

B. SC. BIOTECHNOLOGY
Second Semester
Biostatistics and Bioinstrumentation
(BBT - 09)

Duration: 3Hrs.

Full Marks: 70

(PART-B: Descriptive)

(Biostatistics)

Duration: 2 hrs. 40 mins.

Marks: 50

1. Answer any five of the following

3×5=15

- Births in a hospital occur randomly at an average rate of 1.8 births per hour. What is the probability of observing 4 births in a given hour at the hospital?
- If a coin tossed three times then find the probability of getting at least two head.
- If A and B are independent events, then show that A and B^c are also independent.
- If a dice thrown two times then what is the probability of getting the sum of the event is odd?
- Mention the properties of normal distributions.
- Calculate the co-efficient of correlation between X and Y for the following:
X: 1 3 4 5 7 8 10
Y: 2 6 8 10 14 16 20
- For any two distinct positive numbers a and b, show that
 $A.M > G.M > H.M$

2. Answer any two of the following

- What do you mean by primary data. Discuss the method of collection of primary data. **1+4=5**
- X is a normally distributed and the mean of X is 12 and SD is 4, then find the probability of the following
 - $X \geq 20$
 - $X \leq 20$
 - $0 \leq X \leq 12$

(Given that $P(0 \leq Z \leq 2) = 0.4772$; $P(0 \leq Z \leq 3) = 0.4986$)

2+1+2=5

- c. Calculate and analyze the correlation coefficient between the number of study hours and the number of sleeping hours of different students. 5

Number of Study hours	2	4	6	8	10
Number of sleeping hours	10	9	8	7	6

- d. A card is drawn from a deck of cards. Find the probability of getting a king or a heart or a red Card. 5

Bioinstrumentation

(Answer Q. No. 3 and any three from 4 to 9)

- 3. Write short notes on any five of the following:** 2×5=10

- i. Isotope,
 - ii. Eyepiece,
 - iii. Colorimeter,
 - iv. Ultraviolet spectrum,
 - v. Resolution of a microscope,
 - vi. Electrophoresis,
 - vii. Autoradiography.
4. Define microscope. Give the historical background on the discovery of microscope with its utility. 1+4=5
5. Compare the basic plan of construction of light microscope (LM) and electron microscope (EM) with their differences and similarities. 5
6. What is spectrophotometer? Write precisely on its application in the scientific investigations. 2+3=5
7. Explain the principle of chromatography. Write briefly on the thin-layer, paper and column chromatography. 2+3=5
8. What is gel electrophoresis technology? Explain the principle on which this technology is established. 2+3=5
9. What are alpha, beta and gamma emissions? Describe various types of radioactive decays occur. 2+3=5

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(The figures in the margin indicate full marks for the questions)

Duration: 20 minutes

Marks – 20

PART A- Objective Type

1. Answer each of the following questions.

1×10=10

a. If A and B be two independent events, then which of the following is false.

- i. A^c and B^c are independent.
- ii. A and B^c are independent.
- iii. A^c and B are independent.
- iv. None of these.

b. If $p(A)=0.3$; $p(B)=0.4$ and $p(A \cup B) = 0.5$,then $p(A \cap B)=?$

- i. 0.2
- ii. 0.3
- iii. -0.2
- iv. 0.5

c. The mean, median and mode of the normal distribution coincide.

True/False

d. In a Poisson distribution the mean and the variance is same.

True/False

e. The variance of a binomial distribution is

f. The normal curve is symmetric about the line.....

g. If a dice thrown two times then what is the probability of getting, one in the first thrown.

- i. $\frac{1}{6}$
- ii. $\frac{1}{9}$
- iii. $\frac{1}{3}$
- iv. $\frac{2}{3}$

h. If A be any event and A^c is complement of A , then $p(A^c)$ is

- i. $1 + p(A)$
- ii. $1 - p(A)$
- iii. $1 \pm p(A)$
- iv. None of these

i. If p is the correlation co-efficient of X and Y, then

- i. $|p|=1$
- ii. $|p|\leq 1$
- iii. $|p|\geq 1$
- iv. $p=0$

j. What is the mean of 2,4,7,6,5,8.

- i. 5.33
- ii. 5
- iii. 6
- iv. 4.5

2. Give the answers - true or false (Tick):

1×10=10

- a. Paper chromatography separates molecules according to their molecular size. **True/False**
- b. Bio-photometer is used for DNA amplification. **True/False**
- c. Atomic absorption spectrometry is based on absorption and emission of radiation by atoms. **True/False**
- d. The first light microscope was developed by Robert Hook and Antonie van Leeuwenhoek in the year 1590. **True/False**
- e. Electromagnetic lenses are used in light microscope. **True/False**
- f. Visible light spectrum ranges from 400 – 800 millimicron (m μ). **True/False**
- g. Centrifugation technology is based on the behavior of particles of different densities under application centrifugal field. **True/False**
- h. Migration of charged particle under the influence of a magnetic field is applied in electrophoresis. **True/False**
- i. The pore size of HEPA filter used in a Laminar Air Flow is 2.22 μ . **True/False**
- j. Autoclave is used for explant sterilization in tissue culture work. **True/False**
