

**2017**

**M.Sc. 2nd Semester Examination**

**MICROBIOLOGY**

**PAPER—MCB-203**

*Full Marks : 40*

*Time : 2 Hours*

*The figures in the margin indicate full marks.*

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

*Illustrate the answers wherever necessary.*

**Group-A**

[ 20 Marks ]

Answer any *two* questions.

2×10

1. (a) Define artificial competence. Represent the process of making artificial competence through flow-chart.

*(Turn Over)*

(b) "Hfr  $\times$  F<sup>-</sup> matting, whole F-plasmid transfer from Hfr to F<sup>-</sup> cell is unusual" — explain.

(c) Differ between generalized and specialized transduction.

(1+3)+3+3

2. (a) What do you mean by operon ?

(b) Distinguish between inducible and repressible operon.

(c) Write in brief about the metabolism of lactose in *E. Coli* in the light of lac. operon.

(d) What is gratuitous inducer ?

2+2+5+1

3. Write short notes on (any four) :

4  $\times$  2  $\frac{1}{2}$

(a) Enhancer ;

(b) DNA looping ;

(c) Insulator ;

(d) Lysogeny in  $\lambda$ -phase : molecular mechanism ;

(e) Leader sequence ;

(f) DNA foot printing and its applications.

**Group-B**

[ 20 Marks ]

Answer any *two* questions.

2×10

4. (a) Explain simple random sampling with example.
- (b) What do you mean by degree of freedom ?
- (c) A researcher working on the evaluation of health beneficial activity of herbal extract on rat model. He categorized experimental rats as follows :

|               |       |       |       |       |       |       |       |
|---------------|-------|-------|-------|-------|-------|-------|-------|
| Weight (g) :  | 41-45 | 46-50 | 51-55 | 56-60 | 61-65 | 66-70 | 71-75 |
| No. of rats : | 4     | 10    | 17    | 24    | 15    | 8     | 3     |

Calculate the mean, standard deviation and standard error from the set of data.

2+2+6

5. (a)

$$\mu = \frac{\mu_{\max} S}{K_s + S}$$

Identify the mathematical equation of the bacterial growth kinetics. Write its significance and what will be the value of  $\mu$ , where  $S \gg K_s$ .

- (b) E. Coli PK 19 culture is grown using glucose as the sole source of carbon and energy. The cell yield value is determined by dry weight analysis to be 0.5. What percentage of the substrate (glucose) carbon will be found as cell mass and as  $\text{CO}_2$  ? (1+3+1)+5

6. (a) What do you mean by genome Annotation ?
- (b) Write the different divisions of DNA database.
- (c) Why do we need multiple alignments ?
- (d) How is an alignment done ?
- (e) What are PAM and BLOSUM ? 2+2+2+2+2
-