This question paper contains 5 printed pages.]

Your Roll No. ....

1449   **A**

B.Sc. (Hons.)/I

MICROBIOLOGY—Paper V

(Biostatistics and Introduction to Computer)

(Admissions of 2004 and onwards)

Time : 3 *Hours*   *Maximum Marks* : 60

(*Write your Roll No. on the top immediately*

on receipt of this question paper.)

*Attempt **five** questions in all selecting at least*

***two** questions from each section. **All** questions*

carry equal marks. Attempt Section A and

*Section **B** on separate answer books.*

SECTION-A

1. (a) The following are the hemoglobin values (g/100 ml) of 10 children receiving a treatment for hemolytic anemia :

9.1, 8.3, 10, 9.9, 11.4, 9.1, 12.4, 7.5, 9.8, 6.7

Compute mean, median and standard deviation.

(2, 2, 2)

(b) The following table shows the outcomes of 500 interviews completed during the survey to study the opinions about legalized abortion of residents of a certain city. The data are also classified by the area of the city in which questionnaire was attempted.

[P.T.O.

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Area of City	For (F)	Against (Q)	Undecided (R)	Total
A	100	20	5	125
B	115	5	5	125
C	50	60	15	125
D	35	50	40	125
Total	300	135	65	500

Calculate the following probabilities :

1. $P(\bar{D})$ 2. $P\left(B\mid R\right)$

3. $P(A \cup R)$ and   4. $P\left(Q\mid D\right)$ (1, 2, 1, 2)

2. (a) A box contains '*a*' white balls and '*b*' black balls; '*c*' balls are drawn. Find the expectation of the number of white balls drawn.   3

(b) Find out the mean and standard deviation of the continuous distribution whose relative frequency density is given by $dF = \dfrac{3}{4}x(2-x), 0 \le x \le 2.$ 3

(c) The following data are the number of seeds germinating out of 10 on damp filter paper for 80 sets. Fit a binomial distribution to these data.

x :	0	1	2	3	4	5	6	7	8	9	10	Total
y :	6	20	28	12	8	6	0	0	0	0	0	80

6

3. (a) Six rats are administered a certain dose of poison and the number of rats dying within 24 hours is observed. Suppose that each rat has a probability 0.25 of dying and that the survival of each rat is independent of survival of the other rats. What is the probability that :

   (i) exactly four rats die.

   (ii) all the rats die. 3

   (b) In a hospital there are 20 kidney dialysis machines and that the chance of any one of them to be out of service during a day are 0.02. Determine the probability that exactly 03 machines will be out of service on the same day. Given that $e^{-0.4} = 0.6703$. 3

   (c) If the skulls are classified A, B and C according as the length breadth index is under 75, between 75 and 80 and over 80, find approximately (assuming that the distribution is normal) the mean and standard deviation in which A are 58%, B 38% and C are 4%, being given that if $f(t) = \dfrac{1}{\sqrt{2\pi}} \int_0^1 e^{-\frac{x^2}{2}} dx$, then $f(0.20) = 0.08$ and

   $f(1.75) = 0.46$. 6

4. (a) In an experiment on immunization of cattle from tuberculosis that following were obtained :

	Affected	Unaffected
Inoculated	12	26
Not inoculated	16	06

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At 5% level of significance examine the effect of vaccine in controlling the incidence of the disease? Given :

Degree of freedom : 1   2   3   4

5% value of χ^2 : 3.84   5.99   7.82   9.49

                                                      6

(b) A drug was administered to 10 patients and the following increments in their blood pressure were recorded :

<div align="center">6, 3, –2, 4, –3, 4, 6, 0, 0, 2</div>

Is it reasonable to believe that the drug has no effect on change of blood pressure?

Given that the value of t at 5% level for significance are 2.262, 2.228, 2.201, 2.179 for 9, 10, 11, 12 degree of freedom respectively.   6

SECTION-B

5. (a) Write about different layers in OSI reference model. 6

    (b) Explain the three level architecture of a DBMS.   4

    (c) Define the term "Computer Networks".   2

6. (a) In MS EXCEL, describe the action performed by any *two* of the following functions :   4

      (i)   Or (*expr* 1, *expr* 2, ...)

      (ii)   sum (A2 : A8)

      (iii)   Round (number, number of digits)

    (b) Draw flowcharts to perform the following functions : 8

      (i)   To find out if a given number is prime or not.

      (ii) To generate the first *n* numbers of a fibonacci series :   0 1 1 2 3 5 8 ....

7. (a) Write a short note on any *one* of the following Indian Network : 　　　　3

    (i) ERNET

    (ii) INFLIBNET

    (iii) NICNET

(b) In MS EXCEL, what is the difference between a formula and a function. 　　　　3

(c) On the basis of the structure of the following relations in the database of a company (Attributes for the primary key in each relation are marked by *)

Employee (Emp. No.*, Emp. Name, Age, Salary, Designation)

Department (Dept No.*, Dept Name, Manager, No. of employees)

Emp Dept (Emp No.*, Dept. No.*)

    (i) Get the designation of the employee 'Ram'.

    (ii) Get the manager of the department in which Sohan works. 　　　　6

8. (a) Convert the following from one number system to another : 　　　　4

    (i) $(101101111.101)_2 = ($ 　　　　$)_{10}$

    (ii) $(278.75)_{10} = ($ 　　　　$)_2$

(b) Write a short note on structure prediction. 　　　　4

(c) What is the job of IP protocol in TCP/IP reference model. 　　　　4