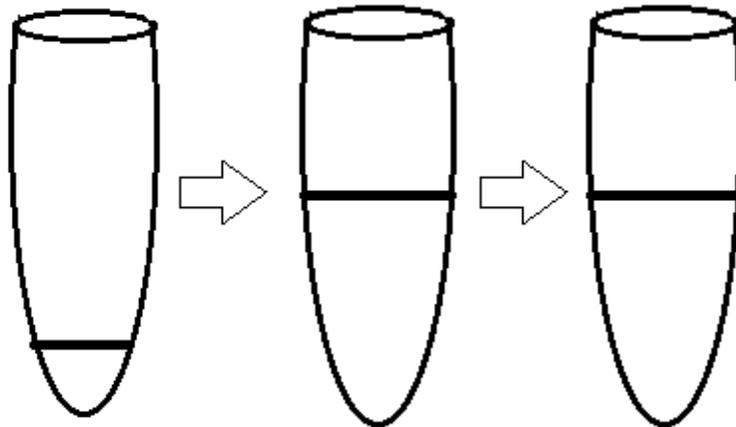


1. Auxotrophic mutation group 1 grows on minimal medium supplemented only by Y. Mutation group 2 grows on medium supplemented by W, X, or Y. Mutation group 3 grows on medium supplemented by W or Y but not X. What is the order of W, X, Y in the biological pathway?
 - a. $W \rightarrow X \rightarrow Y$
 - b. $W \rightarrow Y \rightarrow X$
 - c. $X \rightarrow W \rightarrow Y$
 - d. $Y \rightarrow W \rightarrow X$
2. While the bases are normally _____, the sugar-phosphate backbone is normally _____.
 - a. Hydrophobic; hydrophilic
 - b. Hydrophilic; hydrophobic
 - c. Hydrophobic; hydrophobic
 - d. Hydrophilic; hydrophilic
3. If there are 5,000 nucleotides in a sequence of DNA, how many base pairs are there?
 - a. 5,000
 - b. 2,500
 - c. 10,000
 - d. 3,000
4. An inducible operon is normally _____, but can be turned _____.
 - a. On; on
 - b. On; off
 - c. Off; on
 - d. Off; off
5. In what direction does RNA polymerase create a complementary mRNA transcript from a template strand of DNA?
 - a. 3'-5'
 - b. 3'-3'
 - c. 5'-3'
 - d. 5'-5'
6. Which of the following eukaryotic rRNA transcripts are encoded for on the large gene?
 - I) 28S
 - II) 18S
 - III) 5.8S
 - IV) 5S
 - a. I only
 - b. I and III only
 - c. I, II, and IV only
 - d. I, II, III, and IV

7. When does attenuation occur?
- When regions 1 and 2 form a hairpin.
 - When regions 2 and 3 form a hairpin.
 - When regions 1 and 2 form a hairpin, and 3 and 4 form a second hairpin.
 - When regions 2 and 3 form a hairpin, and 1 and 4 form a second hairpin.
8. It is possible for transcription and translation to occur at the same time.
- True
 - False
9. Given a strand of DNA, choose its complimentary strand.
5'ACGTGC3'
- 5'TGCACG3'
 - 5'GCACGT3'
 - 5'GCGACG3'
 - 5'TGCTCG3'
10. NASA has found a single-celled organism on Mars, which uses DNA as its genetic material. Although there is a chance that the organism replicates its genome in the same way that we earthlings do, there is also a chance that they may replicate their DNA by an entirely new mechanism. Given the tubes below (which have been centrifuged), and your knowledge of the Messelson-Stahl experiment, determine how DNA is replicated in this organism.



- Conservative Replication
 - Semiconservative Replication
 - Dispersive Replication
 - Something new
11. In prokaryotes, what amino acid is attached to the tRNA molecule that is complementary to a start codon?
- Methionine
 - Serine
 - Adenine
 - Formylated methionine

12. When a mutation is considered trans acting, it _____.
- Effects genes located on the same chromosome.
 - Effects genes located on the sex chromosome.
 - Effects genes located on the same and on different chromosomes.
 - Effects genes located on the p-arm of a chromosome.
13. Which of the following sequences of RNA would form a stem?
- CCCCUAUA
 - AGUUAACU
 - CGUCCTCG
 - All of the Above
14. What is the function of DNA gyrase?
- Release the tension formed from the unwinding of the double helix.
 - Unwind the double helix to make the bases accessible.
 - Create short RNA primers.
 - Join the Okazaki fragments.
15. What is the total size of a eukaryotic ribosome?
- 40S
 - 60S
 - 70S
 - 80S
16. Which tRNA anticodon is complimentary to the codon UAA?
- AUU
 - TUU
 - CAA
 - None of the above
17. What would happen if the σ (sigma) factor was nonfunctional?
- DNA polymerase will find the promoter faster.
 - The ribosome would not be able to find the start codon.
 - Transcription of a segment of DNA would be unable to happen.
 - Translation of a segment of mRNA would be unable to happen.
18. During translation, where does the first tRNA molecule bind in the ribosome?
- A-site
 - P-site
 - E-site
 - C-site
19. Which of the following is NOT transcribed in the mRNA transcript?
- Promoter
 - RNA coding region
 - Transcription termination sequence
 - Stop codon

20. The lac operon is a good example of a(n):
- Negative repressible operon
 - Negative inducible operon
 - Positive repressible operon
 - Positive inducible operon
21. Which of the following CANNOT travel through the nuclear pores?
- mRNA
 - rRNA
 - tRNA
 - DNA
22. What would happen if the Shine-Dalgarno sequence was deleted from a molecule of mRNA?
- Transcription and translation would both occur.
 - Neither transcription nor translation would occur.
 - Transcription would still occur, but translation would not occur.
 - Transcription would not occur, but translation would occur.
23. How many aminoacyl-tRNA synthetases can be found in a cell?
- 1
 - 20
 - 61
 - 64
24. The _____ form of DNA is most common under physiological conditions.
- A
 - B
 - Z
 - The A and B forms of DNA are equally common under physiological conditions.
25. In DNA methylation, which of the following bases is most commonly methylated?
- Adenine
 - Guanine
 - Cytosine
 - Thymine
26. Draw the molecular structure of DNA, including the three major components of DNA. Indicate which carbon the bonds occur between. Also indicate where the phosphodiester bond and H bonds occurs between. How is the molecular structure of RNA different from DNA.

27. Indicate the importance of each of the following genes in the lac operon (Regulator of Prokaryotic transcription).

lacI-

lacP-

lacO-

lacZ-

lacY -

28. Explain and then compare and contrast the two termination methods of prokaryotic transcription.

29. How do the mRNAs of bacterial cells and the pre-mRNAs of eukaryotic cells differ? How do the mature mRNAs of bacterial and eukaryotic cells differ?

30. List 3 major differences between the initiation of translation between prokaryotes and eukaryotes.