

[Time: 3 Hours]

[Marks:100]

Please check whether you have got the right question paper.

- N.B:
1. All questions are compulsory.
 2. Figures to the right indicate full marks for the question.
 3. Draw neat and labeled diagrams wherever necessary.
 4. Use of non-scientific calculator is allowed

Q.1 A) Define / Explain the following terms:

1. TCP/IP
2. WWW
3. Proteomics
4. Human Genome Project
5. Forward reading frame
6. Biological database
7. Bioinformatics

(07)

Q.1 B) Match the columns:

Column A	Column B
a) Natural Selection	i) Palaentological Evidence
b) HMS Beagle	ii) Gene for Breast cancer
c) Finches	iii) Allelic Frequency
d) Gene Flow	iv) Alfred Russel Wallace
e) Mould	v) Survival of Fittest
f) BRCA I	vi) Voyage
g) Missing Link between Reptiles and Aves	vii) Modification of beaks
	viii) Charles Darwin

(07)

Q.1 C) Explain whether True or False:

1. The Poisson distribution is also a continuous distribution.
2. Standard Normal curve is a multimodal.
3. Head or tail of a coin is an equally likely event.
4. The two regression lines will coincide when there is perfect positive correlation.
5. Rank correlation is very accurate method of measurement of coefficient of correlation.
6. Coefficient of correlation does not show the cause of relationship.

(06)

Q.2 A) Answer **any one** of the following:

1. Enumerate the characteristics of a population that is in Hardy Weinberg Equilibrium and describe any two characteristics in detail.
2. Explain the Comparative, Anatomical and Embryological evidences supporting evolution.

(10)

Q.2 B) Answer **any two** of the following:

1. Enlist the any type of Natural Selection w.r.t to evolution.
2. Write a note on effect of mutation stating a relevant example.
3. Describe anyone genetic disease.
4. In a given population only A and B alleles are present; there are no individuals with type O blood group. If 200 people have type A blood, 75 have type AB blood and 25 have type B blood. What are the allelic frequencies of this population?

(10)

Q.3 A) Solve **any one** of the following:

(10)

1. From the following data obtain regression equation X on Y:

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

What would be X when Y=10.5?

2. Explain positive and negative correlation by scatter diagram method. Also give its merits and demerits.

Q.3 B) Answer **any two** of the following:

(10)

1. State Binomial distribution law and list the conditions for application of Binomial distribution.
2. Out of 1000 families of 3 children each how many families would you expect to have two boys and one girl assuming that boys and girls are equally likely?
3. A speaks truth in 60% of cases and B in 90% of cases. In what percentage of cases are likely to contradict each other in stating the same fact.
4. If 5% of electric bulbs manufactured by a company are defective. Use poisson distribution to find the probability that in a sample of 100 bulbs will be defective. (Given $e^5=0.007$).

Q.4 A) Discuss **any one** of the following:

(10)

1. What is NCBI? Explain the need of NCBI, its goals and objectives and services provided for managing Biological data in Bioinformatics.
2. Applications of Bioinformatics for the benefit of Human health.

Q.4 B) Describe **any two** of the following:

(10)

1. What are Protein databases? Describe any one Protein databases studied by you.
2. What are Gene Annotations? Explain the types and their use in genetics.
3. Explain the following terms and explain their importance in study of biological data.
 - a. GenBank
 - b. Virtual Library
4. State the principle behind Six frame translation and give the significance of the technique.

Q.5 Write short notes on **any four** of the following:

(20)

1. Palaeontological evidence of evolution.
2. Genetic Drift.
3. Addition and Multiplication theorems of probability.
4. Characteristics of Standard normal curve.
5. Any one Species database
6. OMIM database
