| Date: |
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| Registration number: |

**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27**
**M.Sc. MICROBIOLOGY - II SEMESTER**
**SEMESTER EXAMINATION: APRIL 2022**
(Examination conducted in July 2022)
**MB 8318- MOLECULAR BIOLOGY**

**Time- 2 ½ hrs** **Max Marks-70**

This question paper contains **2** printed pages and **4** parts

**I. Answer any Five of the Following** **5X3=15**

1. How does Pol I mediated transcriptional initiation occur?
2. List the functions of the various arms of the tRNA.
3. Draw a flowchart indicating regulation leading to sex determination in *Drosophila.*
4. Differentiate between prokaryotic and eukaryotic ribosomes.
5. How is EF-Tu recycled?
6. Expand the following: a. MCM b. IF2 c. pTEFb
7. Draw the rho- dependent termination mechanism.

**II. Answer any Five of the following** **5X5= 25**

8. Analyse the importance of post translational modifications.
9. Discuss with an example how sigma factor regulates gene expression.
10. How does replication in eukaryotes occur once per cell cycle?
11. Write the structural features of DNA polymerase of prokaryotes.
12. Explain the mechanism of mRNA capping.
13. Write any three transcriptional inhibitors with their modes of action.
14. Describe the steps involved in obtaining a charged tRNA.

**III. Answer any Two of the following** **2X10=20**

15. a. How are DNA and histones arranged to form a nucleosome?
    b. Explain pre-RC complex formation in eukaryotic replication.
16. Describe the steps involved in the process of prokaryotic transcription initiation and termination.
17. Explain Lac operon and its regulation.

**IV. Answer the following** **1X10=10**

18. a. A research lab has hired you as project coordinator to work on a pilot project to study the effect of promoter strength on prokaryotic gene expression. What features of the promoter do you have to examine? Draw the structure of an ideal promoter. (2m+3m)

    b. Describe initiation of prokaryotic translation. 5m