

This question paper contains 5 printed pages]

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S. No. of Question Paper : 5761

Unique Paper Code : 6792014701

Name of the Paper : Bioinformatics and Biostatistics (BS-DSC-701)

Name of the Course : B.Sc. (H) Biological Science, Theory

Semester : VII (NEP-UGCF 2022)

Duration : 2 Hours

Maximum Marks : 60

(Write your Roll No. on the top immediately on receipt of this question paper.)

There are six questions in this question paper,

attempt *four* questions in all.

All questions carry equal marks.

Question No. 1 is compulsory.

1. (a) Define the following (any *five*) :

5×1=5

(i) Homology Modelling

(ii) GenBank

(iii) Mean Deviation

(iv) Comparative Genomics

P.T.O.

(v) Biostatistics

(vi) Coefficient of variance

(vii) Standard error.

(b) Expand the following (any *five*) :

5×1=5

(i) PDB

(ii) BLOSUM

(iii) BLAST

(iv) HMM

(v) TrEMBL

(vi) EcoCyc

(vii) ADMET.

(c) Give an example of any *five* of the following :

5×1=5

(i) Derived database

(ii) Composite database

(iii) Enzyme database

(iv) Disease database

(v) Microarray database

(vi) Literature database

(vii) Chemical database.

2. (a) Give a brief account of information available in biological databases. 8
(b) Give an account of various resources available at DDBJ. 7
3. Differentiate between any *five* of the following : $5 \times 3 = 15$
(i) Local and Global Alignment
(ii) Primary and Secondary Databases
(iii) Progressive and Pairwise Sequence Alignment
(iv) Substitution matrix and Dot matrix
(v) Rigid and Flexible Docking
(vi) Homology Modeling and Threading
(vii) Metabolic Pathway and Disease Database.
4. (a) Classify the biological databases on the basis of data source and data type.
(b) What is the scope of bioinformatics in biological research ?
(c) Write a short note on Computational Drug Discovery. 6,6,3
5. (a) Define Biostatistics. Mention its aims and applications in biological research. 5
(b) Explain significance of standard deviation and coefficient of variance. 5

- (c) Calculate the standard deviation for height of plant *Withania somnifera* from the following three different locations : 5

Location	Plant Heights (cm)											
Chandigarh	58	54	21	51	59	46	65	31	68	41	70	36
Agra	65	55	26	40	30	74	45	29	85	32	80	39
Patna	36	56	41	46	54	59	55	51	52	44	37	59

6. (a) In a city, total rainfall during the month of July 2017 was recorded day-wise. With the help of χ^2 test, explain if there is any significant difference. 6

Day	Rainfall (mm)
Mon.	15
Tues.	17
Wed.	12
Thur.	10
Fri.	14
Sat.	20
Sun.	17

- (b) Calculate the Student's *t*-test of the following data of fish length of a fish species and check the significance :

6

Fish A (cm)	Fish B (cm)
20	12
24	10
20	6
28	4
22	14
20	20
24	10
32	36
24	10
26	6

- (c) Differentiate between Primary and Secondary data.

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