4. MOLECULAR BASIS OF INHERITANCE

MULTIPLE CHOICE QUESTIONS (1 MARK EACH)

1 Find the odd one out:
A H_2A
B H_3
C H_2B
D $\underline{H_1}$

2 What happened when heat killed S-cells along with live R-cells were injected into mice?
A <u>Mice died and showed live S-cells</u>
B Mice survived and showed live S-cells
C Mice died and showed live R-cells
D Mice died and showed dead R-cells

3 Find out the double ring compound :
A <u>Adenine</u>
B Uracil
C Cytosine
D Thymine

4 If a DNA has 20 Adenine and 30 cytosine bases. What will be the total number of purine bases in the given sample?
A 20
B <u>50</u>
C 30
D 100

5 Semiconservative mechanism of DNA was detected using:
A ^{35}S
B ^{14}C
C ^{32}P
D $\underline{^{15}N}$

6 A template strand of DNA has base sequence CATGATTAC. New strand synthesized on it will be :
A GATCAUATG
B GTACTAACG
C GAACTAATG
D <u>GTACTAATG</u>

7 During DNA replication, the separated strands of DNA are prevented from recoiling by
A DNA primase
B Sigma factor
C Rho-factor
D <u>SSBP</u>

8 In which of the following synthesis of DNA strand is not involved directly?
A m RNA
B t RNA
C Another DNA strand
D <u>Protein</u>

9 Wobble hypothesis is related with
A Ambiguity in codon
B Purine pyrimidine equality
C Genetic code is triplet
D <u>Degeneracy of genetic code and economy of tRNA molecules in the cell</u>

10 During elongation of polypeptide chain, sigma factor is :
A <u>Functionless</u>
B Retained for specific function
C Released for re-use
D Required during closing of chain

11 Enzyme required for peptide formation is :
A Peptidase
B <u>Peptidyl transferase</u>
C Nitrogenase
D Nitrate reductase

12 Exon segments are reunited after splicing by
A RNA primase
B RNA protease
C <u>RNA polymerase</u>
D RNA ligase

13 In lac operon, lactose acts as:
A <u>Inducer</u>
B Co-inducer
C Repressor
D Co-repressor

14 A unit of lac-operon which in the absence of lactose, suppresses the activity of operator gene is :
A Structural gene
B <u>Regulatory gene</u>
C Repressor protein
D Promoter gene

15 A DNA segment has 75 cytosine and 40 thymine nucleotides. What shall be the total number of phosphates in the DNA segment?
A 115
B <u>230</u>
C 75
D 220

VERY SHORT ANSWER QUESTIONS (1 MARK EACH)

1 What is the principle of DNA profiling?
2 What is the use of southern blotting in DNA fingerprinting?
3 Enlist the genes in Lac operon
4 What is meant by an operon?
5 AUG codon gives _____ & _____ amino acids in prokaryotes & Eukaryotes respectively.
6 What is meant by activation of amino acids?
7 What is the role of Mg^{++} in Translation?
8 What are the different types of mutations?
9 Enlist the names of enzymes used in semiconservative replication of DNA?
10 What is central dogma of molecular biology?
11 What type of isotopes used in semiconservative replication experiments?
12 What is the function of RNA primer?
13 What is the function of SSBP?
14 Define RFLP'
15 Define Heterochromatin

SHORT ANSWER TYPE QUESTIONS(SA-I) (2 MARKS EACH)

1. Differentiate between Heterochromatin & Euchromatin'
2. How t-RNA acts as an adapter molecule? Explain in detail with the help of a diagram.
3. Define mutation. State its two types
4. Describe Hershey-Chase experiment in detail.
5. Explain the role of Lactose as inducer in Lac-operon.
6. Draw neat and labelled diagram of Nucleosome.
7. Write a note on: packaging of DNA in prokaryotes.
8. Write a note on: packaging of DNA in Eukaryotes.
9. Explain Avery, McCarty and MacLeod's experiment in detail
10. Draw neat and labelled diagram of Replication Fork.

SHORT ANSWER TYPE QUESTIONS (SA-II) (3 MARKS EACH)

1. Explain the Griffith's experiment in detail with diagram.
2. Describe any three characteristics of Genetic code.
3. Mention any three objectives of Human Genome project.
4. Explain different step involved in DNA Fingerprinting.
5. Draw a neat and labelled diagram of transcription and processing of hn-RNA
6. Draw a neat and labelled diagram explaining Meselson's and Stahl's experiment.
7. How Meselson and Stahl explained the concept of Semiconservative Replication of DNA experimentally?
8. Explain the concept of operon.
9. Give diagrammatic representation of Lac-operon in the presence of an inducer.
10. Define Genomics. Give any two applications of genomics.

LONG ANSWER TYPE QUESTIONS (LA) (4 MARKS EACH)

1. Describe the process of semiconservative replication of DNA with the help of neat and labelled diagram.
2. Describe the mechanism of translation with the help of a neat and labelled diagram.
3. Explain processing of hn-RNA with the help of neat and labelled diagrams.
4. With respect to lac- operon explain the following terms:-
   i) regulator gene
   ii) promoter gene
   iii) structural gene
   iv) inducer
5. Define DNA fingerprinting? State any three applications of it.