

2019

STATISTICS

Full Marks : 100

Pass Marks : 33

Time : Three hours

Attempt all Questions.

The figures in the right margin indicate full marks for the questions.

From Question Nos. 1 to 6, choose the correct answer and rewrite.

1. Classical probability is measured in terms of 1
 - A. an absolute value
 - B. a ratio
 - C. both A and B
 - D. none of the above

2. Simpson's one-third rule of numerical integration is obtained from the general quadrature formula when n (the number of equal parts of the range of integration is divided), is equal to 1
 - A. 1
 - B. 2
 - C. 3
 - D. 4

P.T.O.

3. The total N of all the frequencies of 3 attributes is known as the class of 1

- A. zero order
- B. first order
- C. second order
- D. third order

4. $\left(\frac{\Delta}{E}\right)x^2$ is equal to 1

- A. $2x + 1$
- B. $2x + 2$
- C. $2x - 1$
- D. $2x - 2$

5. For testing the significance of the mean increase in weights of two independent samples of sizes 8 and 11, the degrees of freedom of the test statistic is 1

- A. 7
- B. 10
- C. 18
- D. 17

6. The random variable X represents the number of heads in tossing two coins once. The expectation of X is 1
- A. 1
- B. 2
- C. 0
- D. 1.5
7. Define mutually exclusive events. 1
8. Define the operator Δ . 1
9. State the range of the random variable X which follows normal distribution. 1
10. What is meant by type-I error? 1
11. At what interval is the population census usually collected in India? 1
12. Find the Sample Space when a coin and a die are thrown together once. 1
13. Write the mean of a Poisson distribution whose parameter is 5. 1
14. Give the inference about the population if the Gross Reproduction Rae is less than unity. 1
15. Indicate the position of the mean, the median and the mode in a normal probability curve. 1

16. X is a normal variate with mean 40 and standard deviation 5. Show the area in the normal probability curve for $X \leq 35$. 1
17. Define independent and dependent events. 3
18. Find the probability of containing 53 Sundays in a non-leap year. 3
19. A Curve is drawn to pass through the points 3

x :	1	1.5	2	2.5	3	3.5	4
f(x) :	2	2.2	2.5	2.7	3	2.4	2.2

Estimate the area bounded by the curve, the X-axis and lines $x=1$ and $x=4$ by using Simpson's one-third rule of numerical integration.

20. Fill in the blanks of the following life table which are marked with question marks. 3

Age	l_x	dx	qx	L_x
25	7,48,514	?	?	?
26	7,40,412	—	—	—

21. Show that the operators ∇ and Δ satisfy the relation $(1+\Delta)(1-\nabla) \equiv 1$. 3
22. Draw the probability curve of X^2 distribution. Identify critical value, the rejection and acceptance regions such that $P[X^2 > X_n^2(\alpha)] = \alpha$. 3
23. State and prove addition theorem of probability of two events which are subsets of same sample space. 4

24. State the condition of consistency of two attributes in dichotomy classification. 4
25. Define vital statistics and its uses in public administration. 4
26. Show that
- (i) $\Delta^2(3e^x) = 3(e^h - 1)^2 e^x$
- (ii) $\Delta^5 y_0 = y_5 - 5y_4 + 10y_3 - 10y_2 + 5y_1 - y_0$ 4
27. Given the following ultimate class frequencies, find N, (A) and (B). 4
- (ABC) = 240, (AB γ) = 564
- (A β C) = 345, (A $\beta\gamma$) = 1350
- (α BC) = 250, (α B γ) = 1840
- (α β C) = 190, (α β γ) = 8460
28. In Sample-I of 8 observations, the sum of the squares of deviations of the sample values from the sample mean was 98.6 and in the sample-II of 10 observations it was 100.4. Test whether the population variances are the same. 4
- Given $F_{5\%}$ for (7, 9) d.f = 3.29.
29. Deduce Simpson's three-eighth rule of numerical integration from the general quadrature formula. 6
30. What is meant by stationary population? State the assumptions which are used in the construction of life table. 2+4=6

31. A bag contains 10 white and 5 black balls. 5 balls are successively drawn out and not replaced. What is probability that they are alternately of different colours beginning with white? 6
32. From the following table, find the number of students whose marks are more than 54 marks by using Newton's backward interpolation formula. 6

Marks	No. of Studedents
20 – 30	18
30 – 40	24
40 – 50	32
50 – 60	22
60 – 70	18

33. An unbiased coin is tossed 6 times. Find the mean and the variance of the number of heads obtained and also obtain the probability of obtaining four or more heads. 6
34. To find whether a certain vaccination prevents a certain disease or not, an experiment was conducted and the following figures in various classes were obtained. A– showing vaccination and B– attacked by the disease

	A	α
B	70	10
β	90	30

Calculate the test statistic for testing the independence of attributes A and B. 6

35. The following summary data relate to the adult population of small village. 6

Adult population : 900

Number of employee : 450

Literate adult population employed : 300

Number of literates : 500

Give the inference about the degree of association.

ClassResult.in