2020

MICROBIOLOGY — HONOURS

Paper : CC-7

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Question no.* 1** is compulsory and answer ***any three questions from the rest.

1. Answer ***any ten*** questions : 2×10

(a) What is writing no. of a super coiled DNA?

(b) Write down an example of palindromic DNA.

(c) Calculate the approximate number of Okazaki fragments generated per one round of replication of *E. coli* chromosome.

(d) What is hyperchromic shift?

(e) Explain why the two strands of DNA are anti-parallel in nature.

(f) Write down two major features of BDNA.

(g) Write down the significance of the different exonuclease activities found in DNA pol I.

(h) Define the term Gratuitous Inducer.

(i) Write down the role of SSB protein in replication.

(j) Name the essential elements that should be present in bacterial promoters.

(k) Mention the different initiation factors that are involved in prokaryotic translation.

(l) Write down the role of Tus protein.

(m) Why is transcription less accurate than replication?

(n) What are coding and template strands in DNA transcription?

(o) Write down the function of telomerase.

2. (a) Justify the statement, "tRNA with one anticodon can read more than one codon".

(b) How do the release factors recognize stop codons?

(c) How does activation of tRNA with suitable amino acid take place?

(d) Explain why codons are triplet in nature. 2+3+3+2

3. (a) Why does RNA Polymerase undergo the period of abortive transcription?

(b) What are the components of closed complex, open complex and ternary complex formed during Prokaryotic Transcription?

(c) Which step of Central Dogma is blocked by the antibiotic Rifampicin? Explain the mechanism. 3+3+(1+3)

4. (a) Show with a properly labelled diagram how would the bands in CsCl density gradient centrifugation appear up to 3rd generation, in Messelson Stahl's experiment of DNA Replication.

(b) How are parental and daughter strands identified/distinguished in mismatch repair?

(c) Distinguish between Group I and Group II introns. Write down the significance of alternative splicing. 3+3+(2+2)

5. (a) What do you mean by C-value paradox?

(b) Define attenuation using the example of trp operon.

(c) Draw the structure of 5′ cap of eukaryotic mRNA and write down its significance.

(d) Write down the structural features present in origin of replication. 2+3+(2+1)+2

6. (a) With the help of a diagram write down the steps of Nucleotide Excision Repair.

(b) How are tRNA synthatases involved in fidelity of translation?

(c) What do you mean by endosymbiotic theory? (2+2)+3+3

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