

COMMON P.G. ENTRANCE TEST-2022 (CPET-2022)

Subject Code : **46**

Test Booklet No.:

Entrance Subject : **Statistics**

Hall Ticket No.:

TEST BOOKLET

Time Allowed : **90 Minutes**

Full Marks : **70**

INSTRUCTIONS TO CANDIDATES

1. **Please do not open this Question Booklet until asked to do so.**
2. Check the completeness of the Question Booklet immediately after opening.
3. Enter your **Hall Ticket No.** on the Test Booklet in the box provided alongside. **Do not** write anything else on the Test Booklet.
4. Fill up & darken Hall Ticket No. & Test Booklet No. in the OMR Answer Sheet as well as fill up Test Booklet Serial No. & OMR Answer Sheet Serial No. in the Attendance Sheet carefully. Wrongly filled up OMR Answer Sheets are liable for rejection.
5. Each question has four answer options marked (A), (B), (C) & (D).
6. Answers are to be marked on the Answer Sheet, which is provided separately.
7. Choose the most appropriate answer option and darken the oval completely, corresponding to (A), (B), (C) or (D) against the relevant question number.
8. Use only **Blue/Black Ball Point Pen** to darken the oval for answering.
9. Please do not darken more than one oval against any question, as scanner will read such markings as wrong answer.
10. **Each question carries equal marks. There will be no negative marking for wrong answer.**
11. **Electronic items such as calculator, mobile, etc., are not permitted inside the examination hall.**
12. Don't leave the examination hall until the test is over and permitted by the invigilator.
13. **The candidate is required to handover the original OMR sheet to the invigilator and take the question booklet along with the candidate's copy of OMR sheet after completion of the test.**
14. Sheet for rough work is appended in the Test Booklet at the end.

1. The point of intersection of the less than and the greater than Ogive corresponds to:
 - (A) the median
 - (B) the mean
 - (C) the mode
 - (D) None of these

2. Which of the following series represents a ratio scale?
 - (A) 1,2,3,5,8.....
 - (B) 1,2,4,8,16,32,64.....
 - (C) 1,3,5,7,9,11,13.....
 - (D) 2,4,6,8,10,12,14.....

3. The most stable measure of central tendency is
 - (A) the mean
 - (B) the median
 - (C) the mode
 - (D) None of these

4. In a frequency curve of scores, the mode was found to be higher than the mean. This shows that the distribution is
 - (A) symmetric
 - (B) positively skewed
 - (C) negatively skewed
 - (D) Normal

5. The coefficient of correlation :
 - (A) cannot be positive
 - (B) cannot be negative
 - (C) is always positive
 - (D) can be both positive and negative

6. In the least square linear trend equation $Y_t = a + bx$, If b is positive, it indicates
- (A) rising trend
 - (B) declining trend
 - (C) no trend at all
 - (D) All of these
7. When there is a perfect positive association between two attributes, Q (the coefficient of association) would be
- (A) zero
 - (B) -0.9
 - (C) -1
 - (D) +1
8. In the simultaneous tossing of two perfect coins, the probability of getting at least one head is :
- (A) $\frac{1}{2}$
 - (B) $\frac{1}{4}$
 - (C) $\frac{3}{4}$
 - (D) 1
9. A problem in statistics is given to three students whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$. Then the probability that the problem will be solved is:
- (A) $\frac{1}{2}$
 - (B) 1
 - (C) $\frac{1}{4}$
 - (D) $\frac{3}{4}$
10. Two six-faced unbiased dice are thrown. The probability that the sum of the numbers shown is 7 or their product is 12 is:
- (A) $\frac{1}{9}$
 - (B) $\frac{2}{9}$
 - (C) $\frac{5}{18}$
 - (D) None of these

11. A bag contains 5 white and 3 black balls. Two balls are drawn at random one after the other without replacement. The probability that both the balls drawn are black is:
- (A) $\frac{2}{7}$
 - (B) $\frac{3}{8}$
 - (C) $\frac{3}{28}$
 - (D) None of these
12. A coin is tossed until a tail appears. Then the expectation of the number of tosses is:
- (A) 2
 - (B) 4
 - (C) 6
 - (D) 8
13. The moment generating function of Binomial distribution is
- (A) $(q + pe^t)$
 - (B) $(q + pe^t)^n$
 - (C) $(qe^t + p)$
 - (D) $(qe^t + p)^n$
14. In the case of Poisson distribution
- (A) The mean is greater than variance
 - (B) The variance is greater than mean
 - (C) The mean is equal to variance
 - (D) None of these
15. The size of the critical region is same as
- (A) Power of the test
 - (B) Type I error
 - (C) Type II error
 - (D) none of these

16. Let x_1, x_2, \dots, X_n be a random sample from (μ, σ^2) population, then 95% confidence limits for μ when σ^2 is known are
- (a) $\bar{x} \pm 1.96 \frac{\sigma}{\sqrt{n}}$
 - (B) $\bar{x} \pm 1.96 \sigma \sqrt{n}$
 - (C) $\bar{x} \pm 1.96 \frac{\sqrt{n}}{\sigma}$
 - (D) None of these
17. The range of z^2 variate is
- (A) 0 to 1
 - (B) 0 to ∞
 - (C) $-\infty$ to ∞
 - (D) -1 to 1
18. To test $H_0 : \sigma^2 = \sigma_0^2$ against the alternative $H_1 : \sigma^2 < \sigma_0^2$ we have
- (A) a left-tailed test
 - (B) a right-tailed test
 - (C) a two tailed test
 - (D) none of these
19. To test the significance of correlation coefficient, the appropriate test is
- (A) χ^2 test
 - (B) F test
 - (C) t test
 - (D) None of these
20. In the sign test, it is assumed that
- (A) the samples are independent
 - (B) the samples are dependent
 - (C) the samples have same mean
 - (D) None of these

21. R.B.D is more efficient than C.R.D. The statement is
- (A) never true
 - (B) sometimes true
 - (C) always true
 - (D) none of these

22. In ANOVA, the C.F. is defined as
- (A) G/N
 - (B) G^2/N
 - (C) G/N^2
 - (D) None of these

Where G is the Grand Total of all the observed values and N is the total number of observations.

23. The most important factors causing seasonal variations are
- (A) change in fashion
 - (B) growth of population
 - (C) Technological improvements
 - (D) Weather and social customs
24. Which component of time series is mainly applicable in the case of fall in death rate due to scientific research
- (A) secular trend
 - (B) seasonal
 - (C) cyclic
 - (D) None of these
25. Paasche's price index is based on
- (A) base year quantities
 - (B) current year quantities
 - (C) both of them
 - (D) none of these

26. Fisher's ideal Index satisfies
- (A) Time reversal test
 - (B) Factor reversal test
 - (C) both of them
 - (D) None of these
27. The lower control limit for p-chart is
- (A) $E(p) - SE(p)$
 - (B) $E(p) - 3 SE(p)$
 - (C) $E(p) + 3 SE(p)$
 - (D) $E(p) + SE(p)$
28. C-chart is used normally when the quality of product is
- (A) discrete variable
 - (B) a continuous variable
 - (C) both (A) and (B)
 - (D) none of these
29. If gross reproduction rate is more than 1, it indicates
- (A) population would decrease
 - (B) population would increase
 - (C) neither increase or decrease
 - (D) none of these
30. Demography is the systematic study of
- (A) Statistics
 - (B) Population
 - (C) Culture
 - (D) Economics

31. The coefficient of variation has
- (A) unit of measurement
 - (B) no unit of measurement
 - (C) square of the unit of measurement
 - (D) none of these
32. The sum of absolute deviations about median is
- (A) zero
 - (B) equal
 - (C) least
 - (D) greatest
33. If one regression coefficient is greater than unity then the other must be
- (A) greater than the first one
 - (B) equal to unity
 - (C) less than unity
 - (D) equal to zero
34. The normal distribution is a limiting case of Poisson distribution when
- (A) $\lambda \rightarrow 0$
 - (B) $\lambda \rightarrow \sigma$
 - (C) $\lambda \rightarrow \infty$
 - (D) $\lambda \rightarrow 1$
35. If a,b,c are randomly chosen between 0 and 1, the probability that the quadratic equation $ax^2+bx+c = 0$ has real roots is
- (A) $\frac{1}{9}$
 - (B) $\frac{8}{9}$
 - (C) $\frac{2}{9}$
 - (D) $\frac{4}{9}$

36. If X is a standard normal variable, then $X^2/2$ is a
- (A) Gamma variable with parameter $1/2$
 - (B) a normal variate
 - (C) a poisson variate
 - (D) none of this
37. χ^2 distribution is
- (A) continuous
 - (B) multimodal
 - (C) symmetrical
 - (D) none of these
38. F distribution is
- (A) positively skewed
 - (B) negatively skewed
 - (C) having skewness zero
 - (D) none of these
39. The maximum value for the power of a test is
- (A) zero
 - (B) infinity
 - (C) one
 - (D) none of these
40. A simple regression estimate is a biased one. The statement
- (A) is always true
 - (B) sometimes true
 - (C) never true
 - (D) none of these

41. The bias in the case of a ratio estimate
- (A) decreases as the sample size increases
 - (B) increases as the sample size increases
 - (C) constant as the sample size increases
 - (D) none of these
42. In case of stratified random sampling, the cheaper the cost per sampling unit in a stratum, the larger the sample from that stratum. The statement is
- (A) always true
 - (B) sometimes true
 - (C) never true
 - (D) none of these
43. SPRT terminates with probability
- (A) half
 - (B) zero
 - (C) one
 - (D) none of these
44. A maximum likelihood estimate is
- (A) always biased
 - (B) always unbiased
 - (C) sometimes biased
 - (D) none of these
45. Likelihood ratio test is consistent. The statement is
- (A) always true
 - (B) sometimes true
 - (C) never true
 - (D) none of these

46. The precision of an experiment is defined as
- (A) $\frac{1}{\sqrt{V(\bar{x})}}$
- (B) $\frac{1}{(V(\bar{x}))^2}$
- (C) $\frac{1}{(V(\bar{x}))}$
- (D) None of these
47. A BIBD is said to be symmetric if
- (A) $b = v$ and $r = k$
- (B) $b = r$ and $v = k$
- (C) $b = k$ and $v = r$
- (D) None of these
48. In a 2^3 factorial experiment in blocks of 4 plots involving 3 fertilisers N, P and K, each at 2 levels the number of degrees of freedom for E.S.S. is
- (A) 10
- (B) 11
- (C) 12
- (D) None of these
49. If $X \sim N(\mu, \Sigma)$, then $Y=CX$ (C non singular) is distributed according to
- (A) $N(C\mu, \Sigma)$
- (B) $N(C\mu, C\Sigma C')$
- (C) $N(\mu, C\Sigma C')$
- (D) None of these
50. To test the randomness of a given set of observations, the appropriate test is
- (A) U test
- (B) median test
- (C) sign test
- (D) run test

51. The asymptotic relative efficiency of Mann-Whitney's U test relative to two sample t test is
- (A) less than 0.864
 - (B) greater than 0.864
 - (C) greater than equal to 0.864
 - (D) None of these
52. The control chart used for the fraction of defective items in a sample is
- (A) Range chart
 - (B) \bar{X} chart
 - (C) P-chart
 - (D) C-chart
53. The maximum value of the average outgoing quality for all possible values of proportion defective is called
- (A) Average Outgoing quality (AOQ)
 - (B) Acceptable Quality Level (AQL)
 - (C) Average Outgoing Quality Limit (AOQL)
 - (D) Lot tolerance proportion defective (LTPD)
54. An OC curve is a plot between
- (A) Consumer's risk and Producer's risk
 - (B) Probability of acceptance and probability of rejection
 - (C) Percentage of defective and Probability of acceptance
 - (D) Average outgoing quality and Probability of acceptance
55. Which one is true regarding residuals in regression analysis?
- (A) mean of residuals is always zero
 - (B) mean of residuals is less than zero
 - (C) mean of residuals is greater than zero
 - (D) none of these

56. In one way ANOVA, which of the following is used within the F-ratio as a measurement of the variable of individual observation?
- (A) SSE
 - (B) MSE
 - (C) MST
 - (D) none of the above
57. Which of the following theorem is utilised to justify the normality assumption of random variable in regression model?
- (A) Euler's theorem
 - (B) Chebyshev's theorem
 - (C) Gauss Markov Theorem
 - (D) Central limit theorem
58. In a Markov transition matrix, the sum of the elements in each row is equal to
- (A) 0
 - (B) $\frac{1}{2}$
 - (C) 1
 - (D) None of these
59. The interval between two successive occurrences of Poisson process $\{N(t)\}$ having parameter λ has a negative exponential distribution with mean
- (A) λ
 - (B) λ^2
 - (C) $\frac{1}{\lambda}$
 - (D) None of these
60. Which standard library function will you use to find the last occurrence of a character in a string in C
- (A) `strnchar()`
 - (B) `strchar()`
 - (C) `strrchar()`
 - (D) `strrchr()`

61. A do-while loop is useful when we want that the statements within the loop must be executed;
- (A) at least once
 - (B) only once
 - (C) more than once
 - (D) none of these
62. The 6 x 6 matrix with all entries 1 have rank
- (A) 1
 - (B) 2
 - (C) 4
 - (D) 6
63. Let A be 5 x 7 matrix with rank 4. The dimension of the solution space of $AX=0$ is
- (A) 4
 - (B) 3
 - (C) 5
 - (D) 1
64. The dimension of the zero vector space is
- (A) not defined
 - (B) 1
 - (C) 0
 - (D) ∞
65. Find the minimum value of the function $f(x) = x^2 - x + 2$
- (A) $\frac{1}{2}$
 - (B) $\frac{3}{4}$
 - (C) $\frac{7}{4}$
 - (D) $\frac{1}{4}$

66. The solution of differential equation $dy = (4 + y^2) dx$ is
- (A) $y = 2 \tan (x + c)$
 - (B) $y = 2 \tan (2x + c)$
 - (C) $2y = \tan (x + c)$
 - (D) $2y = 2 \tan (x + c)$
67. The value of the integral $\int_0^2 (2x + 3x^2) dx$ is
- (A) 10
 - (B) 12
 - (C) 24
 - (D) None of these
68. Considering four sub intervals, the value of $\int_0^1 \frac{1}{1+x} dx$ by trapezoidal rule is
- (A) 0.6870
 - (B) 0.6950
 - (C) 0.6677
 - (D) 0.3597
69. The series $\sum_{n=0}^{\infty} \frac{1}{4^n} (x - 1)^{2n}$ converges for
- (A) $-2 < x < 2$
 - (B) $-1 < x < 3$
 - (C) $-3 < x < 1$
 - (D) $x < 3$
70. The value of $\lim_{x \rightarrow \infty} (x \cdot \sin \frac{1}{x})$ is
- (A) 0
 - (B) 1
 - (C) ∞
 - (D) None of these

ROUGH WORK