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63/1 (SEM-5) CC11/ZOOHC5116

2024

ZOOLOGY

Paper : ZOOHC5116

(Molecular Biology)

Full Marks : 60

Pass Marks : 24

Time : Three hours

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

1. Choose the correct answer from the following: **(any five)** 1×5=5

(a) Pentose sugar, nitrogenous base and phosphate unite to form

(i) nucleoside

(ii) nucleotide

(iii) polynucleotide

(iv) purine

- (b) Unwinding of double-stranded DNA during replication is done by the enzyme
- (i) DNA polymerase
 - (ii) helicase
 - (iii) topoisomerase
 - (iv) permease
- (c) Which one of the following is known as start/initiation codon ?
- (i) AUG
 - (ii) UAC
 - (iii) UGA
 - (iv) UAG
- (d) Non-coding sequences that are removed during splicing are known as
- (i) exon
 - (ii) intron
 - (iii) operator
 - (iv) UTR

- (e) lac-Y gene codes for the enzyme
- (i) β -galactosidase
 - (ii) polymerase
 - (iii) acetyltransferase
 - (iv) permease
- (f) siRNA is
- (i) endogenous
 - (ii) exogenous
 - (iii) both endo and exogenous
 - (iv) homogenous
- (g) Which of the following enzymes, makes a nick at the unmethylated GATC sequence during mismatch repair?
- (i) UvrD
 - (ii) MutS
 - (iii) MutL
 - (iv) MutH
- (h) Type of prokaryotic ribosome is
- (i) 70s
 - (ii) 80s
 - (iii) 90s
 - (iv) 100s

(i) Which of the following purine bases is present in RNA ?

- (i) Uracil
- (ii) Thymine
- (iii) Cytosine
- (iv) Guanine

(j) Wobble hypothesis was given by

- (i) F.H.C. Crick
- (ii) R.W. Holley
- (iii) M. Nirenberg
- (iv) H.G. Khorana

2. Answer the following questions : **(any five)**

2×5=10

- (a) Write four properties of genetic code.
- (b) What do you mean by bi-directional DNA replication ?

(c) What are the components of a transcription unit ?

(d) What is globin mRNA ?

(e) What do you mean by riboswitches ?

(f) What is telomeric replication ?

(g) Write the significance of RNA editing.

3. Answer the following questions : **(any five)**

5×5=25

(a) Write a note on miRNA-mediated RNA interference.

(b) State the difference between prokaryotic and eukaryotic translation.

(c) Explain the process of repairing of pyrimidine dimerization with suitable diagram.

(d) Write in detail about Watson and Crick model of DNA with diagram.

- (e) Write a note on the proteins involved in protein synthesis.
- (f) Write about the structure and function of ribosome.
- (g) Write a note on genetic imprinting.
- (h) State the differences between miRNA and siRNA.
- (i) Mention the names of enzymes and their functions involved in prokaryotic DNA replication.

4. Answer the following: **(any two)** $10 \times 2 = 20$

- (a) What do you mean by gene expression? Explain the 'lacoperon' system of gene expression regulation along with diagram. $2+8=10$
- (b) What is transcription? Explain the process of transcription in eukaryotes with suitable diagram. $2+8=10$

- (c) Explain the mechanism and types of RNA splicing in detail.
- (d) Explain the process of replication in prokaryotes with suitable diagram.