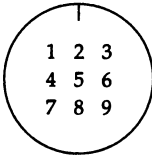
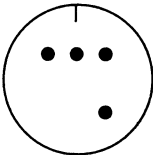


## Objective Questions

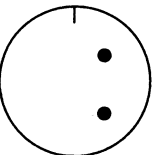
- c  
Recall
1. A gene is best defined as
    - a. A segment of DNA.
    - b. Three nucleotides that code for an amino acid.
    - c. A sequence of nucleotides in DNA that codes for a functional product.
    - d. A sequence of nucleotides in RNA that codes for a functional product.
    - e. A transcribed unit of DNA.
- b  
Recall
2. Which of the following pairs is mismatched?
    - a. DNA polymerase—makes a molecule of DNA from a DNA template
    - b. RNA polymerase—makes a molecule of RNA from an RNA template
    - c. DNA ligase—joins segments of DNA
    - d. Transposase—insertion of DNA segments into DNA
    - e. Spliceosome—removal of introns
- d  
Analysis
3. Which of the following statements is *false*?
    - a. DNA polymerase joins nucleotides in one direction only.
    - b. The leading strand of DNA is made continuously.
    - c. The lagging strand of DNA is started by an RNA primer.
    - d. DNA replication proceeds in one direction around the bacterial chromosome.
    - e. Multiple replication forks are possible on a bacterial chromosome.
- d  
Analysis
4. All of the following will inhibit gene expression *except*
    - a. Dark repair.
    - b. Presence of product.
    - c. Presence of substrate.
    - d. A high glucose level in the cytoplasm.
    - e. None of the above.
- d  
Understanding
5. The following results were obtained from a replica-plating experiment:
 



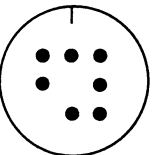
Complete medium



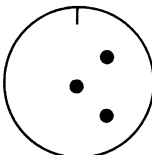
Glucose minimal salts agar (GMSA)



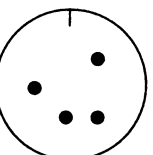
GMSA + streptomycin



GMSA + leucine



GMSA + streptomycin + valine



GMSA + streptomycin + leucine

Which colonies are streptomycin-resistant and leucine-requiring?

- a. 1, 2, 3, and 9
- b. 3 and 9
- c. 4, 6, and 8
- d. 4 and 8
- e. 5 and 6

a  
Understanding

6. Which of the following is *not* a product of transcription?
  - a. A new strand of DNA
  - b. rRNA
  - c. tRNA
  - d. mRNA
  - e. None of the above

b  
Analysis

7. All of the following are true about bacteriocins *except*
  - a. The genes coding for them are on plasmids.
  - b. They cause food poisoning symptoms.
  - c. Nisin is a bacteriocin used as a food preservative.
  - d. Bacteria that produce bacteriocins are resistant to their own bacteriocins.
  - e. None of the above.

Understanding

Use this information to answer questions 8 and 9.

Culture 1: F<sup>+</sup>, leucine<sup>+</sup>, histidine<sup>+</sup>

Culture 2: F<sup>-</sup>, leucine<sup>-</sup>, histidine<sup>-</sup>

a

8. What will be the result of conjugation between cultures 1 and 2?
  - a. 1 will remain the same;  
2 will become F<sup>+</sup>, leucine<sup>-</sup>, histidine<sup>-</sup>
  - b. 1 will become F<sup>-</sup>, leu<sup>+</sup>, his<sup>+</sup>;  
2 will become F<sup>+</sup>, leu<sup>-</sup>, his<sup>-</sup>
  - c. 1 will become F<sup>-</sup>, leu<sup>-</sup>, his<sup>-</sup>;  
2 will remain the same
  - d. 1 will remain the same;  
2 will become F<sup>+</sup>, leu<sup>+</sup>, his<sup>+</sup>
  - e. 1 will remain the same;  
2 will become F<sup>+</sup> and recombination may occur

c

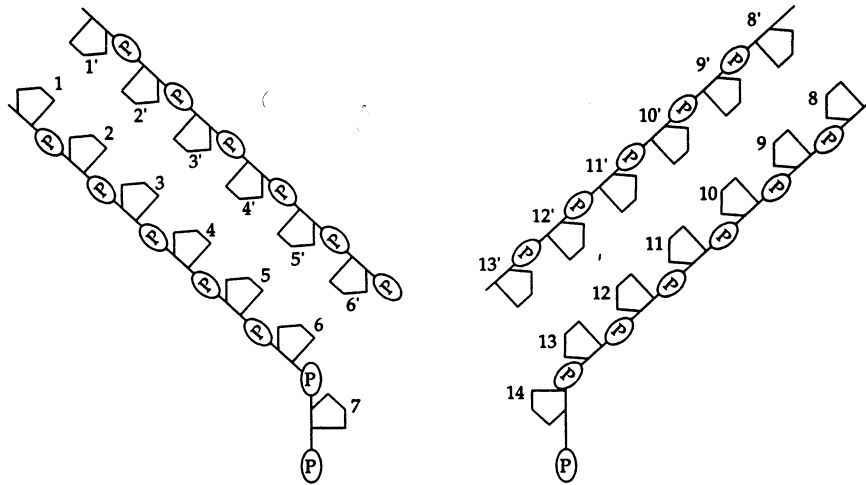
9. If culture 1 mutates to Hfr, what will be the result of conjugation between the two cultures?
  - a. They will both remain the same
  - b. 1 will become F<sup>+</sup>, leu<sup>+</sup>, his<sup>+</sup>;  
2 will become F<sup>+</sup>, leu<sup>+</sup>, his<sup>+</sup>
  - c. 1 will remain the same;  
Recombination will occur in 2
  - d. 1 will become F<sup>-</sup>, leu<sup>+</sup>, his<sup>+</sup>;  
2 will become Hfr, leu<sup>+</sup>, his<sup>+</sup>
  - e. Can't tell

- a  
Recall
10. An enzyme produced in response to the presence of a substrate is called
- An inducible enzyme.
  - A repressible enzyme.
  - A restriction enzyme.
  - An operator.
  - A promoter.
- e  
Recall
11. Which of the following proteins are *not* coded for by genes carried on plasmids?
- Enzymes necessary for conjugation
  - Enzymes that catabolize hydrocarbons
  - Bacteriocins
  - Enzymes that inactivate antibiotics
  - None of the above
- b  
Recall
12. Transformation is the transfer of DNA from a donor to a recipient cell
- By a bacteriophage.
  - As naked DNA in solution.
  - By cell-to-cell contact.
  - By crossing over.
  - By sexual reproduction.
- e  
Understanding
13. Genetic change in bacteria can be brought about by
- Mutation.
  - Conjugation.
  - Transduction.
  - Transformation.
  - All of the above.
- d  
Analysis
14. Which of the following is *not* true of a bacterium that is R<sup>+</sup>?
- R<sup>+</sup> refers to the possession of a plasmid.
  - R<sup>+</sup> can be transferred to a recipient cell.
  - It is resistant to certain drugs and heavy metals.
  - It is F<sup>+</sup>.
  - None of the above.
- d  
Recall
15. The initial effect of ionizing radiation on a cell is that it causes
- DNA to break.
  - Bonding between adjacent thymines.
  - Base substitutions.
  - The formation of highly reactive ions.
  - The cells to get hot.
- c  
Analysis
16. According to the operon model, for the synthesis of an inducible enzyme to occur, the
- End-product must not be in excess.
  - Substrate must bind to the enzyme.
  - Substrate must bind to the repressor.
  - Repressor must bind to the operator.
  - Repressor must not be synthesized.

d  
Analysis

17. Synthesis of a repressible enzyme is stopped by
- The allosteric transition.
  - The substrate binding to the repressor.
  - The corepressor binding to the operator.
  - The corepressor-repressor binding to the operator.
  - The end-product binding to the promoter.

Use the following diagram of replicating DNA to answer questions 18 through 20.



a  
Understanding

18. If base 4 is thymine, what is base 4'?
- Adenine
  - Thymine
  - Cytosine
  - Guanine
  - Uracil

b  
Understanding

19. If base 4 is thymine, what is base 11'?
- Adenine
  - Thymine
  - Cytosine
  - Guanine
  - Uracil

c  
Recall

20. Base 2 is attached to
- Ribose.
  - Phosphate.
  - Deoxyribose.
  - Thymine.
  - Can't tell.

d  
Recall

21. The damage caused by ultraviolet radiation is
- Never repaired.
  - Repaired during transcription.
  - Repaired during translation.
  - Cut out and replaced.
  - Repaired by DNA replication.

## Understanding

Use the following information to answer questions 22 through 26.

Codon on mRNA and corresponding amino acid			
UUA	leucine	UAA	nonsense
GCA	alanine	AAU	asparagine
AAG	lysine	UGC	cysteine
GUU	valine	UCG, UCU	serine

- b 22. If the sequence of amino acids coded for by a strand of DNA is serine-alanine-lysine-leucine, what is the order of bases in the strand of DNA?
- UGUGCAAAGUUA
  - AGACGTTTCAAT
  - TCTCGTTTGTTA
  - TGTGCTTTCTTA
  - AGAGCTTTGAAT
- b 23. The antisense strand of DNA coding for the polypeptide in question 22 is
- ACAGTTTCAAT
  - TCTGCAAAGTTA
  - UGUGCAAAGUUA
  - UCUCGAAAGUUA
  - TCACGUUUCAAU
- d 24. The anticodon for valine is
- GUU
  - CUU
  - CTT
  - CAA
  - GTA
- d 25. What is the sequence of amino acids coded for by the following sequence of bases in a strand of DNA?
- ATTACGCTTTGC
- Leucine-arginine-lysine-alanine
  - Asparagine-arginine-lysine-alanine
  - Asparagine-cysteine-valine-serine
  - Transcription would stop at the first codon
  - Can't tell
- e 26. If a frameshift mutation occurred in a sequence of bases given in question 25, what would be the sequence of amino acids coded for?
- Leucine-arginine-lysine-alanine
  - Asparagine-arginine-lysine-alanine
  - Asparagine-cysteine-valine-serine
  - Translation would stop at the first codon
  - Can't tell