1. Plasmids and bacteriophages are used as cloning vectors because they:
   A. Cannot replicate inside bacteria
   B. Replicate independently in bacterial cells
   C. Destroy bacterial DNA
   D. Produce proteins only (B)

Explanation : Plasmids and bacteriophages can replicate independently without chromosomal DNA control, making them useful cloning vectors.

2. The origin of replication (ori) in a cloning vector is responsible for:
   A. Cutting DNA
   B. Joining DNA fragments
   C. Initiating replication and controlling copy number
   D. Producing antibiotics (C)

Explanation : Ori is the sequence from where replication starts and it also controls the number of copies of inserted DNA.

3. The cloning vector pBR322 contains which antibiotic resistance genes?
   A. amp^R and tet^R
   B. lacZ and amp^R
   C. kan^R and chl^R
   D. ori and rop (A)

Explanation : pBR322 contains ampicillin resistance (amp^R) and tetracycline resistance (tet^R) genes.

4. A selectable marker in a cloning vector helps in:
   A. DNA replication only
   B. Identifying and eliminating non-transformants
   C. Breaking DNA into fragments
   D. Producing proteins (B)

Explanation : Selectable markers help identify transformed cells and eliminate non-transformants.

5. Normal E. coli cells do not naturally show resistance against:
   A. Antibiotics used as selectable markers
   B. DNA fragments
   C. Plasmids
   D. Restriction enzymes (A)

Explanation : Normal E. coli cells do not have resistance to antibiotics like ampicillin, tetracycline, chloramphenicol and kanamycin.

6. The cloning site of a vector should preferably contain:
   A. Many identical restriction sites
   B. Single recognition sites for restriction enzymes
   C. No restriction sites
   D. Only antibiotic genes (B)

Explanation : A vector should have very few, preferably single, recognition sites to avoid formation of multiple DNA fragments.

7. In pBR322, insertion of foreign DNA at BamHI site causes:
   A. Activation of tetracycline resistance
   B. Elimination of tetracycline resistance
   C. Loss of ampicillin resistance
   D. Destruction of plasmid DNA (B)

Explanation : Foreign DNA inserted into the tetracycline resistance gene disrupts it, eliminating tetracycline resistance.

8. Agrobacterium tumefaciens is used as a cloning vector in plants because it:
   A. Produces antibiotics
   B. Transfers T-DNA into plant cells
   C. Destroys plant DNA
   D. Cannot infect plants (B)

Explanation : Agrobacterium transfers a DNA segment called T-DNA into plant cells and its modified Ti plasmid acts as a cloning vector.

9. DNA is introduced into bacterial cells by making them:
   A. Resistant
   B. Competent
   C. Mutated
   D. Haploid (B)

Explanation : DNA is hydrophilic and cannot pass through the cell membrane, so bacterial cells are made competent to take up recombinant DNA.

10. Competent bacterial cells are treated with which divalent cation?
    A. Sodium B. Potassium
    C. Calcium D. Iron (C)

Explanation : Calcium ions help DNA enter bacterial cells through pores in the cell wall during transformation.