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63/1 (SEM-5) CC11/ZOOHC 5116

2023

ZOOLOGY

Paper : ZOOHC 5116

(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 options from the following : **(any five)** 1×5=5

(a) In *E. Coli* the site of origin of replication present in the chromosome is known as

(i) Klenow fragment

(ii) ori C

(iii) A-domain

(iv) C-domain

Contd.

(b) Meselson and Stahl experimentally demonstrated _____ replication of DNA.

- (i) semi-conservation
- (ii) conservative
- (iii) dispersive
- (iv) θ -replication

(c) Which of the following is not a pre-mRNA processing mechanism?

- (i) Polyadenylation
- (ii) 5' capping
- (iii) Acetylation
- (iv) Splicing

(d) Which is a stop codon?

- (i) UUA
- (ii) UCA
- (iii) UAC
- (iv) UGA

(e) The amino acid is attached to the _____ of the tRNA.

- (i) 5' terminal
- (ii) 3' terminal
- (iii) D-arm
- (iv) anticodon arm

(f) lac Z codes for the enzyme

- (i) β -galactosidase
- (ii) β -galactoside permease
- (iii) β -galactoside acetyltransferase
- (iv) allolactose

(g) In Eukaryotic cells, which polymerase is located in the mitochondria.

- (i) Polymerase α
- (ii) Polymerase β
- (iii) Polymerase ϵ
- (iv) Polymerase γ

(h) How many origin of replication does a bacterial chromosome contain ?

(i) 1

(ii) 3

(iii) 4

(iv) 6

(i) During transcription, which transcription factor initially binds to the core promoter.

(i) TF II B

(ii) TF II H

(iii) TF II D

(iv) TF II A

(j) The process of acetylation _____ gene expression.

(i) enhances

(ii) represses

(iii) no effect

(iv) decreases

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

2×5=10

(a) What is the function of 5' capping ?

(b) Define monocistronic and polycistronic transcription unit.

(c) What is semi-discontinuous replication ?

(d) What is pyrimidine dimerization ?

(e) Define genetic imprinting.

(f) What are guide RNAs ?

(g) What are km shuffling ?

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

5×5=25

(a) State the differences between DNA and RNA.

(b) Explain the Wobble hypothesis with suitable diagram.

(c) Describe the charging of tRNA with appropriate diagram.

- (d) Write a note on the fidelity of translation.
- (e) Write a note on the mechanism of spliceosome mediated RNA splicing.
- (f) Discuss the trp operon system of gene expression regulation.
- (g) Write a note on mismatch repair.
- (h) State the differences between translation in prokaryotes and eukaryotes.
- (i) Explain the replication process in the telomeric region.

4. Answer the following questions : **(any two)**

10×2=20

- (a) Describe the mechanism involved in prokaryotic transcription.
- (b) Define self splicing introns. Explain the mechanism of splicing in Group I and Group II introns. 2+8=10

- (c) Explain the process of replication in eukaryotic cell.
- (d) What is RNA interference ? Discuss the action of miRNA and siRNA to mediate RNAi. 2+8=10