DATE: **16-04-2018**

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

**B.Sc. MICROBIOLOGY - IV SEMESTER**

**SEMESTER EXAMINATION: APRIL 2018**

**MB 412: Microbial Genetics, Molecular Biology and Recombinant DNA Technology**

(For supplementary candidates)

Do not write the register number on the question paper

Please attach the question paper along with the answer script.

Time: 3hours Max. Marks: 100

*This question paper has 2 printed pages and 4 parts.*

**I. Answer any Five of the following 5 x 3 =15**

1. What are dNTP’s? Which enzymes add them on template DNA and RNA strand?
2. Draw a neat labelled diagram of a composite transposon.
3. Define silent, missense and nonsense mutations.
4. What are Hfr strains? How are they better in comparison to F+ strains?
5. Define cosmid. How are they advantageous over plasmid vectors?
6. List any three important applications of PCR.
7. Write a short note on the role of genetically engineered microorganisms in bioremediation.

**II Answer any Five of the following 5 x 6 = 30**

1. Describe genomic DNA organisation in prokaryotes.
2. Define origin of DNA replication and describe replication termination in prokaryotes.
3. How does ethidium bromide and nitrous acid bring about mutations?
4. Define DNA ligase and describe its mode of action?
5. Describe the principle involved in CaCl2 mediated gene transfer?
6. What is Genomic DNA library? Write the steps involved in the construction of genomic DNA library.
7. How is insulin being produced by genetic engineering?

**III Answer any Three of the following 3 x 15 = 45**

1. Describe the mechanism of translation in prokaryotes.
2. Explain the mechanism of generalised and specialised transduction.
3. A. Compare and contrast A form of DNA with that of B. **(7.5 marks)**

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B. Describe the mode of action of restriction endonucleases with suitable examples.

**(7.5 marks)**

1. A. How are recombinant DNA molecules introduced into host cells by electroporation?

**(7.5 marks)**

1. How is cDNA synthesized? Write a note on their significance.

**(7.5 marks)**

1. Differentiate between selection and screening of recombinants. Describe any two selection methods and one screening technique of recombinants.

**IV Answer the following 15 x 1 = 15**

1. **A**. Can all bacteria become naturally competent? Why or why not? **3 Marks**

**B**. How is *E. coli* able to use glucose exclusively when presented with a mixture of glucose and lactose? **4 marks**

1. Which technique will you use to demonstrate the presence of gene from a pool of genes in a genomic library, its expression - RNA level and its expression - protein level?

**3 marks**

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