# Module 14: Biotechnology and Genomics

1. What is a restriction enzyme? How do "sticky ends" facilitate ligation?
2. What is a vector (e.g., plasmid)? How is it used to introduce foreign DNA into bacteria?
3. Describe the three steps of PCR: Denaturation, Annealing, Extension.
4. Why is PCR called "molecular photocopying"? Why is it useful for forensics?
5. Explain how gel electrophoresis separates DNA fragments.
6. Do smaller fragments migrate faster or slower? Why?
7. Define transgenic organism (GMO).
8. Outline the steps to produce insulin-secreting bacteria.
9. In a paternity test, a child has bands at positions A and B. The mother has band A.
10. Must the biological father have band B? Explain.
11. Differentiate ex vivo (cells treated outside the body) and in vivo (treatment inside the body) gene therapy.
12. What are the major challenges? (Delivery, immune response, targeting)
13. We have sequenced the human genome. Why doesn't knowing the sequence immediately reveal gene function?
14. What is functional genomics?