2019

MSc

2nd Semester Examination

MICROBIOLOGY

PAPER – MCB-203

(Theory)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand 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

1) Answer any *TWO* questions from the following:　　　　　　　2 X 2=4

   a) What is random sampling ?

   b) Define null hypothesis for t-test.

   c) What is correlation co-efficient?

   d) What is specific growth rate of bacteria?

2) Answer any *TWO* questions from the following:　　　　　　　2 X 4=8

   a) Write the differences between histogram and frequency polygon.　　(2+2)

     15% of a group of 80 men and 18 % of a group 120 women were found to be

     diabetic.Determine the mean percentage of diabetics by combining both group.

   b) What is coefficient of variation? In a PG class of 23 students the mean weight

     was calculated as 58.2 kg. The variance of the distribution was determined

     3.5 kg^2 . What will be the standard deviation of the said distribution. (2+2)

   c) Compute the standard error of mean of the following distribution.　　　4

     Class interval : 156-160　161-165　166-170　171-175

     (height in cm)

     Frequency　:　4　　　　14　　　23　　　6

d) Crossing a grey-bodied scarlet-eyed Drosophila with a black-bodied red-eyed one produced all grey-bodied red-eyed flies in the F_1 generation. On crossing the F_1 files, the F_2 generation gave the following phenotypes:

grey-bodied red-eyed   : 360

black-bodied red-eyed : 130

grey-bodied scarlet-eyed:122

grey-bodied red-eyed   : 44

Do the date have a goodness of fit with Mendelian 9:3:3:1 distribution ?

(Given Chi-square $x^2_{0.05(3)}$ = 7.82)

3) Answer any **ONE** question from the following: 1 X 8=8

a) Define nominal and ordinal variable with example.   2 + 6

A researcher experimenting on albino-mice model. The body weight of the two group of mice are given below. Find whether or not there is significant difference in the mean body weight of male mice and female mice.

(Weight in gram)

Male:	50	58	61	54	59	56	54	64	60	62
Female:	44	49	51	52	50	47	48	52	53	54

(Given : $t_{0.01(18)}$ = 2.878)

b) Explain the Monod equation of bacterial growth.   (3+5)

During a bacterial growth experiment the total viable cell count at 2 hour and 6 hour were $1X10^4$ cells/ml and $1X10^9$ cells/ml, respectively. Determine the specific growth rate (in hour^{-1}) of the bacteria.

Group – B

1. Answer **Any TWO** of the following: 2 X 2=4

   a) Name 2(two) programmes used for protein-ligard docking.

   b) What is the difference between ortholog and paralog?

   c) What is FASTA format?

   d) Name two genome browsers.

2. Write short note an any **TWO** of the following: 2 X 4=8

   a) Biological databases

   b) BLAST

   c) Accession number

   d) BLOSUM

3. Answer any **ONE** of the following: 1 X 8=8

   a) What is the difference between pairwise and multiple sequence alignment? What is log-odd ratio? What is the difference between blastn, tblastn and tblastx? Calculate the identity, similarity and gaps between the following sequences – "MAGTLKYWAAGYMV" and "MANLKYAAGYRK", (G,N) and (M,R) are similar sequences   (2+1+2+3=8)

   b) What is gap opening and gap extension penalties? What is the algorithm of Needleman and Wunsch? Name one programme used for pairwise alignment and one for multiple sequence alignment.   (2+2+2+2=8)