PG/IIS/MICB/VIII/09

2009

MICROBIOLOGY

PAPER—VIII

Full Marks : 40

Time : 2 hours

Answer **two** questions from each Group

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP—A

[*Marks* : 20]

(*Microbial Genetics*)

Answer any *two* questions

1. (*a*) Mention the differences between *B*-DNA and *Z*-DNA. What conditions favour conversion of *B*-DNA to *Z*-DNA ?

(*Turn Over*)

(b) State briefly the possible biological function of
Z-DNA.   (4 + 3) + 3

2. (a) What do you mean by comparative genomics ?
Distinguish between orthologs and paralogs.

(b) Citing a few examples explain briefly how the
comparative genomics of bacteria can be used
in studying microbial evolution.

(c) Comment on the relationship between paralogs
and prokaryotic genome size.   (1 + 2) + 4 + 3

3. Write short notes on (any *four*) : $2\frac{1}{2} \times 4$

(i) DNA condensing proteins in *E.coli*

(ii) C-value paradox

(iii) Genetic mapping

(iv) Composite transposons

(v) Hfr × F⁻ conjugation.

(vi) Positive regulation of *Lac* gene.

GROUP—B

[*Marks* : 20]

(*Molecular Biology*)

Answer any *two* questions

4. (*a*) What is site-directed mutagenesis? How does it differ from traditional mutagenesis?

   (*b*) Illustrate site-directed mutagenesis by a suitable procedure.

   (*c*) State the medical significance of bacterial transposons. $2+6+2$

5. Write short notes on (any *four*) : $2\frac{1}{2} \times 4$

   (*i*) Photoreactivation

   (*ii*) Proto-oncogene

   (*iii*) *E. coli* RNA polymerase

   (*iv*) DNA methylation

   (*v*) Shine-Dalgarno sequence

   (*vi*) Ac transposon in maize.

6. How does the Klenow fragment differ from the intact *E. coli* DNA polymerase I ? Which enzymes would you use in nick translation and DNA end- filling ? Describe the reasons of your choice.   4 + 2 + 2 + 2

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