

RAN-2403001303033001 / 2503001303033002
B.Sc. Biotechnology (NEP) (Sem.-III) Examination March - 2026
BT-MJ-303, Application of Statistical Methods in Biology-I)

Time: 2 Hours]

[Total Marks: 50

સૂચના : / Instructions

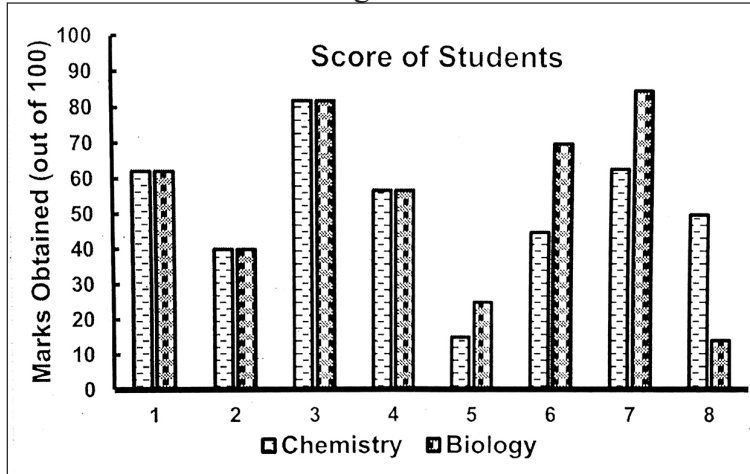
- (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fill up strictly the above details on your answer book.
- (2) Figures to the right indicate full marks.
- (3) Draw neat and labelled diagrams wherever necessary.
- (4) Graph paper and Log book should be provided on request of the students.
- (5) Use 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) Calculate standard deviation if, $N = 12$, $\Sigma X = 72$ and $\Sigma X^2 = 1200$
- c) For Normal Distribution find the value of β_2 ?
- d) One card is randomly drawn from a pack of 52 cards. Find the probability that the drawn card is red.

Q-2. Do as directed.

- a) Attempt Any One out of Two.

06

- i) Define Statistics and justify its application in different branches of sciences.
- ii) The production data of a small-scale toy company is given below. Represent it using a line graph. Write its observations.

Year	2002	2003	2004	2005	2006	2007	2008
Production	70	75	90	98	84	91	99

- b) Attempt Any Two out of Three.

10

- i) Explain three popular measures of central tendency and its importance.
- ii) Calculate Q_1 , Q_3 and P_{35} and Median for the following data:

330	320	550	470	220	510	280	170	680	490
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- iii) Two salesman sale the given product over two months. The sales were counted in numbers per week as follows:

Rajiv	4	6	5	10	11	9	12	7
Sanjiv	10	14	11	16	18	20	19	12

Who is more consistent (stable) in sales?

Q-3. Do as Directed. 03

a) Attempt Any One out of Two.

- Write a note on Standard Deviation and Variance.
- In an online test 100 students appeared. The test was divided in two schedules. Mean marks of 60 students for morning was 40 and mean marks for 40 students for evening was 45. Calculate the combine mean of marks for all students.

b) Attempt Any Two out of Three: 10

- Explain Skewness and Kurtosis.
- From the figures given below calculate the General Fertility Rate and Total Fertility Rate.

Age Group	15-20	20-25	25-30	30-35	35-40	40-45	45-50
No. of Women	100	80	110	60	105	70	120
Specific fertility rate (Per 1000)	80	120	15	140	100	50	10

- State the type of skewness.
- The following coded antibiotics were sold in given quantity. Calculate the Karl Pearsons skewness and its coefficient.

Q-4. Do as Directed :- 03

a) Attempt Any One out of Two.

- State application of Probability.
- For mutually exclusive and exhaustive events check the following statement is true or false?
 - $P(A) = 6/14$ $P(B) = 4/10$ $P(C) = 12/70$
 - $P(A) = 2/4$ $P(B) = 4/10$ $P(C) = 6/10$

b) Attempt Any Two out of Three. 10

- Write a note on Conditional probability.
- A scientist has 3 fermenters for production of an antibiotic. From a collection of 10 recombinant bacterial sample of which 6 are not successful (not good in antibiotic production), he selected 3 at random and inoculated the fermenter. What is the probability that he will have production of antibiotic?
- In a shop three ice-cream brands A, B, C are available, It was found from a survey that 20% purchase A, 16% purchase B and 14% purchase C. 8% purchase both A and B, 5% purchase both A and C, 4% purchase both B and C and 2% purchase all three. Calculate the percentage of people who purchase at least one of them.