1. The genetic material of all living organisms is:
   A. Protein
   B. Lipid
   C. Nucleic acid
   D. Carbohydrate (C)

Explanation : Genetic material in living organisms is nucleic acid, mainly DNA and RNA.

2. During DNA isolation, bacterial cells are treated with which enzyme for cell wall breakdown?
   A. Cellulase
   B. Lysozyme
   C. Chitinase
   D. Protease (B)

Explanation : Lysozyme is used to break the bacterial cell wall during DNA isolation.

3. Which enzyme is used to remove proteins associated with DNA in eukaryotic cells?
   A. Ribonuclease B. Ligase
   C. Protease D. Polymerase (C)

Explanation : In eukaryotic cells, DNA is associated with histone proteins. Protease enzymes remove these proteins.

4. Purified DNA is precipitated by adding:
   A. Hot water
   B. Chilled ethanol
   C. Sodium chloride only
   D. Restriction enzyme (B)

Explanation : Addition of chilled ethanol causes purified DNA to precipitate, appearing as fine threads.

5. Restriction enzyme digestion of DNA is performed under:
   A. Random conditions
   B. Optimal conditions
   C. Extremely high temperature only
   D. Absence of enzymes (B)

Explanation : Digestion is completed when restriction enzymes are incubated with purified DNA under their optimal conditions.

6. Agarose gel electrophoresis is used to:
   A. Synthesize DNA
   B. Separate and monitor DNA fragments
   C. Join DNA fragments
   D. Destroy DNA (B)

Explanation : Agarose gel electrophoresis helps monitor restriction enzyme digestion and separates DNA fragments.

7. In agarose gel electrophoresis, DNA fragments move towards:
   A. Cathode
   B. Anode
   C. Neutral region
   D. Both electrodes equally (B)

Explanation : DNA fragments are negatively charged and move towards the positive electrode (anode).

8. The enzyme used to join the useful gene with vector DNA is:
   A. Restriction enzyme
   B. DNA ligase
   C. Protease
   D. Ribonuclease (B)

Explanation : DNA ligase joins the useful gene fragment with the vector DNA to construct recombinant DNA.

9. PCR was invented by:
   A. Herbert Boyer B. Kary Mullis
   C. Stanley Cohen D. Watson (B)

Explanation : Kary Mullis, an American biochemist, invented Polymerase Chain Reaction (PCR) in 1983.

10. The thermostable DNA polymerase used in PCR is obtained from:
    A. Escherichia coli
    B. Thermus aquaticus
    C. Agrobacterium tumefaciens
    D. Bacillus subtilis (B)

Explanation : Taq polymerase used in PCR is isolated from the bacterium Thermus aquaticus because it remains active at high temperatures.