Name: _____ Block: _____ Mark: _____ out of _____

BIOLOGY 12 - RECOMBINANT DNA & GENETIC ENGINEERING

⇒ Part A: Definitions: Define the following terms, IN YOUR OWN WORDS, IN AS FEW WORDS AS CLARITY ALLOWS.

i.	recombinant DNA	
ii.	genetic engineering	
iii.	biotechnology products	
iv.	transgenic organisms	
v.	gene therapy	
vi.	vector	
vii.	plasmid	
viii.	polymerase chain reaction	
ix.	DNA probe	
x.	RFLP Analysis	

PART B - SHORT ANSWERS

1. _____ _____is the use of technology to alter the genome of viruses, bacteria, and other cells for medical, agricultural, or medical purposes.
2. _____ DNA contains DNA from 2 or more different sources.
3. Several uses of recombinant DNA include _____ genes, producing _____products, making _____ organisms, _____ therapy, _____ fingerprinting.
4. A biotechnology product that are now available include are human _____ hormone, which used to have to be extracted from the pituitary glands of 50 _____ to make a single dose.
5. A common vector is the _____, which is a virus that has, _____, rather than DNA as its nucleic acid.
6. A _____ is something that can get DNA from one species into the DNA of a second species. Often, this can be a _____, a small circular piece of bacterial DNA.
7. An example of in vivo gene therapy is grafting _____-producing cells right onto the brain to treat _____ disease. Another technique involves using an _____ that contains a gene to treat _____ fibrosis - the adenovirus is injected into the body in an inhalant spray.
8. _____ are useful monerans that are engineered for numerous duties. For example, some are engineered to produce an _____ to kill insects. Many are used to clean up messes like garbage dumps and oil spills -- using organisms for this purpose is called _____. They can also be used to _____, like the phenylalanine used in the production of *Nutrasweet.*
9. DNA "fingerprints" are commonly produced using a technique called _____ Analysis. This techniques uses special enzymes called _____ enzymes, which cut up DNA in specific ways.

10. DNA that has been amplified by PCR can be analyzed using a radioactive DNA _____, which can detect viral infections, and diagnose some genetic disorders and cancers.
11. Ex vivo gene therapy has been used to treat liver cells for people suffering from _____, a disorder in which the liver is unable to properly remove _____ from the blood.
12. If two organisms have identical DNA, but are not twins, they are said to be _____. Two animals that have been successfully cloned are _____ and _____ pigs.
13. In order to insert a human gene into a bacterial plasmid, first a _____ enzyme is used to cut up the DNA and form "sticky" ends on the gene and the plasmid. Then, the enzyme DNA _____ is used to seal the human gene into the plasmid. The can now be allowed to reproduce, cloning the DNA, or the bacteria can be caused to _____ the human gene, producing pure human protein.
14. In PCR uses a heat-resistant form of the enzyme DNA _____ and a repeating cycle of heating and cooling to produce massive amounts of DNA from tiny samples (e.g. a single hair from a crime scene).
15. The _____ _____ project is a massive project in biochemistry in which every single nucleotide in the human genome is being sequenced.
16. The laboratory technique that is used to make many multiple copies of a single piece of DNA is the _____ _____ _____reaction, which is abbreviated _____.
17. Tissue _____ _____, or tPA, is a biotechnology product that is used to dissolve blood _____, and tumour necrosis factor is another one used to treat _____.
18. Today, high quality human _____ is produced through biotechnology for the treatment of diabetes.
19. _____animals are now commonly used in agriculture. One commonly used biotechnology product used in cows is _____ _____ _____, (bGH), which increases milk production by 25%.
20. _____ plants are widely used in agriculture. For example, there is an engineered _____ which contains a gene that makes the wheat resistant to the herbicide *Roundup*. These plants can also be engineered to be resistant to temperature extremes, _____ soils, drought, bruising, and spoiling.
21. Treating genetic disorders by replacing defective genes in a person with healthy genes is called _____ _____. If the genes are injected into cells that have been first removed from the patient, and then put back in the patient, this is called _____ _____ gene therapy. If the genes are introduced right into the bodies of the patients directly, this is called _____ _____ gene therapy.
22. Using genetically engineered animals to produce medicines and drugs for human use is called _____ _____.