QUESTION BOOKLET

Entrance Test for Admission to M.Sc. Programme in Statistics
Dibrugarh University

Date of Test : 03/08/2017

Time : 10.30 a.m. – 12.30 p.m. **Marks : 100**

Read the following instructions carefully

- All the questions are compulsory.
- This Paper consists of fifty objective type questions, carrying 2 marks each.
- Your responses are to be given in the Answer Sheet with ' X' mark in the appropriate box.
- Rough work is to be done in the end of this booklet.
- There is no negative mark for incorrect answer.

1. If the inter-quartile range of a set of numbers 0, 3, 7, 17, 30, x, 51, 70, is 44.75, the value of x (assuming the numbers are arranged in ascending order) is
(A) 41.5
(B) 42
(C) 46.5
(D) 48.5

2. The heights (in cm) of two groups of students are given below :

Group A :	131	150	147	138	144
Group B :	139	148	132	151	140

which of the following is / are true ?
(i) The ranges of heights of the two groups are same
(ii) The means of heights of the two groups are same
(iii) The inter-quartile range of heights of the two groups are same

(A) i only
(B) ii only
(C) i & ii only
(D) i, ii & iii

3. Measure of dispersion cannot be
(A) Zero
(B) Negative
(C) Positive
(D) More than mean

4. For a mesokurtic curve the value of β_2 is
(A) 0
(B) > 3
(C) < 3
(D) 3

5. If the population is constituted through experiments being conducted by an investigation then the population is called
(A) Finite
(B) Infinite
(C) Existing
(D) Hypothetical

6. If the slop of the regression line is calculated to be 2.5 and the intercept 16 then the value of Y when X is 4 is
(A) 66.5
(B) 2.5
(C) 26
(D) 16

7. Following values are obtained from a life table T_{15} = 3,493,601 and $e_{15}^{0} = 44.6$ then the expected number of persons alive at exact age 15 will be
(A) 78340
(B) 78332
(C) 8430
(D) None

8. Fisher's index numbers is based on
(A) The arithmetic mean of Laspeyere's & Paasche's index number
(B) The median of Laspeyere's & Paasche's index number
(C) The mode of Laspeyere's & Paasche's index number
(D) The geometric mean of Laspeyere's & Paasche's index number

9. $\frac{Sum\,of\ prices\,of\ all\ commodities\,in\ the\ current\ year}{Sum\,of\ prices\,of\ all\ commodities\,in\ the\ base\ year}\ x\ 100$ is
(A) Laspeyere's index
(B) Simple aggregative price index
(C) Simple average price relative
(D) None

10. Which of the statement is true about Net Reproduction Rate (NRR)
(A) It is one of the measure of reproduction.
(B) It is one of the measure of population growth.
(C) NRR is nothing but adjusted Gross Reproduction Rate (GRR) for the effects of mortality.
(D) All of these.

11. Which is correct
(A) Every cdf is right continuous & non decreasing
(B) Every cdf is increasing & right continuous
(C) Every cdf is continuous & increasing
(D) Every cdf is decreasing & left continuous

12. If two events A and B are s.t *P(A) > 0, P (B) > 0* and $A \cap B = \phi$ then
(A) A , B cannot be independent
(B) A, B can be independent
(C) A, B always independent
(D) A, B independent as well as mutually exclusive

13. The distribution of heights of 6 students of a college is distributed as normal with mean 150 cm and variance 100 cm^2. What proportion of students will have height between 150 to 180 cms
(A) 0.499
(B) 0.955
(C) 0.990
(D) 0.90

14. An unbiased coin is tossed 10 times & results recorded. Then the probability of getting 9 heads is
(A) 0.9
(B) 0.098
(C) 0.0098
(D) 0.98

15. The median, mode and mean of a data set are 24, 25.5 & 23 respectively. The distribution is most likely
(A) Positively Skewed
(B) Negatively Skewed
(C) Symmetric
(D) Uniform

16. If a sampling frame is not available then which of the following method could be used
(A) Quta
(B) Cluster
(C) Stratified
(D) Systematic

17. For a continuous random variable X, $\Pr(X \le t) = 1 - e^{-at}$ then its pdf *f(t)* is given by
(A) $e^{-a} a^t / Lt$
(B) $a e^{-at}$
(C) $\frac{1}{\sqrt{2a}} e^{-\frac{1}{2}t^2}$
(D) 1

18. Based on a sample of size '1' from Binomial (n, p) population an unbiased estimator of p is
(A) $\bar{x}$
(B) x
(C) x/n
(D) none of the above

19. For the probability distribution $\Pr(X = i) = 1/n$, i = 1, 2, …, n, the variance of X is
(A) $(n+1)/2$
(B) $(n^2+1)/2$
(C) $(n-1)/2$
(D) $(n^2-1)/2$

20. For a two way ANOVA with one observation per cell with 'a' rows & 'b' columns the d.f. for error is
(A) ab-1
(B) (a-1) (b-1)
(C) a (b-1)
(D) b (a-1)

21. If $\bar{x}$ is the sample mean and s is the sample standard deviation of the data, by Chebyshev's rule the interval $\bar{x}$ - 2s and $\bar{x}$ + 2s contains at least
(A) ½ of data
(B) ¾ of data
(C) $^{8}/_{9}$ of data
(D) $^{15}/_{16}$ of data

22. A sample space possessing the characteristic of equally likely elements is said to have a
(A) Uniform probability model
(B) Normal probability model
(C) Beta (1^{st} kind) probability model
(D) Chi-square probability model

23. There are 15 people competing in a bicycle race. In how many ways can the first, second and third prizes be awarded to persons participating in the race ?
(A) 15
(B) 14
(C) 13
(D) Non of these

24. If X and Y are independent, Var (X – Y) equals
(A) Var (X) – Var(Y)
(B) Var (X) + Var (Y)
(C) Var (X) + Var (Y) – 2 Cov (XY)
(D) Var (X) – Var (Y) + 2 Cov (XY)

25. The mean of the distribution $P[X = X] = \left(\frac{1}{2}\right)^{x-1} 0.5,\ x = 1, 2, \ldots$ is
(A) ½
(B) 1
(C) 2
(D) 4

26. In design of experiments, each specific combination of the levels of different factors is called
(A) a treatment
(B) a replication
(C) an experimental unit
(D) a factor level

27. In usual notations, which one of the following equality / inequality holds good ?
(A) $R_{1.23} \geq r_{12}$
(B) $R_{1.23} \leq r_{12}$
(C) $R_{1.23} = r_{12}$
(D) $R^2_{1.23} = 1 - r^2_{12}$

28. A coin is tossed until a head appears. The expectation of the number of tosses required is
(A) 1
(B) ½
(C) 2

(D) 4

29. The S.E. of mean of a random sample of size 25 from a population with variance 25 is
(A) 0
(B) $^1/_5$
(C) $^2/_5$
(D) 1

30. Which one of the following statements is not correct ?
(A) A sufficient estimator is most efficient when an efficient estimator exists.
(B) A sufficient estimator is always a consistent estimator.
(C) A sufficient estimator may or may not be an unbiased estimator.
(D) None of the above statements is true in case of a sufficient estimator.

31. An experimental design is
(A) A map
(B) A plan
(C) An architect
(D) All the above

32. Randomisation in an experiment that helps to eliminate :
(A) Systematic influence
(B) Human bias
(C) Observations effect
(D) All the above

33. Local control in the field is maintained through :
(A) Uniformity trials
(B) Randomisation
(C) Natural factors
(D) Treatment effects

34. Experimental error is necessarily required for :
(A) Testing significant of treatment effects
(B) Comparing treatment effects
(C) Calculating the information released from an experiment
(D) All the above

35. With the help of contrasts, one can estimate the :
(A) Linear effect
(B) Quadratic effect
(C) Cubic effect
(D) All the above

36. Formula for obtaining a missing value in randomised block design by minimizing the error mean squares was given by
(A) W.G. Cochran
(B) T. Wishart
(C) F. Yales
(D) J.W. Tukey

37. The precision of whole-plot treatment in a split plot design can be increased by assigning treatment to the whole plot :
(A) Randomly
(B) In randomised block design
(C) In Latin square design
(D) All the above

38. Size of critical region is known as :
(A) Power of the test'
(B) Size of type II error
(C) Critical value of the test statistics
(D) Size of the test

39. Neyman-Pearson lemma provides :
(A) An unbiased test
(B) A most powerful test
(C) An admissible test
(D) Minimax test

40. Equality of several population mean can be tested by
(A) Bartlett's test
(B) F-test
(C) Z-test
(D) t - test

41. Binomial distribution tends to Normal distribution
(A) n (the no. of trials) $\to \infty$ and either 'p' or 'q' is very small
(B) n (the no. of trials) $\to \infty$
(C) n (the no. of trials) $\to \infty$ and neither 'p' nor 'q' is very small
(D) Any one of the above

42. If X is a continuous random variable having p.d.f. $f(x, 0) = Qe^{-Qx}$; $x \geq 0, Q > 0$
$= 0$; otherwise

then , m.g.f of 'X' is

(A) $\left(1-\frac{t}{Q}\right)^{-1}$; $t \in R$

(B) $\left(1+\frac{t}{Q}\right)^{-1}$; $t \in R$

(C) $\left(1+\frac{t}{Q}\right)^{-1}$; $Q > t$

(D) $\sum_{r=0}^{\infty}\left(\frac{t}{Q}\right)^{r}$; $Q > t$

43. If 'a' is the correlation coefficient of X and Y , and 'b' in the regression coefficient of Y on X , then the regression coefficient of X on Y is

(A) $\frac{b^2}{a}$

(B) $\frac{a^2}{b}$

(C) $-\frac{a^2}{b}$

(D) $\pm\frac{a^2}{b}$

44. An Urn contains 7 black balls and 5 white balls. Two balls are drawn without replacement. Then the probability that both balls are black is

(A) $\frac{42}{132}$

(B) $\frac{6}{11}$

(C) $\frac{7}{12}$

(D) $\frac{90}{132}$

45. If X is a Poisson variate and P (X = 0) = P (X = 1) = K, then the value of K is

(A) e

(B) $1/e$

(C) $\frac{e}{2}$

(D) $\frac{2}{e}$

46. If the angle between two regression lines obtained using the data from variable X and Y is 90^0, then the correlation between X and Y is

(A) 0

(B) -1

(C) 1

(D) 0.5

47. Variance of $\bar{X}_{st}$ under random sampling, Proportional allocation and optimum allocation hold the correct inequality as

(A) $Var_{ran}(\bar{X}_{st}) \le Var_{prop}(\bar{X}_{st}) \le Var_{opt}(\bar{X}_{st})$

(B) $Var_{ran}(\bar{X}_{st}) \ge Var_{opt}(\bar{X}_{st}) \ge Var_{prop}(\bar{X}_{st})$

(C) $Var_{ran}(\bar{X}_{st}) \ge Var_{prop}(\bar{X}_{st}) \ge Var_{opt}(\bar{X}_{st})$

(D) None of the above

48. Mean deviation is minimum when deviation are taken from
(A) Mean
(B) Mean $\pm$ 3.SD
(C) 0
(D) None of the above

49. If S is a set of exhaustive events, then
(A) $0 < P(S) < 1$
(B) $P(S) = 0$
(C) both (A) and (B)
(D) neither (A) nor (B)

50. If X is a discrete random variable assuming the values 0, 1, 2, 3, and 4 and F(x) is its c.d.f., then $P(1 < x \leq 3)$ is equal to
(A) F(3) – F(1)
(B) F(3) – F(2)
(C) F(1) + F(3)
(D) F(1) – F(3)

** X **

[Rough Work]

ANSWER SHEET

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Name of the Candidate:

Roll No. :

1.	A	B	C	D
2.	A	B	C	D
3.	A	B	C	D
4.	A	B	C	D
5.	A	B	C	D
6.	A	B	C	D
7.	A	B	C	D
8.	A	B	C	D
9.	A	B	C	D
10.	A	B	C	D
11.	A	B	C	D
12.	A	B	C	D
13.	A	B	C	D

14. A B C D

15. A B C D

16. A B C D

17. A B C D

18. A B C D

19. A B C D

20. A B C D

21. A B C D

22. A B C D

23. A B C D

24. A B C D

25. A B C D

26. A B C D

27. A B C D

28. A B C D

29. A B C D

30. A B C D

31. A B C D

32. A B C D

33. A B C D

34. A B C D

35. A B C D

36. A B C D

37. A B C D

38. A B C D

39. A B C D

40. A B C D

41. A B C D

42. A B C D

43. A B C D

44. A B C D

45. A B C D

46. A B C D

47. A B C D

48. A B C D

49. | A | | B | | C | | D |

50. | A | | B | | C | | D |

(Signature of the Candidate)