BRAIN INTERNATIONAL SCHOOL

SUBJECT: BIOLOGY CLASS XII JULY,2021

Molecular basis of inheritance:

1. **MULTIPLE CHOICE QUESTIONS:**

(a) The sequence of nitrogen bases in a segment of a coding strand of DNA is ATGCTTAGGCA. What will be the sequence of nitrogen bases in the mRNA transcribed by it?
(i) UUA CGA AUC CGU (ii) AAU GCU AAC CGA
(iii) AAU GCA AUC CGU (iv) AAU GCU UAG GCA

(b) The central dogma of molecular biology (genetic information flow) was modified by the discovery of
(i) RNA polymerase (ii) DNA ligase
(iii) Reverse transcriptase (iv) DNA polymerase

2. **ASSERTION-REASON QUESTIONS:**

Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below, mark one as the correct answer.

(i) A and R both are correct statements and R is correct explanation for assertion.
(ii) A and R both are correct statements but R is not the correct explanation for assertion.
(iii) A is correct statement but R is wrong statement.
(iv) A is wrong statement but R is correct statement.

(a) **Assertion:** Lactose is known to be the inducer and the substrate for the enzyme β-galactosidase.
Reason: Lactose binds to the operator region of the operon and prevents binding of RNA polymerase.

(b) **Assertion:** Eukaryotic mRNA requires post-transcriptional modification to form functional mRNA.
Reason: Eukaryotic transcripts possess extra non-functional gene segments called introns.

3. If the base adenine constitutes 30 per cent of an isolated DNA fragment, then what is the expected percentage of the base cytosine in it?
4. (i) Name the enzyme that catalyses the transcription of *hn*RNA.
(ii) Why does the *hn*RNA need to undergo changes? List the changes *hn*RNA undergoes and where in the cell such changes take place.
5. Explain the mechanism of DNA replication. Highlight the role of enzymes in the process.
6. (a) Mention the contributions of the following scientists:
(i) Maurice Wilkins and Rosalind Franklin.
(ii) Erwin Chargaff.
(b) Draw a double-stranded dinucleotide chain with all the four nitrogen bases. Label the polarity and the components of the dinucleotide.

Evolution:

1. The wing of bat is homologous to:
a. arm of a human b. tail of a kangaroo
c. tail fin of a fish d. wing of a butterfly
2. Who provided experimental support for Oparin-Halden hypothesis? Explain it how they prove it.
3. Mention the two key concepts of Darwinism.
4. Birds have evolved from reptiles. How does paleontology provide evidence in support of this statement?
5. Differentiate between convergent and divergent evolution.
6. How did industrial melanism bring about natural selection?