13. Write short notes on any five of the following :

(i) Histogram

(ii) Coefficient of variation

(iii) ANOVA table

(iv) Large sample test

(v) Local control

(vi) Scope of Bioinformatics in computer

(vii) Database searching.

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(201217)   Roll No. ....

M.Sc.(Biotech.)-I Sem.

NP-3332

M. Sc. (Biotechnology) Examination, Dec. 2017

Statistical Methods & Bioinformatics in Biology

[H-103(M.Sc. Biotech.)]

Time : Three Hours]   *[Maximum Marks : 50*

Note : Attempt questions from all Sections as per instructions.

Section-A

(Very Short Answer Questions)

Attempt all the *five* questions. Each question carries 2 marks. Very short answer is required not exceeding 75 words. $2 \times 5 = 10$

1. Define "Less than" and "More than" ogives with examples.

2. What are the various measures of central tendency ? Explain any one of them.

3. Define paired t-test.

4. Explain χ^2-test for independent of attributes.

5. What are the components of Bioinformatics?

Section-B

(Short Answer Questions)

Attempt any *two* questions out of the following three questions. Each question carries 5 marks. Short answer is required not exceeding 200 words. $5 \times 2 = 10$

6. Explain Mean deviation and standard deviations.

7. Describe Randomized Block design.

8. Explain molecular sequence alignments.

Section-C

(Detailed Answer Questions)

Attempt any *three* questions out of the following five questions. Each question carries 10 marks. Answer is required in detail. $10 \times 3 = 30$

9. (a) Compute the value of the median from the following:

5, 9, 12, 7, 10, 15, 8, 11 and 9.

(b) Compute the value of standard deviation from the following frequency distribution:

Marks	No. of Students
0 − 10	2
10 − 20	8
20 − 30	16
30 − 40	10
40 − 50	4

10. Explain the statistical analysis of Latin Square Design.

11. What do you mean by Testing of hypothesis ? Also explain t-test for testing the significance difference between two population means.

12. What are the advantages of preparing biological databases ? Describe any two databases exclusively devoted to nucleotides and/or proteins.

13. Write short notes on any *five* of the following :

(i) Frequency distribution

(ii) Coefficient of variation

(iii) Database searching

(iv) Components of Bioinformatics

(v) Role of internet in Bioinformatics

(vi) Databases accession

(vii) Latin Square Design.

A   **Printed Pages : 4**

(21119)   Roll No. ....

M.Sc. (Bio-Tech.) -I Sem.

NP-3332

M. Sc. (Biotechnology) Examination, November–2019

STATISTICAL METHODS AND BIOINFORMATICS IN BIOLOGY

[H-103 (M. Sc. Biotech.)]

Time : Three Hours]   *[Maximum Marks : 50*

Note : Attempt questions from **all** sections as per instructions.

Section–A

(Very Short Answer Questions)

Note : Attempt all *five* questions. Each question carries 2 marks. Very short answer is required not exeeding 75 marks. $5 \times 2 = 10$

1. Differentiate between frequency polygon and frequency curve.

2. Explain standard deviation.

3. Explain correlation.

4. What are the principles of experimental design ?

5. Write the applications of Bioinformatics.

(2)

Section–B

(Short Answer Questions)

Note : Answer any *two* questions out of the following three questions. Each questions carries 5 marks. Short answer is required not exceeding 200 words. $2 \times 5 = 10$

6. Define Mean, Median and Mode with their simple properties.

7. Explain the various t-tests.

8. What is bioinformatics ? Also explain the various. Biological databases.

Section–C

(Detailed Answer Questions)

Note : Attempt any *three* questions out of the following five questions. Each question carries 10 marks. Answer is required in detail. $3 \times 10 = 30$

9. Explain the term Dispersion. What are the various methods of measuring dispersion ? Explain them in detail.

NP-3332

(3)

10. Explain Chi-square test for goodness of fit.

The following table gives the number of aircraft accidents that occured during the various days of the week :

Days : Sun Mon Tues Wed Thurs Fri Saturday
No.of accident : 14 16 8 12 11 9 14

Using χ^2 (Chi-square) test, find whether the accidents are uniformly distributed over the week.

[Given that χ^2 for degrees of freedom at 5% level of significance is 12.59]

11. Give the layout and analysis of Completely Randomized Design (C.R.D.).

12. (a) Explain similarities and differences between BLAST and FASTA tools for sequence alignment.

(b) Explain the following structure databases of protein.

CCDC, DSSP, SCOP and CATH

NP-3332 [P.T.O.]

(v)   Database accession and searching

(vi) Paralogs, Orthologs and Xenologs

(vii) BLOSUM matrix

(viii) DNA microarray.

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(21216)   Roll No. ....

M. Sc. (Biotech.)-I Sem.

NP-3332

M. Sc. (Biotechnology) Examination, Dec. 2016

Statistical Methods & Bioinformatics in Biology

[H-103(M. Sc. Biotech.)]

Time : Three Hours]   *[Maximum Marks : 50*

Note : Attempt questions from all Sections as per instructions.

Section-A

(Very Short Answer Questions)

Answer all the *five* questions. Each question carries 2 marks. Very short answer is required not exceeding 75 words. $2×5=10$

1.   Differentiate between histogram and frequency polygon.

2. What is coefficient of variation ?

3. Define correlation.

4. Define LSD.

5. What is database ?

Section-B
(Short Answer Questions)

Answer any *two* questions out of the following three questions. Each question carries 5 marks. Short answer is required not exceeding 200 words. $5 \times 2 = 10$

6. What are cumulative frequency curves ? Illustrate frequency distribution in cumulative frequency curves.

7. Differentiate between mean, median and mode giving their statistical significance, with examples.

8. Define molecular sequence alignments and their use in phylogenetic analysis.

Section-C
(Detailed Answer Questions)

Answer any *three* questions out of the following five questions. Each question carries 10 marks. Answer is required in detail. $10 \times 3 = 30$

9. Define measures of dispersion and their significance.

10. Describe the various *t*-tests and Chi-square test. How are they individually important for data analysis ?

11. Discuss the various components of ANOVA and its significance.

12. Discuss the scope and applications of Bioinformatics in molecular biology and computers.

13. Write short notes on any five of the following :
    (i) BLAST programmes
    (ii) FASTA
    (iii) Sequence homology, similarity and identity
    (iv) Sequence databases

D   (Printed Pages 4)

(20321)   Roll No. ....

M.Sc. (Biotech.)-I Sem.

NP-3332

M.Sc. (Biotechnology)

Examination, Dec.-2020

Statistical Methods and Bioinformatics

in Biology

(H-103)

[M.Sc. (Bio-Tech.)]

Time : Three Hours]   *[Maximum Marks : 50*

Note : Attempt questions from **all** sections as per instructions.

Section-A

(Very Short Answer Questions)

Note : Attempt all the **five** questions. Each question carries 2 marks. Very short answer is required not exceeding 75 words.   2×5=10

1. Explain Cumulative frequency curves.

P.T.O.

2. Define Mode and how it is calculated.

3. Define paired t-test.

4. Explain randomization in Design of experiment.

5. Write the scope of Bioinformatics in molecular biology.

Section-B

(Short Answer Questions)

Note : Attempt any **two** questions out of the following **three** questions. Each question carries 5 marks. Short answer is required not exceeding 200 words. $5 \times 2 = 10$

6. Define the following terms :

   (i) Mean deviation

   (ii) Standard deviation

7. Describe "Randomized Block Design".

8. Explain molecular sequence alignments.

Section-C

(Detailed Answer Questions)

Note : Attempt any **three** questions out of the following five questions. Each question carries 10 marks. Answer is required in detail. $10 \times 3 = 30$

9. (a) Find the mean deviation about median from the following data :

    size of the items : 4 6 8 10 12 14 16

    frequency   : 2 4 5 3 2 1 4

    (b) Calculate the standard deviation of the following marks obtained by 5 students in a test :

    Marks obtained : 8, 12, 13, 15, 22

10. (a) Outline the steps in the BLAST Algorithm. What are the limitations for MULTIPLE SEQUENCE ALIGNMENT.

    (b) When might you use FASTA align?

11. The frequency distribution of the digits 0, 1, 2, − −, 9 in a set of random numbers was to be :

    Digit :   0 1 2 3 4 5 6 7 8 9

    Frequency : 18 19 23 21 16 25 22 20 21 15

P.T.O.

NP-3332/3

Test the hypothesis that the digits are equally distributed in a set of random numbers.

[Given that $\chi^2_9 (0.05) = 16.92$]

12. (a) Explain the complete statistical analysis of "Completely Randomized Block Design".

(b) Complete the following ANOVA Table

Source of variation	d.f.	S.S.	M.S.S.	Fcal
Treatment	?	48	?	?
Error	15	?	?	
Total	17	84		

13. Write short notes on any **four** of the following :

(a) Histogram

(b) Coefficient of variation

(c) Large sample test

(d) Replication

(e) NCBI

(f) Applications of Bioinformatics

3. Differentiate between Randomized Block and Latin Square Design.

4. What are the basic tools of bioinformatics?

5. Differentiate between primary and secondary databases.

Section - B

Note : Attempt any **one** question out of the following three questions. Each question carries 10 marks. Short answer is required not exceeding 200 words.

6. Comment on significance of calculation of Standerd Deviation (S.D.) and Coefficient of Variation.

7. Comment on application of Bioinformatics specifying the role of Internet.

8. Comment on TIGR human genome index.

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Section - C

Note : Attempt any **two** questions out of the following five questions. Each question carries 15 marks. Answer is required in detail.

9. With the help of suitable tables and diagrams describe frequency distributions.

10. Discuss chi-square (x^2) test and its application.

11. Discuss the principle and types of experimental designs giving their significance.

12. What are the various web browsers and networks which provide required information to the man.

13. Discuss techniques of database searching.