B.Sc. BIOTECHNOLOGY
SECOND SEMESTER
BIOSTATISTICS & BIOINSTRUMENTATION
BBT – 204
(Use separate answer scripts for Objective & Descriptive)

Duration: 3 hrs.   Full Marks: 70

(PART A : Objective)

Time: 20 min.   Marks: 20

Choose the correct answer from the following: $1 \times 20 = 20$

1. The most commonly used measure of Central tendency is:
 a) standard deviation   b) arithmetic mean
 c) correlation coefficient   d) none

2. Probability of an event may be:
 a) 0.5   b) 3.2   c) -0.8   d) none

3. Standard deviation is:
 a) always negative   b) may be positive
 c) always positive   d) none

4. Correlation between two variables x and y is:
 a) always positive   b) always negative
 c) either positive   d) none

5. Coefficient of variation is given by:
 a) standard deviation/mean deviation
 b) mean x standard
 c) standard deviation/ mean x 100
 d) None of the above

6. Range is:
 a) difference between the highest and the lowest values.
 b) product of the highest and lowest values.
 c) square of the lowest value.
 d) none of the above.

7. In random sampling:
 a) all units get chance of selection.
 b) only the best ones get the chance for selection.
 c) some units are ignored.
 d) none of the above.

8. Secondary data are obtained:
 a) from past records   b) by direct interview
 c) from future studies   d) none of the above

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b) Describe briefly about techniques and applications of a compound microscope.   (5)

8. a) Give the conditional probability definition.   (2+4+4=10)

 b) If A and B are events with $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$ and $P(A \cup B) = \frac{1}{2}$, find:

  (i) P(A/B)

  (ii) P(B/A)

  (iii) $P(A \cap B)$

  (iv) $P(A/B')$

 c) A bag contains 10 black and 5 white balls. Two balls are drawn from the bag one after the other without replacement. What is the probability that one black and one white ball will be selected?

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9. In calculating mean deviation:
   a) modulus values of the deviations are considered.
   b) one occurring the other cannot occur.
   c) both events occur simultaneously.
   d) the two events are independent.

10. Different methods give different average which are known as the:
    a) Measures of central tendency   b) Statistics
    c) Measures of dispersion   d) Skewness

11. Calculated ^nC_r if n=10 and r=2.
    a) 45   b) 46   c) 42   d) 40

12. What is the chance that a leap year selected at random will contain 53 Sundays?
    a) 1/7   b) 2/7   c) 3/7   d) none

13. Coefficient of quartile deviation is calculated by the formula:
    a) $\frac{(Q_2 + Q_1)}{4}$ b) $\frac{(Q_2 + Q_1)}{2}$ c) $\frac{(Q_2 - Q_1)}{(Q_2 + Q_1)}$ d) none of the above

14. Coefficient of variation is calculated by the formula:
    a) $\frac{x}{\sigma} \times 100$ b) $\frac{x}{\sigma}$ c) $\frac{\sigma}{x} \times 100$ d) none of the above

15. When one regression coefficient is negative then the other would be:
    a) negative   b) positive   c) 0   d) infinity

16. If A and B are two mutually exclusive event then $P(A \cap B)$ is:
    a) 1   b) φ c) 0   d) -1

17. Algebraic sum of deviations of a set of values taken from their mean is always:
    a) zero   b) one   c) average   d) median

18. Which of the following is non-probability sampling?
    a) Purposive sampling   b) Random sampling
    c) Cluster sampling   d) Stratified sampling

19. Which of the following term best describes data what were originally collected at an earlier time by a different person for a different purpose?
    a) Primary   b) Secondary
    c) Experimental   d) Field notes

20. The sum of squares of deviations from mean is:
    a) Maximum   b) Minimum
    c) Zero   d) None of the above

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(PART B : Descriptive)

Time: 2 hrs. 40 min.   Marks: 50

(Answer question no. 1 & any four (4) from the rest)

1. Answer the following: (any five)   (2×5=10)
   a) Define probability.
   b) Name the common measures of central tendency.
   c) Define standard deviation.
   d) Name two probability distributions.
   e) What is pH of a solution?
   f) What do you mean by stacking gel?
   g) What are the different types of microscopes?

2. What do you mean by scintillation? Explain the types of scintillation counting with diagram.   (5+5=10)

3. Write the basic principle of thin layer chromatography. Explain the procedure of TLC. Also write its application.   (3+5+2=10)

4. What is electrophoresis? Explain gel electrophoresis. Briefly explain isoelectric focussing.   (2+5+3=10)

5. Distinguish clearly between primary and secondary data. Construct a frequency distribution table using the class limits 1-4, 5-8, 9-12, 13-16, 17-20 from the following data:
   18,13,2,20,8,10,5,10,6,9,10,20,2,15,16,16,13,10,17,3,2,15,8,5
   Also calculate cumulative frequency less than and more than.   (5+5=10)

6. a) What is Isoelectric point? Write the different applications of Isoelectrofocussing.   (5)
   b) What do you mean by centrifugation? Give a short description of different types of centrifuges known to you.   (5)

7. a) State the addition rule of probability. What is the probability of getting a 3 or a 6 in throwing a dice?   (5)