4. Molecular Basis of Inheritance

1) Place the following event of translation in the correct sequence
i. Binding of met-tRNA to the start codon.
ii. Covalent bonding between two amino acids.
iii. Binding of second tRNA.
iv. Joining of small and large ribosome subunits.
(a) iii, iv, i, ii (b) i, iv, iii, ii
(c) iv, iii, ii, i (d) ii, iii, iv, i

2) Friedrich Miescher's Nuclein was a mix of
(a) Phosphorus and Nucleic Acid
(b) Proteins and phosphorus
(c) DNA and RNA
(d) Proteins and Nucleic Acids

3) By the early 1900's Geneticists believed that
(a) Genes control the inheritance of traits.
(b) Genes are located on the chromosomes
(c) Chromosomes are mainly composed of DNA and Proteins.
(d) Genes are located on DNA

4) According to Griffith's Experiment
(a) R-Strain bacterium gets transferred into smooth-coated bacterium and become virulent.
(b) Genetic material from heat killed strain s bacterium had changed Strain R into S-Strain bacterium.
(c) He mixed heat killed S-Strain Bacteria and injected to mice.
(d) He recovered large number of R-Strain Bacteria from the blood of dead mice.

5) The process of Protein Synthesis includes
(a) Transcription
(b) Translation
(c) Both (a) and (b)
(d) Maturation of Okazaki fragments.

6) In DNA Replication,
(a) Leading strand synthesized in 5'- 3' direction
(b) Leading strand synthesized discontinuously
(c) Both the strands are simultaneously replicated at the Replication Fork
(d) All of the above

7) The reason behind the anti-parallel strand of DNA structure is
(a) disulphide bond (b) Replication fork
(c) Hydrogen bond (d) Phosphodiester bond

8) The principle on which Hershey and Chase experiment was based?
(a) Anticodon (b) Transformation
(c) Replication (d) Transduction

9) Regulator gene produces a protein called _____.
(a) Promoter gene (b) Lactose operon
(c) Operator gene (d) Repressor protein

10) TRANSLATION in the correct sequence

(a) Binding of met-tRNA to the START codon.
(b) COVALENT bonding between two AMINO ACIDS.
(c) Binding of second tRNA.
(d) Joining of SMALL AND Large ribosome subunits

11) Which is not included in the process of Transcription includes
(a) Initiation (b) Elongation
(c) Termination (d) translation

12) The Enzyme Restriction endonuclease is used
(a) To cut the DNA segment binding
(b) To manipulate genes with precisely defined sequence
(c) (a) and (b)
(d) To cleave foreign DNA, thus eliminating infecting organisms in bacteria

13) Protein synthesis includes the processes
(a) Transcription (b) Translation
(c) Both(a) and (b) (d) Replication

14) In RNA molecule, nitrogen base thymine is replaced by
(a) Cytosine (b) Uracil
(c) Guanine (d) Thymine

15) The enzyme required for transcription is.....
(a) DNA Polymerase
(b) RNA Polymerase
(c) Restriction enzyme
(d) RNAase

16) Transcription is the transfer of genetic information from .....
(a) DNA to RNA (b) tRNA to mRNA
(c) DNA to mRNA (d) mRNA to tRNA

17) Which of the following is NOT part of protein synthesis?
(a) Replication (b) Translation
(c) Transcription (d) All of these

18) In the RNA molecule, which nitrogen base is found in place of thymine?
(a) Guanine (b) Cytosine
(c) Thymine (d) Uracil

19) In Eukaryotes the replication of DNA takes place
(a) Two times in the cell cycle
(b) During the cell cycle.
(c) During the S Phase of interphase in the cell cycles.
(d) during G1 phase.

20) The Semi-Conservative Replication Model of DNA was proposed by
(a) Hershey and Chase
(b) Watson and Crick
(c) Avery, McLeod, and McCarty
(d) Meselson and Stahl

21) Euchromatin constitute
(a) Chromosomes in non-condensed state.
(b) Genetically Less Active
(c) Less Replicating
(d) Stain Dark

22) The unwinding of DNA Molecule is
(a) Is Bi- Directional
(b) Continues as 'Y'-Shaped Replicating Fork
(c) Initiated by enzyme DNA HELICASE by breaking the Hydrogen Bonds.
(d) All of the above.

23) Histones are the proteins that are rich in
(a) Lysine, Arginine
(b) These Amino Acids carry negative charge.
(c) Histone proteins organize themselves to make Histone Octamer
(d) Both (a) and (c).

24) Nucleosomes are _____
(a) The repeating units of chromatin.
(b) Thread like, stained bodies present in the cytoplasm.
(c) Nucleosomes core is made up of 6 molecules of each of the four types of Histone Proteins.
(d) Nucleosomes get coiled to form Octamer.

25) The backbone of the DNA Structure comprises of
(a) Pentose Sugar (b) Phosphate Group
(c) Nitrogen Base (d) All of the above

26) In Transcription, genetic information is transferred from
(a) DNA to mRNA (b) mRNA to tRNA
(c) tRNA to RNA (d) DNA to RNA

27) DNA is located in the
(a) The Nucleus of Eukaryotes
(b) Nucleoid of Prokaryotes
(c) Both (a) and (b)
(d) The cytoplasm of Eukaryotes

28) Okazaki Fragments are _____
(a) Small fragments formed during DNA Synthesis
(b) Is formed in the leading templates
(c) Join by enzyme DNA gyrase.
(d) DNA ligase forms double helix to form daughter DNA molecule.

29) In Genetic Code, first synthesized amino acid is
(a) Cytosine (b) Thymine
(c) Methionine (d) Guanine

30) The mRNA _____
(a) Forms the core of the ribosome
(b) Adaptor between Nucleic Acids and Proteins
(c) Carries the instruction for protein synthesis
(d) Does not carry instructions to connect several amino acids.

31) Which out of the following is NOT an example of inducible operon?
(a) Lactose operon (b) Histidine operon
(c) Arabinose operon (d) Tryptophan operon

32) In 1944, US Microbiologist proved that
(a) The DNA is the main basic genetic material.
(b) RNA is the main genetic material
(c) Proteins are responsible for genetic transformation.
(d) Proteases and RNAases affect transformation

33) How many codons are needed to specify three amino acid?
(a) 3 (b) 6 (c) 9 (d) 12

34) In 1952 Alfred Hershey and chase experiment proved that
(a) Proteins are the basic genetic material
(b) DNA is the genetic material and not the proteins.
(c)They use bacteriophages to confirm this statement.
(d) Histones are positively charged

35) Griffith worked on .....
(a) Bacteriophage (b) Drosophila
(c) Frog eggs (d) Streptococci

36) The molecular knives of DNA are ……..
(a) ligases (b) polymerases
(c) endonuclease (d) transcriptase

37) Translation occurs in the .....
(a) Nucleus (b) Cytoplasm
(c) Nucleolus (d) Lysosomes

38) DNA is a highly coiled structure. The coiling (Packing) is assisted by
(a) Positively charged HU (Histones like DNA binding proteins)
(b) DNA Gyrase
(c) DNA Isomerase
(d) All of the above

39) In 1958, Meselson and Stahl proved
(a) The Semi-Conservative nature of DNA Replication using E-Coli.
(b) They use Bacteria Streptococcal Pneumonia.
(c) They used bacteriophage using phosphorus labelled DNA
(d) Radioactive phages could infect E. Coli bacteria grown on the medium.

40) The Central Dogma of Molecular Biology was postulated by F.H.C Crick In 1958 Which constituted
(a) Double stranded DNA molecule give rise to mRNA
(b) mRNA acts as messenger to program the synthesis of Polypeptide Chain
(c) Unidirectional flow of information from DNA to RNA
(d) DNA replication is semiconservative.

41) Genetic code is a collection of
(a) Basic sequences that correspond to each amino acid
(b) Base sequences that correspond to each enzyme

(c) Single base in a codon code for 4 amino acids and
(d) transcription in all three types of RNA in bacteria.

42) In Semi-Conservative Replication, newly formed DNA is _____
(a) One strand is old
(b) Another strand is new
(c) Both the strands are new
(d) (a) and (b)

43) The gene expression results in the formation of a polypeptide is a _____ process.
(a) Multistep (b) Peptidyl transferase
(c) Replication (d) Elongation

44) Identify the wrong statement from the following.
(a) DNA is in the nucleoid of prokaryotes.
(b) DNA transfers information to Messenger RNA.
(c) RNA consists of promoter and the structural gene.
(d) Enzyme joining nucleotide of new strand.

45) The Deoxyribonucleic Acid, i.e. DNA are
(a) Different cells in viruses
(b) Code for genetic information
(c) Always form Double Helix
(d) All of the above

46) Steps not included in Translation -
(a) Initiation of polypeptide chain
(b) Elongation of polypeptide chain
(c) Termination and release of polypeptide
(d) Code for genetic information

47) Heterochromatin in eukaryotes are the
(a) 2 to 3 times richer than in the euchromatin.
(b) Stain Light
(c) Less Active
(d) Less rich in DNA

48) Which of the following statement is true about chromosome?
(a) Chromatin which is packed to form a solenoid structure.
(b) Further supercoiling tends to form chromatin fibre.
(c) Chromatin fibre further condense at metaphase to form chromosome
(d) All of the above

49) Identify the incorrect pair from the following.
(a) ATP- the energy carrying compound in the cell
(b) Lactose – inducible operon
(c) rRNA- found in ribosome
(d) Galactosidase- chemical inducer

50) DNA Helix of 200 bps wraps around the histone octamer by _____
(a) 1 ½ Turns (b) 1 ¾ Turns
(c) 2 Times (d) 2 ½ Turns

51) Genomics can lead to _____

(a) Sudden change in RNA Sequence
(b) Introduce new gene in microbes
(c) Results in change of Genotype
(d) Rapid development in one area

-------- All the Best --------

4. Molecular Basis of Inheritance Keys

1) Ans. (b)

2) Ans. (d)

3) Ans. (b)

4) Ans. (a)

5) Ans. (c)

6) Ans. (a)

7) Ans. (d)

8) Ans. (c)

9) Ans. (d)

10) Ans. (d)

11) Ans. (d)

12) Ans. (c)

13) Ans. (c)

14) Ans. (b)

15) Ans. (b)

16) Ans. (a)

17) Ans. (a)

18) Ans. (d)

19) Ans. (c)

20) Ans. (b)

21) Ans. (a)

22) Ans. (a)

23) Ans. (a)

24) Ans. (a)

25) Ans. (d)

26) Ans. (a)

27) Ans. (c)

28) Ans. (a)

29) Ans. (c)

30) Ans. (d)

31) Ans. (c)

32) Ans. (a)

33) Ans. (a)

34) Ans. (b)

35) Ans. (d)

36) Ans. (c)

37) Ans. (b)

38) Ans. (d)

39) Ans. (a)

40) Ans. (c)

41) Ans. (a)

42) Ans. (c)

43) Ans. (a)

44) Ans. (c)

45) Ans. (d)

46) Ans. (d)

47) Ans. (a)

48) Ans. (c)

49) Ans. (d)

50) Ans. (b)

51) Ans. (b)