

(i) Phillip A Sharp and Richard J Roberts

(ii) Jacob and Monod

5. (a) Describe the mechanisms of regulation of the *trp* operon in *E. coli*. (7)

(b) Provide a brief overview of how ribosomal RNA (rRNA) is processed from its precursor molecule in eukaryotes. (5)

(c) Identify and explain any two mechanisms that ensure the fidelity of translation in prokaryotes. (6)

6. Write short note on (any three): (6×3=18)

(i) Genetic control of sporulation in *Bacillus*

(ii) Charging of tRNA

(iii) Spliceosome machinery

(iv) Positive and negative transcriptional control in *lac* operon

[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1734

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Unique Paper Code : 2532013601

Name of the Paper : Principles of Molecular Biology-II

Name of the Course : **B.Sc. (H) Microbiology**

Semester : UGCF, Part III, Semester-VI

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any **five** questions.
3. **All** question carry equal marks.

1. Define the following (**any nine**): (2×9=18)

(i) MAT locus

(ii) Polysome

- (iii) Kozak sequence
 - (iv) Split genes
 - (v) ORF
 - (vi) Non sense codons
 - (vii) Ribosome cycling
 - (viii) Cotranscriptional loading
 - (ix) RNA interference
 - (x) Translational coupling
2. (a) Differentiate between the following **(any three)** :
(4×3=12)
- (i) miRNA and siRNA
 - (ii) Group I and Group II introns
 - (iii) Prokaryotic ribosome and Eukaryotic ribosome
 - (iv) Histone acetylation and Histone methylation
- (b) Write the significance of the following : **(any six)**
(1×6=6)
- (i) snoRNA
 - (ii) IPTG

- (iii) Peptidyl transferase
 - (iv) Operator
 - (v) Dicer
 - (vi) Isoaccepting tRNA
 - (vii) CPSF
3. (a) Discuss the steps in the termination of translation in prokaryotes. (6)
- (b) Briefly describe the process of trans-splicing with a relevant biological example. (6)
- (c) Discuss the steps involved in the capping of eukaryotic mRNA and write its significance. (6)
4. (a) Define long non-coding RNAs and explain their role in regulating gene expression with an example. (6)
- (b) Expand and give significance of the following **(any five)** :
(2×5=10)
- RBS, PAP, IF-1, EF-G, RF-1, RRF
- (c) Describe the contribution of the following scientists **(any one)** : (2)