

## THIRD SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2011

(C.C.S.S.)

Microbiology—Complementary

MB 3C 11—BIOSTATISTICS—I

(As per 2009 admission syllabus)

Time : Three Hours

Maximum Weightage : 30

## Part A

*Answer all questions.**Each question carries weight '1'.*

1. If we go to a hospital and collect data from patients who are present on that day, the sample is called :
  - (a) Simple random sample.
  - (b) Stratified sample.
  - (c) Systematic sample.
  - (d) Non-probability sample.
2. If heights of students are recorded in inches, then the measurements are in :
  - (a) Interval scale.
  - (b) Nominal scale.
  - (c) Ratio scale.
  - (d) Ordinal scale.
3. Which of the following is a parameter ?
  - (a) Sample mean.
  - (b) Sample variance.
  - (c) Population median.
  - (d) Sample median.
4. The G.M. of 4 and 16 is :
  - (a) 8.
  - (b) 10.
  - (c) 12.
  - (d) 10.5.
5. If  $\bar{x} = 10$  and S.D. = 4, then the coefficient of variation is :
  - (a) 40.
  - (b) 20.
  - (c) 50.
  - (d) 10.
6. For testing the equality of means of 2 normal populations with common variance we use :
  - (a) F test.
  - (b) t-test.
  - (c) Z test.
  - (d) Chi-square test.

Turn over

7. The set of all outcomes of a random experiment is called \_\_\_\_\_
8. If S is the sure event, then  $P(S)$  will be \_\_\_\_\_
9. If  $X \sim N(\mu, \sigma^2)$  then the percentage of values outside the interval  $[\mu - 3\sigma, \mu + 3\sigma]$  will be \_\_\_\_\_
10. If  $P(A) = 0.5$  and  $P(B|A) = 0.4$  then  $P(A \cap B)$  is \_\_\_\_\_
11. An unbiased die is rolled. The probability that face with number '6' turns up is \_\_\_\_\_
12. A random variable X follows binomial distribution with parameters  $n = 8$  and  $p = \frac{1}{4}$ . Then its mean is \_\_\_\_\_

(12 x 1 = 12 weightage)

**Part B**

*Answer all questions.  
Each question carries weight 1.*

13. In the case of 2 events state the addition theorem of probability.
14. State the merits of Arithmetic mean.
15. Distinguish between Accuracy and Precision.
16. State the rules to be followed while forming a frequency table.
17. Define HM and GM for a set of n observations.
18. If A and B are independent events and  $P(A) = \frac{1}{3}$ ,  $P(B) = \frac{1}{2}$  find  $P(A \cup B)$ .
19. What is a parameter? Give one example.
20. Define Poisson distribution and give expressions for its mean and variance.
21. For a random variable  $Z \sim N(0, 1)$ . Find  $P[0 < Z < 1]$ .

(9 x 1 = 9 weightage)

**Part C**

*Answer any five questions.  
Each question carries a weight of 2.*

22. Find the S.D. of the following cholesterol measurements :  
197, 193, 198, 209, 206.
23. Explain the method of drawing the Ogives. Indicate how to locate the median from the graph.
24. What is meant by a simple random sample? Explain one method of drawing a simple random sample of size 50 from a population having 1000 units.
25. Indicate 2 uses of the t distribution.
26. If  $P(A) = \frac{1}{3}$ ,  $P(B) = \frac{1}{14}$ ,  $P(A \cap B) = \frac{1}{42}$ . Find  $P(A \cup B)$  and  $P(A|B)$ .
27. For the following set of observations obtain the H.M. :  
1040, 30, 100, 200.

28. Explain the mathematical definition of probability. What is the probability of getting a spade when a card is drawn at random from a standard deck of 52 cards according to this definition.

(5 x 2 = 10 weightage)

**Part D**

*Answer any two questions.  
Each question carries weight of 4.*

29. Using the following data test the hypothesis that male and female turtles have the same mean serum cholesterol measurements. The cholesterol measurements in the case of a sample is given below :

Male : 220.1 218.9 229.6 228.8 222 224.1 226.5

Female : 223.4 221.5 230.2 224.4 223.8 230.8

30. Discuss the properties of a normal distribution. The IQ's of children are found to be normal with mean 100 and S.D. 15. What is the probability that the IQ of a randomly selected student will be

(a) Greater than 125.

(b) Between 90 and 110.

31. Obtain the coefficient of variation for the following frequency distribution :

Weight (in kg.) : 2.0-2.5 2.5-3.0 3.0-3.5 3.5-4.0 4.0-4.5

No. of infants : 17 97 187 135 34

(2 x 4 = 8 weightage)