Chapter 10
Microbial Genetics

1. Which of the following processes are involved in horizontal gene transfer (HGT)?
(A) Conjugation
(B) Transduction
(C) Transversion
(D) Transformation

2. Which of the following statements about specialized transduction are TRUE?
(A) Specialized transducing phages can transport only certain genes between bacteria
(B) Specialized transducing phages can transport any gene between bacteria
(C) Phage P22 is a specialized transducing phage
(D) Phage lambda (λ) is a specialized transducing phage

3. Which of the genomes listed below are infectious when introduced into host cells by liposomes?
(A) Linear double stranded DNA
(B) Minus strand RNA
(C) Circular double stranded DNA
(D) Plus strand RNA

4. Which of the following statement about bacteriophage *λ* are CORRECT?
(A) It initially produces two proteins, one acts as an inhibitor of λ repressor synthesis and the other acts as a terminator for transcription
(B) It maintains its lysogenic state in the absence of an inducer
(C) In switching from the lysogenic to the lytic phase, it turns off the synthesis of λ repressor because cro protein binds to λ operator O_R3
(D) It forms N and Q gene products which act as positive regulatory proteins leading to the sequential production of λ encoded proteins

5. Which of the following statements related to 'High Frequency recombination' (Hfr) cells are CORRECT?
(A) Single strand of DNA that enters into recipient F cell contains a piece of the F factor at the leading end followed by the bacterial chromosomes and then by the remainder of the F factor
(B) Most mating results in the transfer of only a portion of donor chromosome because the attachment between the two cells can break
(C) The bacterial genes adjacent to the leading piece of the F factor are least frequently transferred
(D) The donor cell genes that are transferred vary, since the F plasmid can integrate at several different sites in a bacterial DNA

6. Deletion of a single nucleotide from the open reading frame sequence of a mRNA result in the following.
(A) A shorter polypeptide
(B) An extended polypeptide
(C) An altered N-terminal domain without affecting the C-terminal domain of the polypeptide
(D) An altered C-terminal domain without affecting the N-terminal domain of the polypeptide

7. Which of the statements given below on telomerase are CORRECT?
(A) Telomerase is a ribonucleoprotein
(B) Telomerase can be defined as a reverse transcriptase
(C) It is an unusual DNA polymerase as it polymerizes in 3′ to 5′ direction
(D) It uses an RNA template to extend the ends of the chromosome

8. Of the following, which component are required for protein synthesis in archaebacteria?
(A) Ribosomes
(B) mRNA
(C) release factors
(D) *f*Met-tRNA

9. One of the post replication modifications in DNA is the methylation of the bases. In this context which of the following statements are CORRECT.
(A) Methylation protects cell's own DNA from digestion by its own restriction endonuclease(s)
(B) Methylation may result in the localized conversion of B-DNA to Z-DNA
(C) Methyl groups are added predominantly to cytosines in bacterial cells and to adenines in eukaryotes
(D) Methylation of bases is important in some aspects of DNA repair in bacteria

10. In which of the following splicing events, the intermediates form the lariat or the branched structure?
(A) Trans splicing
(B) Group I intron splicing
(C) Group II intron splicing
(D) hnRNA splicing

Answer

1. **(A), (B), (D)**
2. **(A), (D)**
3. **(A), (C), (D)**
4. **(A), (B), (C)**
5. **(A), (B), (D)**
6. **(A), (C), (D)**
7. **(A), (B), (D)**
8. **(A), (B), (C)**
9. **(A), (B), (D)**
10. **(A), (C), (D)**