1) Which of the following **IS NOT** required for PCR?
   a. DNA Polymerase
   b. dNTPs
   c. Helicase
   d. Primers
   e. None of the above (all are required)

2) Which **IS NOT** true about complimentary base-pairing:
   a. It is important for DNA replication
   b. It is important for transcription
   c. It is important for translation
   d. It is important for PCR
   e. None of the above (all of the statements are true)

3) Recombinant DNA:
   a. Is defined as a mix of human and animal DNA.
   b. Contains a segment of DNA from a foreign source.
   c. Is created from embryonic stem cells.
   d. Is required for human cloning.
   e. None of the above.

4) The term "***cloning***" refers to:
   a. Producing multiple copies of a recombinant DNA by transforming bacteria.
   b. The ability of bacteria to divide by mitosis and thereby make clones of themselves.
   c. Producing a transgenic animal by inserting recombinant DNA into an embryo.
   d. Generating an organism that is a genetic copy of another organism by bypassing sexual reproduction.
   e. All of the above

7) Which of the following is **NOT** true about gene expression in Eukaryotes?

a. Gene expression can be regulated in the nucleus epigenetically.
b. Gene expression can be regulated transcriptionally by RNA editing.
c. Gene expression can be regulated in the cytoplasm at the level of translation.
d. Gene expression can be regulated in the nucleus by post- translational modifications.
e. None of the above (all of the above statements are TRUE)

8) In PCR, what happens during the ***annealing*** phase?

a. Denaturation of DNA template strands
b. base-pairing between primers and template strands
c. Extension of target DNA by Taq polymerase
d. Exponential accumulation of target DNA
e. None of the above

9) Given the short DNA anticodon sequence: **TAC GGC AGC TTG**

a. The RNA transcript would be: AUG CCG UCG AAC
b. The RNA transcript would be: UAC GGC AGC UUG
c. The RNA transcript would be: ATG CCG TCG AAC
d. None of the above

10) Which **IS NOT** true about complimentary base-pairing?

a. It is important for DNA replication
b. It is important for transcription
c. It is important for translation
d. It is important for PCR
e. None (all of the statements are true)

11) Which is **NOT** an application of DNA fingerprinting?

a. Identification of human remains
b. Paternity determination
c. Crime Scene Investigation
d. Identification of genetic markers associated with disease risk
e. None of the above (All are applications of DNA profiling)

The questions below refer to the following terms. Each term may be used once, more than once, or all.

A.) Enhancer
B.) Promoter
C.) Activator
D.) Repressor
E.) Terminator

12. Can inhibit transcription by blocking the binding of positively activing transcription factors to the DNA.
13. Site in the DNA that may be located far from that transcription initiation site in any direction.
14. The phenomenon in which RNA molecules in a cell are destroyed if they have a sequence complementary to an introduced double-stranded RNA is called:
    A.) RNA interference
    B.) RNA obstruction
    C.) RNA blocking
    D.) RNA targeting
    E.) RNA disposal

15. In eukaryotes, why are certain genes expressed only in certain types of cells?
    a) Different cell types contain different genes
    b) Different cell types have same genes but different promoters
    c) Different cell types have same genes but different enhancers
    d) Different cell types have different regulatory transcription factors.

16. The following is/are way(s) of controlling the efficiency of translation.
    a) Binding of repressor molecule to the mRNA
    b) Binding of small molecules to the mRNA
    c) Binding of anti-sense RNA to the mRNA
    d) Formation of polyribosome
    e) All of the above

17. The following is an example of posttranslational of gene expression
    a) Control of transcription by repressor
    b) Control of transcription by an inducer
    c) Alternative splicing of RNA
    d) Controlling transport of mRNA from the nucleus
    e) Phosphorylation of protein

18. A mutation can best be described as a:
    a) Change in cell morphology
    b) Change in number of the nucleus
    c) Transient change in DNA
    d) Permanent and inheritable change in DNA
    e) Change in protein conformation

19. During splicing, following components are removed from primary transcript?
A.) Intron
B.) DNA
C.) Protein
D.) Exon
E.) Sugar

20. Which of the following is least related to transcription?
A.) Translatin
B.) TATA box
C.) Template strand
D.) RNA polymerase II
E.) CAT box

21. The following structure are name of the common biological forms(s) of DNA EXCEPT:
A.) A-form DNA
B.) B-form DNA
C.) Z-form DNA
D.) C-form DNA

22. A codon is present in the following type of RNA
A.) rRNA
B.) tRNA
C.) mRNA
D.) MicroRNA

23. If the size of an mRNA is 1512 bases long. Assuming that all bases are used as codon, the size of the translation product would be:
A.) 405 amino acids
B.) 1512 amino acids
C.) 1200 amino acids
D.) 512 amino acids
E.) 504 amino acids

24. A codon, CCC code for proline in E. coli. In human, proline will be coded by:
A.) AAA
B.) GGG
C.) UUU
D.) TTT