited by high concentrations of allolactose.
   (d) Allolactose is not present to bind with the *lac* repressor.
8. Which term refers to a point mutation that results in a different amino acid in a particular position? (7.5) K/U
   (a) missense mutation
   (b) silent mutation
   (c) nonsense mutation
   (d) frameshift mutation
9. Which statement about variable number tandem repeats is correct? (7.6) K/U
   (a) They vary proportionally with the complexity of the organism.
   (b) They are thought to help prevent DNA replication problems.
   (c) They are non-coding regions.
   (d) all of the above
10. How are viruses classified? (7.7) K/U
    (a) by genomic structure
    (b) by preferred host
    (c) by shape
    (d) all of the above

Indicate whether each statement is true or false. If you think the statement is false, rewrite it to make it true.

11. Translation is the process of producing a gene from a protein. (7.1) K/U
12. Translation occurs in the cytosol of both prokaryotes and eukaryotes. (7.1) K/U
13. Exons are transcribed to build pre-mRNA in eukaryotes. (7.2) K/U
14. Prokaryotes use different types of RNA polymerase to transcribe coding and non-coding genes. (7.2) K/U
15. The wobble hypothesis proposes that the 61 sense codons require 61 distinct tRNA molecules. (7.3) K/U
16. The hydrolysis of GTP provides the energy for polypeptide chain elongation. (7.3) K/U
17. Most of the human genome is composed of LINEs, SINEs, and pseudogenes. (7.6) K/U
18. Mutations always lead to harmful effects. (7.5) K/U
19. Transposons can move around the genome with no effect. (7.6) K/U
20. Reverse transcriptase allows a virus to insert its RNA into its host's DNA. (7.7) K/U

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