RAN-2403001303033001

RAN-2403001303033001/2503000503031111

B. Sc. Biotechnology (NEP)(Sem. - III) Examination November - 2025

Application of Statistical Methods In Biology- I

Time: 2 Hours] **[Total Marks: 50**

સૂચના : / Instructions

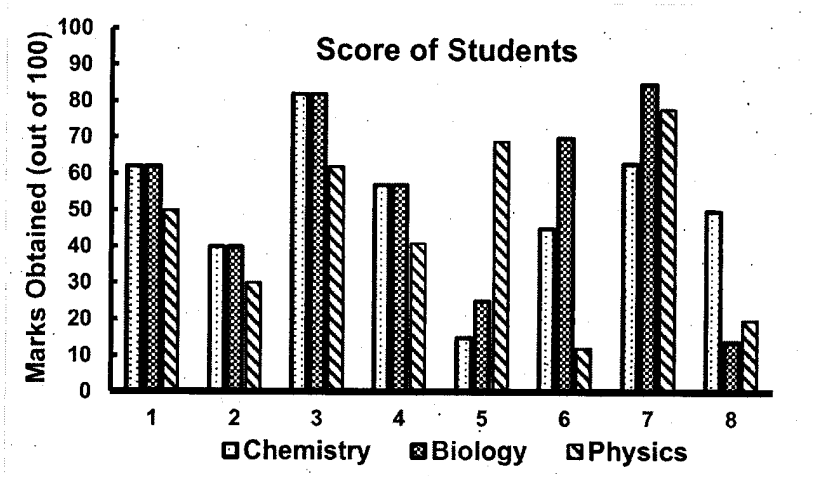
(1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book
(2) Figures to the right indicate full marks.
(3) Draw neat and labelled diagrams wherever necessary.
(4) Graph paper and Log book should be provided on request of the students
(5) Use of non-programmable scientific calculator is allowed.

Seat No.:

Student's Signature

Q . 1 **Answer the following:** **08**

(a) Write four observations for the given bar chart



(b) State two differences between mean and mode.
(c) Find the value of μ_4, when S.D is 4 and the distribution is mesokurtic.
(d) If P (AUB) = 10/12, P(A ∩ B) = 1/6 and P(B′) = 1/2 Find P(A), given that A and B are independent events.

Q. 2 **Do as directed.**

(a) Attempt Any One out of Two: **06**

i) Explain pie chart of graphical representation and its applications.
ii) The data of change in substrate quantity (mg/mL) and product yield (mg/L) was note down for a reactor at different hours as follows

Time (hours)	0	2	4	6	8	10
substrate quantity (mg/ml)	6	6.5	5	5.5	4	4.5
product yield (mg/L)	0	4	10	15	15	15

Draw a line graph and write four observations

(b) Attempt Any Two out of Three: **10**

i) Explain different type of Mean.

ii) The length and width of the stem increase after addition of the fertilizer as follows

Plant no.	1	2	3	4	5	6	7	8
Length	4	6	5	10	11	9	12	7
Width	10	14	11	16	18	20	19	12

Calculate which parameters length or breadth is more variable

iii) The number of patients of viral fever in different age group is given below. Calculate mode for the given frequency

Age group	18-22	22-26	26-30	30-34	34-38
No. of patients	11	8	2	16	9

Q. 3 Do as directed.

(a) Attempt Any One out of Two. **03**

i) Explain partition value.

ii) Find the median for the following frequency distribution.

X	0	1	2	3	4	5	6	7	8
f	16	25	48	36	30	16	15	3	2

(b) Attempt Any Two out of Three. **10**

i) Write a note on different type of moments and explain its importance.

ii) Find the coefficient of skewness from quartiles and median. Given data 4, 5, 7, 12, 20, 13, 15,8,9, 10.

iii) From the following table compare the death rates in two towns A and B. Which town is healthier?

Age Groups	Town A		Town B		Standard Populations	
	Populations	No. of Deaths	Populations	No. of Deaths	Populations	No. of Deaths
0-10	2000	36	4000	30	2000	60
10-25	10000	48	20000	100	8000	8
25-60	4000	60	3000	48	6000	4
60 and over	8000	152	3000	60	4000	50

Q. 4 Do as directed.

(a) Attempt Any One out of Two. **03**

i) Define Mathematical and Statistical Probability.

ii) A card is drawn at random from a well-shuffled pack of 52 cards. Find the probability of getting an ace or a spade.

(b) Attempt Any Two out of Three. **10**

i) Write a note on different type of Events.

ii) A random variable has the following probability distribution

Value of X	0	1	2	3	4	5	6	7	8
P (X)	m	3m	5m	7m	9m	11m	13m	15m	17m

(a) Determine the value of m.

(b) Find $P(2 < X < 5)$ and $P(X \leq 3)$.

iii) A researcher has to select a medical composition out of 80 samples. 60 of the sample are herbal and 20 are chemically made, 30 are effective on allergy and 50 not, 45 of them are start-up driven and 35 not. What is the probability of the researcher selecting herbal effective on allergy start-up driven sample?

———————