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Register Number:

DATE: **16** **-4-2018 (9 AM)**

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BENGALURU-27**

**B.Sc. BIOTECHNOLOGY– IV SEMESTER**

**SEMESTER EXAMINATION: APRIL 2018**

**BT415: Molecular Biology**

Time- 1 1/2 hrs Max Marks-35

**This paper contains TWO printed pages and TWO parts.**

1. **Answer any SEVEN of the following 7 X 2 =14**
2. Write a note on charging of t-RNA.
3. A student sets up a transcription experiment in laboratory for the synthesis of mRNA of his gene of interest from *E. coli*. He added the following into a test tube – DNA template containing promoter of the gene, four different ribonucleotides and RNA polymerase core enzyme – and kept for incubation. But he did not obtain the mRNA of the desired gene. What can be the reason?
4. Differentiate between the homologous and nonhomologous chromosomes in humans.
5. To understand the semiconservative model of DNA replication, you repeat the Meselson-Stahl experiment by growing *E. coli* cells initially in a medium containing ammonium salts prepared with “heavy” nitrogen (15N) until all the cellular DNA was labeled; latertransferringthe cellsto a medium containing the “light” isotope (14N) and equilibrium density-gradient centrifugation of the culture after several generations of bacterial growth.
6. Drawthe banding pattern of the differently labeled DNAafter centrifugation if culture was retrieved after 5 generations of growth.
7. If DNA replication was conservative, represent the banding pattern obtained on centrifugation done immediately after first generation of bacterial growth.
8. Give description about the general transcription factors required for transcription initiation by RNA polymerase II.
9. What are the major types of chemical mutagens.

BT-415-E-18

1. During the process of DNA replication, the DNA polymeraseenzyme movesonly in one direction through the twooppositely orientedtemplate strands of a double stranded DNA moleculeto generate daughter strands. On both the Leading strand and lagging strands, which are in oppositely oriented, the DNA synthesis is in 5’ 🡪 3’ direction. How is this made possible?
2. Is polyadenylation post transcriptional or coupled with transcription termination? Briefly describe the mechanism of polyadenylation.
3. Briefly describe any four post translational modifications of proteins.
4. Draw a labelled diagram of a nucleoside triphosphate.
5. **Answer any THREE of the following 3 X 7 = 21**
6. Write notes on differences in prokaryotic and eukaryotic transcription with reference to RNA polymerases, other components, and RNA modifications.
7. *Lac* operon is a negatively as well as positively controlled inducible operon. Justify this statement.
8. Diagrammatically represent the replication fork in a prokaryote showing all the major components of the replication machinery.
9. Make a comparison of protein synthesis in prokaryotes and eukaryotes considering the components as well as the processes.
10. Write notes on photoreactivation and excision repair.