QUIZ 5 BSB3583

1. Protein Engineering is the process to design and construct proteins with desired function(s).

   (a) You have isolated an enzyme from a bacterial strain of *Bacillus*. You have decided to improve the thermal stability properties of the enzyme by using a protein engineering approach that mimics natural Darwinian evolution in a laboratory environment. Discuss the protein engineering approach you should use including general procedure and pros and cons of using that approach.

   (9 Marks)

   (b) During the DNA amplification process in a standard PCR, the chance of incorporating wrong nucleotides into the progeny genes by the Taq DNA polymerase is very low. Discuss why this situation occurs and how PCR can be manipulated for protein engineering.

   (11 Marks)

2. Explain **TWO (2)** key components for a successful directed evolution experiment.

   (2 Marks)

3. DNA shuffling is the first and most widely used gene recombination method. Identify how the final amplified product of DNA shuffling can consist of a library of full-length genes containing recombined mutations from different parental genes.

   (8 marks)