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FOR KUET EXAM PREPARATION

KUET 2022 Question Paper · M.A. M.Sc. Statistics

EXAM	YEAR	TYPE	SUBJECT
KUET	2022	Question Paper	M.A. M.Sc. Statistics

Sr. No. 133

ENTRANCE TEST-2022

SCHOOL OF PHYSICAL & MATHEMATICAL SCIENCES

OPTION—1 : STATISTICS

OPTION—2 : MATHEMATICS FOR STATISTICS

Total Questions : 60
Time Allowed : 70 Minutes

Question Booklet Series A

Roll No. :

Instructions for Candidates :

1. Write your Entrance Test Roll Number in the space provided at the top of this page of Question Booklet and fill up the necessary information in the spaces provided on the OMR Answer Sheet.
2. OMR Answer Sheet has an Original Copy and a Candidate's Copy glued beneath it at the top. While making entries in the Original Copy, candidate should ensure that the two copies are aligned properly so that the entries made in the Original Copy against each item are exactly copied in the Candidate's Copy.
3. All entries in the OMR Answer Sheet, including answers to questions, are to be recorded in the Original Copy only.
4. Choose the correct / most appropriate response for each question among the options A, B, C and D and darken the circle of the appropriate response completely. The incomplete darkened circle is not correctly read by the OMR Scanner and no complaint to this effect shall be entertained.
5. Use only blue/black ball point pen to darken the circle of correct/most appropriate response. In no case gel/ink pen or pencil should be used.
6. Do not darken more than one circle of options for any question. A question with more than one darkened response shall be considered wrong.
7. There will be **'Negative Marking'** for wrong answers. Each wrong answer will lead to the deduction of 0.25 marks from the total score of the candidate.
8. Only those candidates who would obtain positive score in Entrance Test Examination shall be eligible for admission.
9. Do not make any stray mark on the OMR sheet.
10. Calculators and mobiles shall not be permitted inside the examination hall.
11. Rough work, if any, should be done on the blank sheets provided with the question booklet.
12. OMR Answer Sheet must be handled carefully and it should not be folded or mutilated in which case it will not be evaluated.
13. Ensure that your OMR Answer Sheet has been signed by the Invigilator and the candidate himself/ herself.
14. At the end of the examination, hand over the OMR Answer Sheet to the invigilator who will first tear off the original OMR sheet in presence of the Candidate and hand over the Candidate's Copy to the candidate.

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OPTION—1 : STATISTICS

1. The Bowley's coefficient of skewness ranges between :

(A) 0 and 1

(B) –1 and 0

(C) –3 and 3

(D) –1 and 1

2. A manager of a departmental store wants to place orders of the most economical size of every item. Which measure of central tendency can help him in arriving at the desired size ?

(A) Arithmetic mean

(B) Geometric mean

(C) Mode

(D) Median

3. If a constant is added to every item of a series, then which one of the following measures of dispersion would change ?

(A) Mean deviation about mean

(B) Range

(C) Standard deviation

(D) Coefficient of variation

4. If the geometric mean and harmonic mean of two numbers are respectively 28 and 16, then the arithmetic mean of these two numbers is :

(A) 49

(B) 28

(C) 22

(D) 16

5. If the correlation coefficient between two variables X and Y is 0.8, then the correlation coefficient between $U = X - 0.4$ and $V = Y - 0.3$ is :

(A) 0.1

(B) 0.4

(C) 0.5

(D) 0.8

6. The law of demand states that the price and demand of commodity are inversely related. The correlation coefficient between these two economic variables would be :

(A) Positive

(B) Negative

(C) Zero

(D) Nothing definite

7. If $\sigma_x^2 = 4\sigma_y^2$ and $r = 0.25$, then the regression coefficient b_{xy} is :

(A) 0.125

(B) 0.0625

(C) 0.50

(D) 1.00

8. For obtaining the regression line of X on Y :

(A) $E(Y - a - bX)^2$ is minimized

(B) $E(Y - a - bX)^2$ is maximized

(C) $E(X - a - bY)^2$ is minimized

(D) $E(X - a - bY)^2$ is maximized

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9. A die is loaded in such a way that an even number is twice as likely to occur as an odd number. If E is the event that a number less than 4 occurs on a single toss of the die, then P(E) :

(A) $\frac{1}{2}$

(B) $\frac{2}{3}$

(C) $\frac{1}{9}$

(D) $\frac{4}{9}$

10. The probability that a regularly scheduled flight departs on time is P(D) = 0.83; the probability that it arrives on time is P(A) = 0.82; and the probability that it departs and arrives on time is P (D∩A) = 0.78. Find the probability that a plane arrives on time, given that it departed on time :

(A) 0.95

(B) 0.94

(C) 0.50

(D) 0.24

11. In which theory of probability, the outcomes of a random experiment are assumed to be equally likely ?

(A) Statistical

(B) Subjective

(C) Classical

(D) Axiomatic

12. If A and B are any two events, then :

(A) $P(A \cap B) = P(A)\, P(A|B)$

(B) $P(A \cap B) = P(A)\, P(B|A)$

(C) $P(A \cup B) = P(A)\, P(B|A)$

(D) $P(A \cap B) = P(A|B)$

13. If the moment generating function of a random variable X is given by $M_x(t) = \frac{3}{3-t}$ then its standard deviation is given by :

(A) 1/3

(B) 2/9

(C) 1/5

(D) 1/9

14. Let X and Y be two independent Poisson variates. Then the conditional distribution of X given X + Y is :

(A) Poisson

(B) Geometric

(C) Binomial

(D) Negative binomial

15. The density function of a random variable X is given by $f(x) = \begin{cases} \frac{1}{2}x & 0 < x < 2 \\ 0 & \text{otherwise} \end{cases}$

The expected value of X is then :

(A) 1

(B) $\frac{1}{2}$

(C) $\frac{3}{4}$

(D) $\frac{4}{3}$

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16. The mean of a binomial distribution is 20 and its standard deviation is 4. Then the number of trials is :

(A) 75

(B) 100

(C) 150

(D) 200

17. In an exponential distribution with mean other than unity :

(A) Mean = $(\text{variance})^2$

(B) Mean = 2 variance

(C) Mean = standard deviation

(D) Mean = variance

18. Let Y have uniform distribution over the interval (α, β), then its mean is given by :

(A) $\frac{\beta+\alpha}{2}$

(B) $\frac{\beta-\alpha}{2}$

(C) $\frac{\beta+\alpha}{12}$

(D) $\frac{(\beta-\alpha)^2}{12}$

19. If $X \sim N(\mu, \sigma^2)$, then moment generating function of a standard normal variate is :

(A) $e^{t^2/2}$

(B) $e^{i\mu t+\sigma^2 t^2/2}$

(C) $e^{i\mu t+\sigma^2 t^2/2}$

(D) $e^{i\mu t-\sigma^2 t^2/2}$

20. For gamma distribution with single parameter :

(A) Mean > variance

(B) Mean < variance

(C) Mean = variance

(D) Mean = standard deviation

21. The probability distribution of a statistic i called :

(A) Statistic

(B) Standard error

(C) Frequency distribution

(D) Sampling distribution

22. Let $\underline{X} = (X_1, X_2, \ldots, X_n)$ be a sample and ω be th critical region. The power of test is defined by :

(A) $P(\underline{X} \in \omega | H_0)$

(B) $P(\underline{X} \in \omega | H_1)$

(C) $P(\underline{X} \in \varpi | H_0)$

(D) $P(\underline{X} \in \varpi | H_1)$

23. A company manufacturing electric bulbs clair that the average life of its bulbs is 1600 hou The average life and standard deviation of random sample of 100 such bulbs were 1570 hou and 120 hours respectively, then standard error the average life of bulbs is :

(A) 12 hours

(B) 1.2 hours

(C) 157 hours

(D) 15.7 hours

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24. The standard deviation of the sampling distribution of a statistic is known as :

(A) Standard error

(B) Mean squared error

(C) Variance

(D) Coefficient of variation

25. Consider the 2×2 contingency table on two attributes A and B :

	A_1	A_2
B_1	10	20
B_2	30	40

The value of χ^2 for testing the independence of attributes A and B is :

(A) 0.85

(B) 0.83

(C) 0.81

(D) 0.79

26. The range of F-variate is :

(A) $-\infty$ to ∞

(B) 0 to ∞

(C) 0 to 1

(D) –1 to 1

27. Goodness of fit of a distribution is tested by :

(A) Z test

(B) F test

(C) t-test

(D) Chi-square test

28. The degree of freedom for paired t-test based on n pairs of observations is :

(A) $n-2$

(B) $2(n-1)$

(C) $n-1$

(D) $2n-1$

29. Compared to complete enumeration, sampling may be unable to provide :

(A) Reduction in cost

(B) Increase in administrative efficiency

(C) Estimator of error

(D) Measurement of the whole population

30. In SRSWOR, the $V(N\bar{y})$ is given by :

(A) $\left(\frac{N-n}{nN}\right)S^2$

(B) $N\left(\frac{N-n}{n}\right)S^2$

(C) $N^2\left(\frac{N-n}{n}\right)S^2$

(D) $n\left(\frac{N-n}{N}\right)S^2$

31. The total number of possible samples of size n from a population of size N in case of SRSWOR is :

(A) $\binom{N}{n}$

(B) N^n

(C) $\left(\frac{N}{n}\right)^n$

(D) $\frac{1}{N^n}$

32. The difference between a sample estimate and the population parameter from a complete count is termed as :

(A) Human error

(B) Sampling error

(C) Non-sampling error

(D) Mistakes

33. Stratified sampling is appropriate when the population is :

(A) Heterogeneous

(B) Homogeneous

(C) Finite

(D) Infinite

34. In systematic sampling, the population is 200 and the selected sample size is 50, then the sampling interval is :

(A) 0.25

(B) 40

(C) 4

(D) 250

35. A population of 108 units is divided into three strata whose sizes are 24,36 and 48 respectively. In proportion allocation, the number of units selected from the second stratum when sample size is 18, will be :

(A) 4

(B) 6

(C) 8

(D) 9

36. The criterion, which enables us to classify variou sampling units into different strata, is termed as

(A) Inflation factor

(B) Sampling factor

(C) Sampling fraction

(D) Stratifying factor

37. If G is the grand total, T is the number of treatments and N is the total number of observations, then the correction factor is given by :

(A) $\frac{G^2}{NT}$

(B) $\frac{G}{N}$

(C) $\frac{G^2}{N}$

(D) $\frac{G^2}{T}$

38. In which of the following designs is principle of local control not used ?

(A) CRD

(B) RBD

(C) LSD

(D) BIBD

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39. In one way classification, the test statistic F is given by :

(A) $\frac{\text{Treatment sum of squares}}{\text{Error sum of squares}}$

(B) $\frac{\text{Treatment mean sum of squares}}{\text{Error mean sum of squares}}$

(C) $\frac{\text{Error mean sum of squares}}{\text{Treatment mean sum of squares}}$

(D) $\frac{\text{Raw sum of squares}}{\text{Total sum of squares}}$

40. Local control is used to :

(A) Reduce the error variance

(B) Reduce the number of replications

(C) Reduce the degree of freedom

(D) Decrease the number of plots

41. A feasible solution to an LP problem :

(A) Must satisfy all the problems constraints simultaneously

(B) Must optimize the value of the objective function

(C) Need not to satisfy all constraints, only some of them

(D) Must be a corner point of the feasible region

42. While solving LP Problem graphically, the area bounded by the constraints is known as :

(A) Infeasible region

(B) Feasible region

(C) Unbounded region

(D) Critical region

43. For maximization LP model, the simplex method is terminated when all values :

(A) $C_j - Z_j \geq 0$

(B) $C_j - Z_j = 0$

(C) $Z_j \leq 0$

(D) $C_j - Z_j \leq 0$

44. A solution which can indefinitely increase or decrease the value of the objective function is called :

(A) Degenerate solution

(B) Feasible solution

(C) Unbounded solution

(D) Optimal solution

45. The trend of annual production of a company is described by the following equation $Y_c = 18+0.6X$.

Origin 1988; X-unit = 1 year; Y-unit = annual production. The monthly trend equation is :

(A) $Y_c = 1.50 + 0.0041X$

(B) $Y_c = 0.01 + 0.05X$

(C) $Y_c = 1.80 + 0.06X$

(D) $Y_c = 1.50 + 0.05X$

46. Which of the following is an example of seasonal variation ?

(A) Recovery in business

(B) Death rate decreased due to advance in science

(C) Sudden causes by war

(D) Sale of ice cream increases during summer

47. The multiplicative time series model is :

(A) $Y = T + S + C + I$

(B) $Y = T \times S \times C \times I$

(C) $Y = a + bX$

(D) $Y = a + bX + cX^2$

48. Fisher's method of calculating the index number is based on :

(A) Geometric mean

(B) Arithmetic mean

(C) Harmonic mean

(D) Quartile deviation

49. The number of births per thousand women of child bearing age group is :

(A) Crude birth rate

(B) General fertility rate

(C) Total fertility rate

(D) Gross reproduction rate

50. Natural increase indicates :

(A) Higher mortality

(B) An excess of deaths over births

(C) Higher fertility

(D) An excess of births over deaths

51. The child bearing age in India is :

(A) 15-59 years

(B) 20-29 years

(C) 15-49 years

(D) 14-49 years

52. Mortality experience is taken into consideration when defining :

(A) Crude birth rate

(B) General fertility rate

(C) Gross reproduction rate

(D) Net reproduction rate

53. Computer is free from tiresome and boredom. We call it :

(A) Diligence

(B) Intelligence

(C) Robotics

(D) Accuracy

54. Assignable causes of variation :

(A) Are not as important as natural causes

(B) Can be identified and removed

(C) Also referred to as "chance" causes

(D) Are within the limits of a control chart

55. Central tendency of a process is monitored in :

(A) Range chart

(B) Mean chart

(C) p-chart

(D) c-chart

56. Process control is carried out :

(A) Before production

(B) After production control

(C) During production

(D) All of the above

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57. Let T_1 be the most efficient estimator of θ with variance σ_1^2 and T_2 be any other estimator of the same parameter of θ with variance σ_2^2. The efficiency of T_2 is :

(A) σ_1^2/σ_2^2

(B) σ_2^2/σ_1^2

(C) σ_1/σ_2

(D) σ_2/σ_1

58. If $X_i \sim N(\mu, \sigma^2)$ where σ^2 is known, then 95% confidence interval for μ based on a sample of size n is :

(A) $\left(\overline{X} \pm 2.00^{\sigma}/\sqrt{n}\right)$

(B) $\left(\overline{X} \pm 2.58^{\sigma}/\sqrt{n}\right)$

(C) $\left(\overline{X} \pm 1.96^{\sigma}/\sqrt{n}\right)$

(D) $\left(\overline{X} \pm 1.00^{\sigma}/\sqrt{n}\right)$

59. Let (Y_1, Y_2, Y_3) be a random sample from a population having mean θ. Let $T = \frac{(2Y_1 + 3Y_2 + \lambda Y_3)}{9}$. If T is given to be an unbiased estimator of θ, then the value of λ is :

(A) 1

(B) 2

(C) 3

(D) 4

60. A statistic is called sufficient for a parameter if it :

(A) Possesses all three criteria of unbiasedness, consistency and efficiency

(B) Gives among all the statistics, the maximum of the information about parameter

(C) Gives all information about the parameter that is contained in the sample

(D) Gives more information about the parameter than that is contained in the sample

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