Total number of printed pages–7

3 (Sem–5/CBCS) ZOO HC 1

2024

ZOOLOGY

(Honours Core)

Paper : ZOO–HC–5016

(Molecular Biology)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : 1×7=7

   (i) The coding sequences in a slip gene are known as –

   (A) Introns

   (B) Operons

   (C) Exons

   (D) Cistrons

Contd.

(ii) Isotopes used by Meselson and Stahl, in proving semiconservative replication of DNA were –

(A) $^{14}N\ ^{14}C$

(B) $^{14}N\ ^{15}N$

(C) $^{14}N\ ^{31}P$

(D) $^{14}C\ ^{31}P$

(iii) A paricular triplet of bases in the template strand of DNA is 5′ AGT 3′. The corresponding codon for mRNA transcribed is –

(A) 5′ TCA 3′

(B) 3′ UCA 5′

(C) 3′ ACU 5′

(D) *Either* UCA *or* TCA, depending on wobble in the first base

(iv) Which is the most abundant type of RNA ?

(A) mRNA

(B) tRNA

(C) rRNA

(D) hnRNA

(v) The repeat sequence of nucleotides in telomere is –

(A) TTGGGA

(B) TTAGGG

(C) GGGATT

(D) TTGAGG

(vi) Which of the following RNAs can induce gene silencing ?

(A) ssRNA

(B) snoRNA

(C) miRNA

(D) ncRNA

(vii) TBP stands for –

(A) TATA box polymerase

(B) Transcription factor binding protein

(C) TATA box binding protein

(D) None of the above

2. Write short notes on the following : 2×4=8

(a) Replicons

(b) Transcription unit

(c) RNA interference

(d) Globin mRNA

3. Answer the following questions : ***(any three)*** 5×3=15

(a) Write the mechanism of rolling circle replication.

(b) Discuss the salient features of Watson and Crick model of DNA.

(c) Write a note on mismatch repair system.

(d) Write a brief account of structure and assembly of ribosomes in prokaryotes.

(e) State the role of Activator and Silencer in regulation of eukaryotic gene expression.

4. Why is DNA replication known as semi-discontinuous ? Discuss the role of various enzymes involved in eukaryotic DNA replication. 2+8=10

Or

Define spliceosome. Describe the process of mRNA splicing with suitable diagram. Why is alternative splicing significant ?

2+6+2=10

5. What is an operon ? Briefly describe about regulation of trp operon in *E. coli*. How do mutations in leader sequence affect regulation process ? 2+6+2=10

Or

Define Transcription. Briefly discuss the differences between prokaryotic and eukaryotic transcription. 2+8=10

6. What is genetic code ? Write the characteristics of genetic code. Explain degeneracy of genetic code with special reference to 'Wobble hypotheses'.

1+4+5=10

Or

Give a detailed account of mechanism of translation in eukaryotes. How inhibitors of protein synthesis affect translation proces ?

8+2=10

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