(c) In the general population, the average cholesterol level is 180 mg/dL, with a standard deviation of 30 mg/dL. A group of researchers aims to test whether a new cholesterol lowering drug decreases the levels. A sample of 80 participants who have taken the medication shows an average cholesterol level of 160 mg/dL. Perform an appropriate statistical test to conclude whether the medication caused a significant decrease in cholesterol levels in the population. (6,6,6)

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 3298 **I**

Unique Paper Code : 3184002006

Name of the Paper : GE-Statistical Concepts in Biology (NEP-UGCF)

Name of the Course : **B.Sc. (Hons.) Biomedical Science**

Semester : III/V

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll. No. on the top immediately on receipt of this question paper.
2. Attempt **any five** questions.
3. Subparts of the questions should be attempted together.
4. Use of simple/non-programmable scientific calculators is allowed
5. Statistical and log table will be provided

1. (a) Differentiate between the following (any 2)

(i) Type I and Type II error

(ii) Independent T test and Paired T Test

(iii) Parameter and Statistics

(b) Explain the following (any 4)

(i) Continuous variable

(ii) Sample

(iii) Partition value

(iv) Null Hypothesis

(v) Line of best fit

(c) Give a brief account of sampling distribution.

(6,6,6)

6. (a) What is the multiplicative rule of probability? Ten people are there in a room. Six are female (2 diabetic and 4 non-diabetic) and 4 are male (1 diabetic and 3 non-diabetic). What is the probability that a person picked at random.

(i) will be a diabetic male

(ii) will be a female, but non-diabetic.

(b) Two random samples were drawn from two normal populations. The data is as follows:

A	66	67	75	76	82	84	88	90	92		
B	64	66	74	78	82	85	87	92	93	95	97

Test whether the two populations have the same variance at 5% level of significance.

P.T.O.

average 25 hours and a standard deviation of 5 hours. Six patients were randomly chosen and the number of hours taken to recover from fever was observed to be 24,26,30,20,20,18. Use an appropriate hypothesis test to validate the manufacturer's claim at 1% level of significance?

(b) In a study group consisting of 70 females and 30 males, it is observed that 30 females and 10 males have low haemoglobin. If a student is picked up at random from this class.

(i) What is the probability that a student picked at random has low haemoglobin, given that the student is a female?

(ii) What is the probability of the occurrence of the event of having low haemoglobin and being a female?

(c) Estimate mean, median, and mode of the given data

10, 18, 7, 14, 20, 24, 19, 18, 30, 18, 16

(6,8,4)

2. (a) State True/False. Justify your answer (Any three)

(i) The nominal scale is the simplest scale of measurement.

(ii) A frequency polygon is constructed by joining the midpoints of the class intervals.

(iii) The range is a measure of central tendency.

(iv) The probability of an event is always between -1 and 1.

(b) For the given tabulated data, find out the two linear regression equations:

X	1	3	5	6	8
Y	2	5	7	8	10

(6,12)

3. (a) In a clinical trial, a new antihistamine drug is given to a group of 25 patients. The following data represents the time (in minutes) for each patient to experience noticeable relief from symptoms:

Data (in minutes):

22, 24, 27, 23, 25, 24, 23, 26, 28, 25, 27, 24, 26, 29, 23, 24, 25, 27, 22, 26, 28, 24, 23, 25, 26

Determine the interquartile range of this dataset, D9 and P25

(b) Differentiate between Bar graph and Histogram.

(12,6)

4. Write short notes emphasising the importance/ applications of the following (Any 3):

(a) Skewness

(b) Bayes theorem

(c) Cumulative Frequency Curve

(d) Scatter Diagram (6,6,6)

5. (a) As per Manufacturer's claim, 500mg dosage of paracetamol cures Fever in humans within an