Examination: **M.Sc. Statistics**

Section 1 - Section 1

Question No.1 4.00

Bookmark

The standard error of the sampling distribution of median is given by

- $\sqrt{\frac{\sigma\pi}{2}}$
- $\sigma\sqrt{\frac{\pi}{2}}$
- $\sigma\sqrt{\frac{\pi}{2n}}$
- $\sqrt{\frac{\sigma\pi}{2n}}$

Question No.2 4.00

Bookmark

The average travel time to a distant city is c hours by car or b hours by bus. A woman cannot decide whether to drive or take the bus, so she tosses a coin. What is her expected travel time?

- $\frac{c+b}{4}$
- $2(c+b)$
- $\frac{c+b}{2}$
- $c+b$

Question No.3 4.00

Bookmark

The determinant of an elementary matrix of the third kind is

- 0
- -1
- 1
- 2

Question No.4 4.00

Bookmark

If P(A) = 0.25 and P(B) = 0.8, which of the following is true?

- $0.05 \leq P(A \cap B) \leq 0.25$
- $0.05 \leq P(A \cap B) \leq 0.50$
- $0.25 \leq P(A \cap B) \leq 0.8$
- $0.05 \leq P(A \cap B) \leq 0.8$

Question No.5 4.00

Bookmark

The range of multiple correlation coefficient R is

- [0.5,1]
- (-∞,∞)
- [0,1]
- [-1,1]

Question No.6 4.00

Bookmark

The ratio of class frequency to the class width is called

- Relative frequency
- Conditional frequency
- Cumulative frequency
- Frequency density

Question No.7 4.00

Bookmark

If X is a continuous random variable and a< b
then $\int_a^b f(x)dx$ is equal to

- {F(b) + F(a)}/2
- F(b)-F(a)
- F(a)-F(b)
- F(b)/F(a)

Question No.8 4.00

Bookmark

If a fair coin is tossed twice, what is the probability of getting at least one head?

- 2/3
- 1/4
- 3/4
- 1/2

Question No.9 4.00

Bookmark

When three unbiased coins are tossed at a time the chance of getting no heads is

- 1/8
- 5/8
- 1/4
- 3/8

Question No.10 4.00

Bookmark

A nonparametric method in the analysis of variance for one-factor experiments is provided by

- Kruskal-Wallis H test
- Friedman test
- Wilcoxon's signed rank test
- Mann-Whitney U test

Question No.11 4.00

Bookmark

The maximum probability with which we would be willing to risk a type I error is termed as

- error probability
- power of the test
- margin of error
- significance level

Question No.12 4.00

Bookmark

When two six-faced dice are rolled simultaneously the chance of getting a sum of 8 is

- 1/36
- 1/2
- 5/36
- 8/36

Question No.13 4.00

Bookmark

A quicker response to a shift in the process average is provided by

- exponential weighted moving average chart
- standard deviation chart
- mean chart
- acceptance control chart

Question No.14 4.00

Bookmark

The equation of the tangent to $y = x^3 - 2x^2 + 4$ at (2, 4) is

- $x + 4y = 18$
- $4x - 4$
- $2x - 4$
- $4x + y = 18$

Question No.15 4.00

Bookmark

The proportion of nonconforming items being produced by a process is monitored by using

- NP chart
- U chart
- P - chart
- Both P and NP charts

Question No.16 4.00

Bookmark

The null hypothesis that the three or more sampling means are all equal is tested using

- Chi-square test procedure
- ANOVA procedure
- normal Z test procedure
- Student's t test procedure

Question No.17 4.00

Bookmark

The amount of variation present in a set of time series data can be reduced by using the method of

- moving averages
- separate averages
- free-hand
- least-squares

Question No.18 4.00

Bookmark

For a normal distribution, which of the following relations is correct?

- $MD = \frac{4}{5} SD$
- $SD = \frac{4}{5} MD$
- $SD = \frac{2}{3} MD$
- $MD = \frac{2}{3} SD$

Question No.19 4.00

Bookmark

For two attributes A and B, $(AB) = \frac{(A)(B)}{N}$. This is the criterion for:

- dependence
- correlation
- association
- independence

Question No.20 4.00

Bookmark

The number of parameters for bivariate normal density is

- 3
- 5
- 6
- 2

Question No.21 4.00

Bookmark

The effect of a factor is defined to be the change in response produced by a change in the level of the factor. This is frequently called

- interaction effect
- fixed effect
- random effect
- main effect

Question No.22 4.00

Bookmark

The square of a standard normal random variable is distributed as

- chi-square with n degrees of freedom
- chi-square with n/2 degrees of freedom
- normal with mean 0 and variance 2
- chi-square with one degree of freedom

Question No.23 4.00

Bookmark

One of the types of sampling involves a researcher determining the appropriate sample sizes for the groups identified as important, and then taking convenience samples from those groups. Identify the type of sampling.

- Quota sampling
- Multi-stage sampling
- Proportional stratified sampling
- Cluster sampling

Question No.24 4.00

Bookmark

The set consisting of a single vector is linearly dependent if and only if that vector is a

- vector of zeros and ones
- constant vector
- zero vector
- unit vector

Question No.25 4.00

Bookmark

The ratio of imports to exports for the years 2015 and 2016 are 1.25 and 1.40 respectively. If the imports in 2015 was Rs. 250 crores and the total exports in the years 2015 and 2016 together was Rs. 500 crores, find the imports in 2016.

- 270 crores
- 320 crores
- 370 crores
- 420 crores

Question No.26 4.00

Bookmark

If A is an attribute, then its negation is denoted by

- α
- 1/A
- -A
- A^2

Question No.27 4.00

Bookmark

The slopes of the regression lines of X on Y and Y on X are equal if and only if

- r= ±1
- r=0
- r= -1
- r=1

Question No.28 4.00

Bookmark

Coefficient of determination is defined by

- Unexplained variation / Total variation
- Unexplained variation / Explained variation
- Explained variation / Total variation
- Explained variation / Unexplained variation

Question No.29 4.00

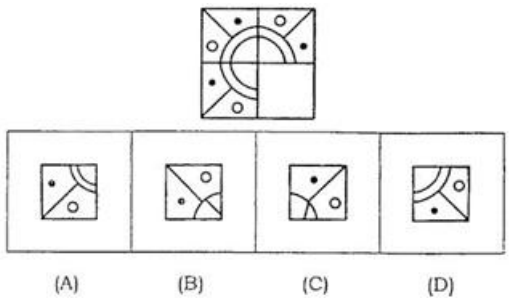
Bookmark

If A and B are two events that cannot happen simultaneously then P(AÇB) =

- 0
- 1
- P(A)xP(B)
- P(A)+P(B)

Question No.30 4.00

Bookmark



- B
- A
- D
- C

Question No.31 4.00

Bookmark

Two attributes A and B satisfies the relation (AB)(αβ) < (Aβ)(Bα). Then, A and B are said to be

- correlated.
- positively associated.
- negatively associated.
- independent.

Question No.32 4.00

Bookmark

Find out the missing term:

1, 2, 3, 6, 11, 20, 37, 68, ?

- 126
- 105
- 124
- 125

Question No.33 4.00

Bookmark

The distribution function of X is given by $F(x) = 1 - e^{-2x}, x \geq 0.$ Then, P(X > 2) is

- $1 - e^{4}$
- e^{4}
- e^{-4}
- $1 - e^{-4}$

Question No.34 4.00

Bookmark

The expectation of the sum of points obtained in tossing a pair of fair dice is equal to

- 6/7
- 7/6
- 1/3
- 7

Question No.35 4.00

Bookmark

A shelf has 6 mathematics books and 4 physics books. The probability that 3 particular mathematics books will be together is

- $\frac{3!}{10!}$
- $\frac{6!}{10!}$
- $\frac{6!\,3!}{10!}$
- $\frac{8!\,3!}{10!}$

Question No.36 4.00

Bookmark

One of the following relationships is only true

- GM = $\sqrt{AM x HM}$
- GM = $\sqrt{AM + HM}$
- AM = $\sqrt{GM x HM}$
- HM = $\sqrt{GM x AM}$

Question No.37 4.00

Bookmark

If the correlation coefficient 'r' is equal to +1 then the two regression lines will be

- Coincident
- Parallel
- Lie at 45^0
- Perpendicular to each

Question No.38 4.00

Bookmark

Obtain the missing term.

300, 296, 287, 271, ? , 210

- 246
- 250
- 244
- None of the above

Question No.39 4.00

Bookmark

For a chi-square distribution with n degrees of freedom, the mean and variance are

- n and 2n
- n and n/2
- n and n
- n/2 and n

Question No.40 4.00

Bookmark

Choose the correct meaning of the italicized idiom.
Anil got me into trouble by giving a *false colour* to my statement.

- Colouring the sentence
- Giving a wrong character
- Giving a wrong colour box
- Giving good impression

Question No.41 4.00

Bookmark

The standard deviation of the values {3,3,3,3,3,3} is

- 1/3
- $\sqrt{3}$
- 0
- 9

Question No.42 4.00

Bookmark

If 'r' denotes the correlation coefficient between X and Y the coefficient of determination is

- 1-r
- 1/r
- r^2
- $1-r^2$

Question No.43 4.00

Bookmark

Deseasonalized time series data still include

- trend and cyclic movements
- trend, cyclic and irregular movements
- cyclic and irregular movements
- trend and random movements

Question No.44 4.00

Bookmark

Identify the underlined part of speech:
Sorry, I don't know any <u>foreign</u> languages

- adverb
- noun
- pronoun
- adjective

Question No.45 4.00

Bookmark

When a = E(X), the quantity $E[X - a]^2$ is

- zero
- a maximum
- a minimum
- one

Question No.46 4.00

Bookmark

Price relatives computed by chain base method are called

- chain indices
- average price relatives
- price relatives
- link relatives

Question No.47 4.00

Bookmark

In the usual notation the coefficient of contingency C is given by

- $\left[\frac{\chi^2}{\chi^2 + N}\right]^{1/2}$
- $\left[\frac{\chi^2}{\chi^2 + N}\right]^{2}$
- $\left[\frac{N}{\chi^2}\right]$
- $\left[\frac{\chi^2 + N}{\chi^2}\right]^{1/2}$

Question No.48 4.00

Bookmark

Statements: Some bats are snakes, No snake is dangerous
Conclusion:
I. Some dangerous animals are snakes
II. Some bats are not dangerous.

- If neither I nor II follows
- If only conclusion II follows
- If either I or II follows
- If only conclusion I follows

Question No.49 4.00

Bookmark

In the usual notation the distribution function of a random variable X is stated as F(x) =

- P(X > x)
- P(X=x)
- P(X=1/x)
- P(X<=x)

Question No.50 4.00

Bookmark

A statement of the error or precision of an estimate is often called its

- efficiency
- Bias
- reliability
- Consistency

Question No.51 4.00

Bookmark

Assertion: - India's president is appointed on a five-year term

Reason: -PratibhaPatil was appointed as India's first woman president in 2007

- Both A and R are true and R is not the correct explanation of A
- A is false but R is true
- Both A and R are true and R is the correct explanation of A
- A is true but R is false

Question No.52 4.00

Bookmark

Normality of data can be tested using

- Normal probability plot, Kolmogorov-Smirnov test and Anderson-Darling test
- Normal probability plot only
- Andesrson-Darling test only
- Kolmogorov-Smirnov test only

Question No.53 4.00

Bookmark

The 95% confidence interval for the population variance when a sample is drawn from a population follows normal distribution is specified by

- $\frac{ns^2}{\chi^2_{0.025}} \le \sigma^2 \le \frac{ns^2}{\chi^2_{0.975}}$
- $\frac{\chi^2_{0.975}}{ns^2} \le \sigma^2 \le \frac{\chi^2_{0.025}}{ns^2}$
- $\frac{ns^2}{\chi^2_{0.975}} \le \sigma^2 \le \frac{ns^2}{\chi^2_{0.025}}$
- $\frac{\chi^2_{0.025}}{ns^2} \le \sigma^2 \le \frac{\chi^2_{0.975}}{ns^2}$

Question No.54 4.00

Bookmark

Identify the type of set: (2, 3, 4, 4, 4, 5, 5, 7, 7, 7, 9).

- The set is bimodal.
- The set is unimodal.
- The set is multimodal.
- The set has no mode.

Question No.55 4.00

Bookmark

In the usual notation the inter-quartile range of a data set is given by

- $(Q_3 - Q_1)$
- (Q_3/Q_1)
- $\frac{(Q_3 - Q_1)}{(Q_3 + Q_1)}$
- $(Q_3 + Q_1)$

Question No.56 4.00

Bookmark

For a random variable X if E(X) = m then E(3X+5) =

- 3m+5
- 9m
- 3m+15
- 3m

Question No.57 4.00

Bookmark

Based on the information given, answer the below question.
1. A,B,C,D,E and F are travelling in a bus.
2. There are two reporters, two mechanics, one photographer and one writer in the group.
3. Photographer A is married to D who is a reporter.
4. The writer is married to B who is of the same profession as that of F.
5. A,B,C,D are two married couples and no one in this belong to the same profession.
6. F is the brother of C.

How is C related to F?

- Brother-in-law
- Sister
- Brother
- Cannot be determined

Question No.58 4.00

Bookmark

$e^{\ln 3 - \ln 2 + \ln(1/x)} =$

- 1+1/x
- 3/2 – 1/x
- 3x/2
- 3/(2x)

Question No.59 4.00

Bookmark ☐

Choose the best antonym of the italicized word.
Ravi and Raghu are really *obstinate* men.

- friendly
- compliant
- considerate
- understanding

Question No.60 4.00

Bookmark ☐

In a code language, 321 means "Hot Black Coffee", 536 means "Very Hot Summer", and 589 means "Summer and Winter". Which digit stands for "Very" ?

- 5
- 3
- 9
- 6

Question No.61 4.00

Bookmark ☐

Data on categorical variables is summarized as

- Average
- Ratio
- Interval
- Frequency

Question No.62 4.00

Bookmark ☐

In the usual notation, if AÇB = null set then P(A|B) =

- P(B)
- P(A)/P(B)
- 0
- P(A)

Question No.63 4.00

Bookmark ☐

In the usual notation the expression $\sqrt{\frac{r_{12}^2+r_{13}^2-2r_{12}r_{13}r_{23}}{1-r_{13}^2}}$ denotes

- $R_{2.13}$
- $R_{3.12}$
- $R_{13.2}$
- $R_{1.23}$

Question No.64 4.00

Bookmark ☐

Choose the correct meaning of the italicized idiom.
Sheela's work seems to be a *Penelope's web.*

- Endless
- Declining
- In her best form
- Difficult

Question No.65 4.00

Bookmark

For what value of c,
the function
$f(x) = c, a \leq x \leq b$ is
the density function?

- 1/(a+b)
- 1/(b-a)
- 1
- 1/(a-b)

Question No.66 4.00

Bookmark

Good restaurants serving pure vegetarian food are very hard to _____.

- get in
- come by
- take to
- go through

Question No.67 4.00

Bookmark

Consider the following statements:
I: The company sold 5000 units of product A each costing Rs. 100.
II: This company has no other product line.
To find the total sales of the company, which of the following is true?

- I alone is sufficient while II alone is not sufficient
- Either I or II is sufficient
- II alone is sufficient while I alone is not sufficient
- Both I and II are sufficient

Question No.68 4.00

Bookmark

The diagram used to understand the nature of relationship between two variables is

- Histogram
- Scatter diagram
- Line chart
- Pie chart

Question No.69 4.00

Bookmark

The standard error of the sampling distribution of proportions is given by

- $\sqrt{\frac{n}{p(1-p)}}$
- $\frac{n}{p(1-p)}$
- $\frac{p(1-p)}{n}$
- $\sqrt{\frac{p(1-p)}{n}}$

Question No.70 4.00

Bookmark

Three sources of error or variability can be controlled using

- factorial design
- Latin squares design
- Greaco - Latin squares design
- randomized block design

Question No.71 4.00

Bookmark

A quantity computed with complete population data to represent a characteristic of the population is called

- index
- parameter
- statistic
- sample point

Question No.72 4.00

Bookmark

Assume that
$r_{12} = r_{13} = r_{23} = r \neq 1.$
Then, $R_{1.23} =$

- $\sqrt{\frac{2}{1-r}}$
- $r\sqrt{\frac{2}{1-r}}$
- $\sqrt{\frac{2}{1+r}}$
- $r\sqrt{\frac{2}{1+r}}$

Question No.73 4.00

Bookmark

The most common multiplier used in vital statistics mortality rates is

- 10000
- 1000
- 100
- 10

Question No.74 4.00

Bookmark

A nonparametric test for randomness is provided by

- Kruskal-Wallis test
- sign test
- theory of runs
- Friedman test

Question No.75 4.00

Bookmark

Select the option which improves the underlined part of the sentences.
The Prime Minister called on the President.

- to
- by
- in
- No improvement

Question No.76 4.00

Bookmark

The Arithmetic Mean of first 9 natural numbers is

- 4.5
- 45
- 55
- 5.5

Question No.77 4.00

Bookmark

The number of points of intersections of the graphs of $y = x^2$ and $y = 2 - x^2$

- 1
- 2
- 3
- 0

Question No.78 4.00

Bookmark

If X is a discrete random variable taking values 1,2,…,n then P(X=i) is called _____ function

- probability density
- distribution
- probability mass
- characteristic

Question No.79 4.00

Bookmark

Choose the correct meaning of the italicized idiom.
He had great difficulty to *save his bacon* when he was blackmailed.

- Threaten somebody
- Escape death
- Save pork
- Put bacon in the refrigerator

Question No.80 4.00

Bookmark

In case the population is normally distributed, the sampling distribution of means is

- normally distributed only for small values of n
- not normal even for large values of n
- normally distributed even for small values of n
- normally distributed only for large values of n

Question No.81 4.00

Bookmark

Based on the given information, answer the following question.
1. Six friends P,Q,R,S,T and U are memebers of a club and play different games of Football, Cricket, Tennis, Basketball, Badminton and Volleyball
2. T who is taller than P and S plays Tennis.
3. The tallest among them plays Basketball.
4. The Shortest among them plays volleyball.
5. Q and S neither play Volleyball nor Basketball.
6. R plays Volleyball
7. T is between Q who plays Football and P in order of height

What does S Play?

- Cricket
- Badminton
- Either Cricket or Badminton
- None of the above

Question No.82 4.00

Bookmark

It takes eight hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more, if 200 km is done by train and the rest by car. The ratio of the speed of the train to that of the cars is:

- 3:4
- 1:4
- 2:3
- 1:2

Question No.83 4.00

Bookmark

When Y and X are related by the model Y = 2x+4 then the correlation coefficient between X and Y is

- -1
- +1
- 0.5
- 0

Question No.84 4.00

Bookmark

The expression $\frac{r_{13}-r_{12}r_{23}}{\sqrt{(1-r_{12}^2)(1-r_{23}^2)}}$ indicates the following partial correlation

- $r_{13.2}$
- $r_{12.3}$
- $r_{32.1}$
- $r_{23.1}$

Question No.85 4.00

Bookmark

If X takes values 1,2,3,4,5 with equal probability then E(X) =

- 7.5
- 3
- 5
- 15

Question No.86 4.00

Bookmark

$E(X \mid Y) =$

- $\int_{-\infty}^{\infty} xf(y \mid x)dx$
- $\int_{-\infty}^{\infty} yf(y \mid x)dy$
- $\int_{-\infty}^{\infty} xf(y \mid x)dy$
- $\int_{-\infty}^{\infty} xf(x \mid y)dx$

Question No.87 4.00

Bookmark

If (X,Y) is a bivariate random variable then the marginal density of Y is given as

- $\int_{-\infty}^{\infty} f(x,y)\,dy$
- $\frac{f(x)}{f(x,y)}$
- $\frac{f(x,y)}{g(x)}$
- $\int_{-\infty}^{\infty} f(x,y)\,dx$

Question No.88 4.00

Bookmark

Choose the best synonym of the italicized word.
Each one of us is the subject of *derision* at some time or the other in our life.

- criticism
- irony
- laughter
- ridicule

Question No.89 4.00

Bookmark

The regression equation of X_1 on X_2 and X_3 can be written as X_1 =

- $a + b_{13.2}X_2 + b_{12.3}X_3$
- $a + b_{12}X_2 + b_{13}X_3$
- $a + b_{12.3}X_2 + b_{13.2}X_3$
- $a + b_{13}X_2 + b_{12}X_3$

Question No.90 4.00

Bookmark

Suppose that X is a random variable having mean μ and variance σ^2, which are finite. Then, if ε is any positive number, which of the following is true?

- $P[|X-\mu| \leq \varepsilon] \leq \frac{\sigma^2}{\varepsilon^2}$
- $P[|X-\mu| \geq \varepsilon] \geq \frac{\sigma^2}{\varepsilon^2}$
- $P[|X-\mu| \geq \varepsilon] \leq \frac{\sigma^2}{\varepsilon^2}$
- $P[|X-\mu| \leq \varepsilon] \geq \frac{\sigma^2}{\varepsilon^2}$

Question No.91 4.00

Bookmark

If $s_n = \frac{2n+1}{n+1}$, then

$\lim_{n\to\infty} s_n =$

- 0
- Indeterminate
- 2
- 1

Question No.92 4.00

Bookmark

Ramesh had a cold and couldn't go to the party, so I bought him a cake to make up for his_____

- depression
- disgust
- disappointment
- disillusion

Question No.93 4.00

Bookmark

The geometric mean of Laspeyre's and Paasche's formulae is

- Walsch index number
- Fisher's ideal index number
- Marshall – Edgeworth index number
- Bowley index number

Question No.94 4.00

Bookmark

Study the following information carefully and answer the question below it

The Director of an MBA college has decided that six guest lectures on the topics of Motivation, Decision Making, Quality Circle, Assessment Centre, Leadership and Group Discussion are to be organised on each day from Monday to Sunday.
(i) One day there will be no lecture (Saturday is not that day), just before that day Group Discussion will be organised.
(ii) Motivation should be organised immediately after Assessment Centre.
(iii) Quality Circle should be organised on Wednesday and should not be followed by Group Discussion
(iv) Decision Making should be organised on Friday and there should be a gap of two days between Leadership and Group Discussion

How many lectures are organised between Motivation and Quality Circle?

- One
- Four
- Two
- Three

Question No.95 4.00

Bookmark

The quantity $E[X-E(X)]^3$ is a measure of

- Scale
- Kurtosis
- Skewness
- Location

Question No.96 4.00

Bookmark

Choose the missing term: 3F,6G,11I,18L, ?

- 27P
- 28Q
- 26N
- 27O

Question No.97 4.00

Bookmark

Bayes theorem produces _____ probability

- Apriori
- Complementary
- Empirical
- Posterior

Question No.98 4.00

Bookmark

In the usual notation $E(e^{itX})$ is called

- Probability Generating Function
- Moment Generating Function
- Characteristic Function
- Cumulant Generating Function

Question No.99 4.00

Bookmark

If $\bar{A}$ denotes the compliment of A then $P(\bar{A})$ =

- 1
- P(A)+0.5
- 1/P(A)
- 1-P(A)

Question No.100 4.00

Bookmark

Consider F and t distributions. Which of the following relations is true?

- $F_{1-p,1,\nu} = t^2_{1-(p/2),\nu}$
- $F_{1-p,1,\nu} = t^2_{p/2,\nu}$
- $F_{1-p,1,\nu} = t^2_{p,\nu}$
- $F_{1-p,1,\nu} = t^2_{1-p,\nu}$