22 Sts 12/18

2018

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. For a binomial distribution with parameters n and p, the relation between mean and variance is 1

   A. mean $>$ variance.

   B. mean $<$ variance.

   C. mean = variance.

   D. both mean and variance are unity.

2. An estimator θ is considered to be the unbiased estimator of T if 1

   A. $E(\theta) = T$.

   B. $v(\theta) = T$.

   C. $E(\theta^2) = T^2$.

   D. $v(\theta) = T^2$.

3. The probability of getting at most one head in tossing three coins at a time is 1

A. $\frac{1}{8}$.

B. $\frac{3}{8}$.

C. $\frac{4}{8}$.

D. $\frac{7}{8}$.

4. If $X \sim p(x, 2)$, $V(X)$ is 1

A. 2.

B. 2^2.

C. less than 2.

D. greater than 2.

5. Degrees of freedom of χ^2-test statistic in case of a contingency table of order (5×4) is 1

A. 20.

B. 16.

C. 15.

D. 12.

6. The probability of containing 53 Sundays in a leap year is 1

A. $\frac{2}{7}$

B. $\frac{5}{7}$

C. $\frac{1}{7}$

D. $\frac{6}{7}$

7. Define the operator E. 1

8. What is meant by dichotomy classification in the theory of attributes ? 1

9. When an estimator is said to be positively biased ? 1

10. Trapezoidal's rule of numerical integration was wrongly written as

$$\int_{x_0}^{x_0+nh} ydx = \frac{h}{2}\left[2(y_0+y_n)+\left(y_1+y_2+\cdots\cdots+y_{n-1}\right)\right]$$

Write the correct Trapezoidal's rule. 1

11. The probability of success of binomial distribution is $\frac{1}{2}$. Find the number of trials if the variance is 3. 1

12. The number of males and females of a given population are 3,40,000 and 3,10,000. Find the sex ratio. 1

13. The Crude Death Rate for a population A is 30·1 and adjusted factor is 0·6. Find the Standardised Death Rate. 1

14. Test, whether the attributes A and B are independent in the following cases :

$(AB) = 256,\ (\alpha B) = 768,\ (A\beta) = 48,\ (\alpha\beta) = 144,\ (A) = 304,\ (\alpha) = 912$ 1

15. Draw the Curves of t-distribution with n=3 and n = 7. 1

16. Draw the Curve of F-distribution. 1

17. What is meant by quadrature ? Which formula is used for evaluating the definite integral $\int_a^b f(x)\,dx$ by numerical integration ? 3

18. Define ultimate class frequency and order of the class frequency. 3

19. A dice is thrown at random once. What is the expectation of the number on it ? 3

20. Give reasons why the NRR may be regarded as a good index of population growth. 3

21. Given $P(A) = \frac{3}{8}$, $P(B) = \frac{5}{8}$ and $P(A \cup B) = \frac{3}{4}$.

Test whether A and B are independent or not. 3

22. A normal distribution have mean 50 and variance 100. Draw the rough sketch of the areas when

(i) $x \geq 70$

(ii) $30 \leq X \leq 40$. 3

23. Define interpolation. Write Lagrange's interpolation formula. 4

24. Define Simple hypothesis and Composite hypothesis with one example each. 4

25. Define General Fertility Rate and state its two merits. 4

26. Show that (i) $f(4) = f(3) + \Delta f(2) + \Delta^2 f(1) + \Delta^3 f(1)$

(ii) $\Delta\{f(x)g(x)\} = f(x+h)\Delta g(x) + g(x)\Delta f(x)$ 4

27. If a random variable X follows Poisson distribution such that $P(x=2) = P(x=3)$. find the mean of the distribution. 4

28. Interpret the type of association using Yule's coefficient of association from the following data :

$(A) = 60,\ (B) = 80,\ (AB) = 40,\ (A\beta) = 20,\ N = 100$ 4

29. Define (i) random experiment 6

(ii) favourable events

(iii) exhaustive events.

30. Define (i) Crude death rates for males

(ii) Crude death rates for females

(iii) Specific death rates 6

31. Two cards are drawn from a well shuffled pack of 52 cards. Find the probability of drawing the cards of (i) same colour (ii) different colours. 6

32. Estimate the population in 1976 by using Newton's forward interpolation formula from the following data. 6

Year :	1971	1981	1991	2001	2011
Population : (in lakhs)	14	20	24	27	34

33. Calculate the approximate value of $\int_{-3}^{3} x^2 dx$ by using Simpson's $\frac{1}{3}$rd rule of numerical integration. Obtain the error by comparing with the exact value of the integral. 6

34. Given the following frequencies of the positive classes, find out the frequencies of the contrary classes of order three :

$N = 700$, $(A) = 125$, $(B) = 202$, $(C) = 51$, $(AB) = 35$, $(AC) = 25$, $(BC) = 32$, $(ABC) = 15$. 6

35. Two independent samples of 8 and 7 items respectively had the following values :

Sample-I :	10	11	13	11	14	9	12	14
Sample-II :	10	12	10	14	9	8	11	

Test whether the two samples were drawn from two populations having the same variance.

[Table value of the test statistic with corresponding d.f is 3·87] 6