Section Two: Molecular Genetics (20 Marks)

Part One: Answer all questions (from 1-20) by choosing the single right answer: Each Right answer ½ mark (Total 10 Marks).

(1) The bond between a phosphate group and the ribose sugar group in RNA is called which of the following? (a) Phosphodiester linkage (b) ionic bond(c) Peptide bond (d) Amide bond (e) Glycosidic bond

(2) Which of the following does not play a role in DNA replication? (a) DNA polymerase (b) Helicase (c) Single-stranded binding protein (d) Guanyl transferase (e) rRNA.

(3) Splicing is the process that does which of the following? (a) Remove introns and conserve exons (b) Remove exons and conserve introns (c) Remove mutated regions of primary transcript RNA (d) Add multiple adenosine bases to the end of a primary RNA transcript (e) Translate DNA.

(4) Which of the following codons cannot be recognized by a tRNA molecule? (a) UAA (b) CGA (c) UUU (d) AUG (e) AAA.

(5) During DNA replication, the 3' –OH of the growing DNA chain attacks which phosphate of an incoming nucleotide? (a) Alpha (b) Beta (c) Gamma (d) Delta (e) epsilion.

(6) Codons that code for the same amino acid are called: (a) Synonyms (b) Similar (c) Degenerates (d) Complements (e) anticodons.

(7) Which of the following is not a characteristic of a tRNA molecule? (a) D arm (b) Beta arm (c) T arm (d) Anti-codon arm (e) snRNA.

(8) Adenine and guanine are examples of what class of nitrogen base? (a) Large (b) Pyrimidines (c) Small (d) Purines (e) cumbersome.

(9) What signals the end of transcription? (a) Stop codon (b) Terminator (c) The end of the DNA chain (d) RNA polymerase runs out (e) No Codon.

(10) The start codon is: (a) AUU (b) UAA (c) AUG (d) UAG (e) AAA.

(11). Which of the following is not a component of a nucleotide? (a) Phosphate group (b) Anti-codon (c) Ribose sugar (d) Nitrogen base (e) ATP.

(12) Which of the following is an example of a missense mutation? (a) UAC to UAG (b) AAA to UAA (c) UGC to UCC (d) UAA to UGA (e) none of the above.

(13) The structure of tRNA resembles a(n): (a) Cloverleaf (b) L (c) A helix (d) B helix (e) double helix.

(14) Which of the following is not a DNA base? (a) Thymine (b) Uracil (c) Adenine (d) Guanine (e) ATP.

(15) What is the name of the enzyme responsible for helping charge tRNA molecules? (a) Guanyl transferase (b) Polymerase (c) Helicase (d) Aminoacyl-tRNA synthase (e) all of the above.

(16) Which of the following is not an RNA base? (a) Adenine (b) Uracil (c) Thymine (d) Cytosine (e) none of the above.

(17) The strand on which DNA replication is continuous is called the: (a) Leading strand (b) Lagging strand (b) Major strand (d) Minor strand (e) Replication Fork.

(18) The 3' end of a tRNA molecule contains which of the following sequences? (a) TATA (b) CAA (c) AUG (d) UAA (e) None of the above.

(19) What is the name of the bond that links the nitrogen base and the ribose sugar in a nucleotide? (a) Phosphodiester bond (b) 5'-5' bond (c) Glycosidic bond (d) Amide bond (e) all of the above.

(20) How many base pairs make up a codon? (a) 1 (b) 2 (d) 3 (d) 4 (e) 5

Part Two: Answer the questions by using short and precise answers:

(1) (a) Differentiate between gene Regulation on Eukaryotes and Prokaryotes. (2 Marks)

(b) How do Eukaryotes regulate genes by: (i) Changing the rate pf transcription?(ii) Enhancers? (iii) Silencers? (iv) Insulators? (4 Marks)

(c) How do prokaryotes regulate genes by (i) Operon ? (ii) Corepressors? (iii) Cap? (4 Marks)