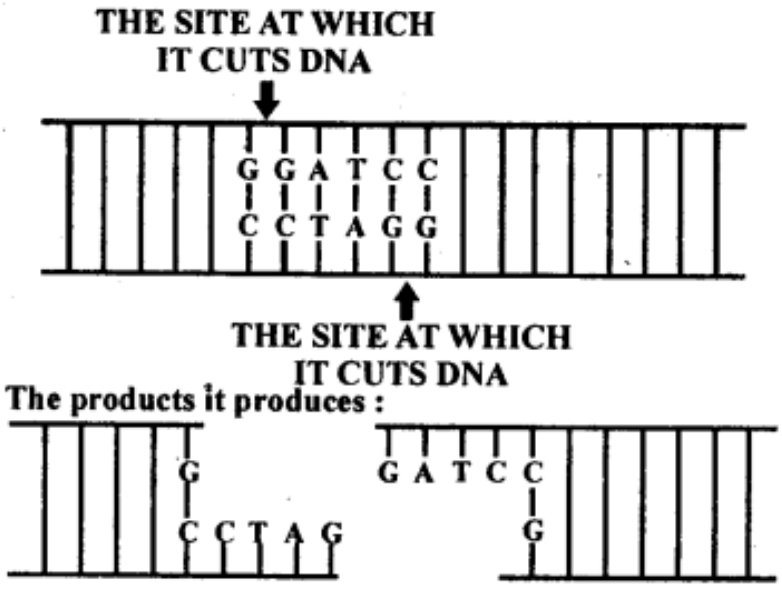
1. Can you list 10 recombinant proteins which are used in medical practice? Find out where they are used as therapeutics (use the internet).
Ans:
(i) Human insulin - Diabetes
(ii) Human growth hormone - Dwarfism cure
(iii) Blood clotting factor Y1H/IX-Haemophilia
(iv) TPA (tissue plasminogen activator) - Heart attack/strokes
(v) PDGF (platelet derived growth factor) - Stimulates wound healing.
(vi) Interferon - Treatment of viral infection.
(vii) Interlinking - Enhances immune reaction, (viii) Hepatitis B vaccine - Prevention of infectious disease.
(ix) Herpes Vaccine - Prevention of infectious disease.
(x) DNase I - Treatment of cystic fibrosis.

2. Make a chart (with diagrammatic representation) showing a restriction enzyme, the substrate DNA on which it acts, the site at which it cuts DNA and the product it produces.
Ans: Name of the Restriction enzyme - Bam HI.
The substrate DNA on which it acts -



3. From what you have learnt, can you tell whether enzymes are bigger or DNA is bigger in molecular size? How did you know?
Ans: Enzymes are bigger than DNA as they are proteins and proteins are macromolecules made of amino acids which are bigger than nucleotides. This can also be proved by gel electrophoresis, where denatured protein would not move but denatured DNA will move to a distance. Protein synthesis is regulated by small portions of DNA, called genes.

4. What would be the molar concentration of human DNA in a human cell? Consult yourteacher.
Ans: The molar concentration of DNA in human cell is 2 mg/ml of cell extract.

5. Do eukaryotic cells have restriction endonucleases? Justify your

answer.
Ans: No, eukaryotic cells do not have restriction endonuclease because DNA molecules of eukaryotes are heavily methylated. All the restriction endonucleases have been isolated from various strain of bacteria.

6. Besides better aeration and mixing properties, what other advantages do stirred tank bioreactors have over shake flasks?
Ans: Shake flasks are used for growing and mixing the desired materials on a small scale in the laboratory. A large scale production of desired biotechnological product is done by using 'bioreactors'. Besides better aeration and mixing properties, the bioreactors have following advantages:
(i) Small volumes of cultures are periodically withdrawn from die reactor for sampling.
(ii) It has a foam control system, pH control system and temperature control system.
(iii) Facilitates even mixing and oxygen availability throughout the bioreactor.

********** END **********