2018

BOTANY

BOT 304 (CE)

BIO-STATISTICS AND BIO-INFORMATICS

Full Marks: 80

Time: 3 hours.

The figures in the margin indicates full marks for the questions

BIOSTATISTICS

1. Choose the correct answer for the following ***multiple choice questions***: 1x6=6

   a. When two variables are in perfect correlation, the value of correlation is/lies
      i. Between +1 and 0 iii. =0
      ii. Between +1 and -1 iv. Between "1and 0

   b. Which of the following represents the nature of correlation between the variables
      i. Histogram iii. Bar diagram
      ii. Scatter diagram iv. None of the above

   c. Quartile deviation represents the dispersion between the range
      i. 1^{st} to 75^{th} percentile iii. 25^{th} to 50^{th} percentile
      ii. 25^{th} to 75^{th} percentile iv. 25^{th} to 100^{th} percentile

   d. The median for the data: 10, 8, 20, 22, 39 and 18 is
      i. 19 iii. 20
      ii. 17 iv. 23

   e. The range of the scores 29, 3, 143, 27, 99 is:
      i. 143 iii. 140
      ii. 146 iv. 70

f. If two variables are highly correlated, what does it mean?
   i. that they always go together
   ii. that high values on one variable lead to high values on the other variable
   iii. that there are no other variables responsible for the relationship
   iv. that changes in one variable are accompanied by predictable changes in the other

2. Answer the following questions: ***(Any four)*** 3x4=12
   a. Define central tendency. What are its different types? 1+2=3
   b. What does variation mean? Name the various ways of measuring variations of any set of data. 1+2=3
   c. Define median. Write the formula for computing the median of a grouped data. 1+2=3
   d. Differentiate between correlation and regression. 3
   e. Differentiate between parametric and non-parametric test. 3

3. Answer ***(any three)*** of the following questions: 4x3=12
   a. Define chi square test. Mention the applications of chi square test. 2+2=4
   b. Differentiate between standard error of mean and standard error of standard deviation. 4
   c. What do you mean by statistical data? State few ways of representing a statistical data. What is the difference between grouped and ungrouped data? 1+1½+1½=4
   d. Correlation matrix of the elemental concentrations of soil samples are given below. Draw your inferences from the following matrix. 4

Ca	Cd	Fe	Mn	Pd	Zn
Cd	1	0.87	0.53	0.37	0.67
Fe	0.87	1	0.63	0.30	0.89
Mn	0.53	0.63	1	0.48	0.87
Pd	0.37	0.30	0.48	1	0.98
Zn	0.67	0.89	0.87	0.98	1

4. Answer the following questions: ***(Any one)*** 10x1=10
   a. What is correlation coefficient? Write different methods of studying correlation. 2+8=10
   b. Define standard deviation and variance. Calculate the median, standard deviation and variance from the following set of data: 2+2+4+2=10

No. of germinated seeds	Frequency
1-3	6
4-6	14
7-9	9
10-12	12

BIO-INFORMATICS

1. Choose the correct answer for the following ***multiple choice questions***: 1x4=4
   a. Docking is a computational approach to find out the binding affinity or best matching of following two molecules.
      i. Protein – Ligand iii. Protein – Protein
      ii. Protein – Nucleic acid iv. All the above
   b. Sanger's sequencing method makes use of ddNTPs for DNA sequencing. HereddNTP is .....
      i. Fluorescently level sequence terminator
      ii. Chemical analogue of deoxy- ribonucleotide
      iii. It lack hydroxyl group at 32 end
      iv. All the above
   c. Transcriptome is a collection of data of
      i. cDNA iii. Protein
      ii. mRNA iv. Both cDNA and mRNA
   d. Which of the following antibiotics is used for targeting ribosomes
      i. Dihrydrofolate iii. Vanomycin
      ii. Erythromycin iv. All the above

2. Answer the following questions: ***(Any six)*** 2x6=12
   a. Define PubMed database.
   b. What is expect value?
   c. Give an example of PIR format.
   d. What is gap penalty?
   e. What are the steps followed for homology modelling?
   f. What is homology and orthology?
   g. What is structural and functional annotation of genes?
3. Answer the following questions: ***(Any two)*** 3x2=6
   a. What is Lipinski's rule?
   b. What are the key point to take care during the designing a primer?
   c. What is docking? What the two main components that should be needed to take care of during docking? 1+2=3
   d. What types of information are obtained from PDB database?
4. Answer ***(any two)*** of the following questions: 5x2=10
   a. Write short note on NCBI resources.
   b. Write the application of structural bioinformatics in drug discovery.
   c. Discuss the role of biological database in understanding the life and solving the biological questions with special reference to nucleotide sequence databases.
   d. How ribosome could be used as drug target? Give examples of drugs acting on ribosome. 4+1=5
5. Answer ***(any one)*** the following questions: 8x1=8
   a. What is Genome sequencing? Describe the various methods used in genome sequencing. 2+6=8
   b. What are drugs target? Explain the competitive enzyme inhibitors with special reference to inhibitors to DHFR (Dihydrofolate reductase). 2+6=8

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