KARPAGAM ACADEMY OF HIGHER EDUCATION

(Deemed to be University Established Under Section 3 of UGC Act 1956)

Coimbatore – 641 021.

LECTURE PLAN

DEPARTMENT OF MATHEMATICS

FACULTY NAME : Dr. K.KALIDASS
SUBJECT NAME : PROBABILITY & STATISTICS
SUB.CODE : 17MMU302A
SEMESTER : V
CLASS : III B. Sc. MATHEMATICS

S. No	Lecture Duration Hour	Topics To Be Covered	Support Materials
UNIT-I			
1	1	Meaning and definition of statistics	S1: Ch 1, 1-2
2	1	Frequency Distribution Measures of central tendency	S1: Ch 1, 3-4
3	1	Arithmetic Mean	S1: Ch 1, 5-4
4	1	**Tutorial**	
5	1	Arithmetic Mean	S1: Ch 1, 6-10
6	1	Median	S1: Ch 1, 11-20
7	1	Mode	S1: Ch 1, 21-23
8	1	**Tutorial**	
9	1	Measures of dispersion	S5: Ch 2, 12-18
10	1	Range	S7: Ch 2, 41-44
11	1	Coefficient of range	S7: Ch 2, 44-47
12	1	**Tutorial**	
13	1	Quartile deviation	S7: Ch 2, 48-50
14	1	Coefficient of Quartile deviation	S7: Ch 2, 51-55
15	1	Standard deviation	S7: Ch 2, 55-60
16	1	**Tutorial**	
17	1	Coefficient of variation	
18	1	Recapitulation and discussion of possible questions	
Total number of hours planed for unit I 18 hours			
. UNIT-II			
1	1	Trial, event and sample space	S3: Ch 2, 21-23
2	1	Mutually exclusive event	S3: Ch 2, 24-26
3	1	**Tutorial**	
4	1	Exclusive and exhaustive events	S3: Ch 2, 27-29

5	1	Dependent and independent events	S3: Ch 2, 30-33
6	1	**Tutorial**	
7	1	Simple and compound events	S3: Ch 2,34-37
8	1	Mathematical properties	S3: Ch 2, 38-40
9	1	Permutation and combination	S3: Ch 2, 41-45
10	1	**Tutorial**	
11	1	Probability axioms	S3: Ch 2, 46-50
12	1	Addition and multiplication theorem	S3: Ch 2, 51-54
13	1	Real random variables (discrete and continuous)	S3: Ch 2, 55-57
14	1	**Tutorial**	
15	1	Cumulative distribution function	S3: Ch 2, 58-59
16	1	Probability density functions	S3: Ch 2, 60
17	1	Moments, MGF, Characteristic function	S3: Ch 3, 113-117
18		**Tutorial**	
19	1	. Recapitulation and discussion of possible questions	
Total number of hours planed for unit I 18 hours			
1	1	Uniform distribution	S3: Ch 4, 148-150
2	1	Binomial distribution	S3: Ch 4, 151-153
3	1	**Tutorial**	
4	1	Poisson distribution	S3: Ch 4, 154-157
5	1	Properties	S3: Ch 4,158-160
6	1	Joint probability density functions	S3: Ch 4, 161-163
7	1	**Tutorial**	
8	1	Marginal and conditional distributions	S3: Ch 4, 164-167
9	1	Expectation of function of two random variables	S3: Ch 4, 168
10	1	Conditional expectations	S3: Ch 4, 169
11	1	**Tutorial**	
12	1	Conditional expectations-contd	S3: Ch 4, 170
13	1	Conditional expectations-contd	S3: Ch 4, 170
14	1	Independent random variables	S3: Ch 4, 171
15	1	**Tutorial**	
16	1	Independent random variables-contd	S3: Ch 4, 171-172
17	1	Independent random variables-contd	S3: Ch 4, 172
18	1	**Tutorial**	
19	1	Recapitulation and discussion of possible questions	
Total number of hours planed for unit III 19 hours			
UNIT-IV			
1	1	Uniform distribution,	S3: Ch 5, 177-179
2	1	Normal distribution	S3: Ch 5, 180-182
3	1	**Tutorial**	

4	1	Exponential distribution	S3: Ch 5, 185-187
5	1	Joint cumulative distribution function	S3: Ch 5, 189-190
6	1	Properties	S3: Ch 5, 191-192
7	1	**Tutorial**	
8	1	Joint probability density functions	S3: Ch 5, 193-195
9	1	Problems	S3: Ch 5, 196-199
10	1	Bivariate distribution	S3: Ch 5, 200
11	1	**Tutorial**	
12	1	Correlation coefficient	S3: Ch 5, 201-203
13	1	Joint moment generating function	S3: Ch 5, 204
14	1	Calculation of covariance	S3: Ch 5, 205-207
15	1	**Tutorial**	
16	1	Linear regression for two variables	S3: Ch 5, 209-210
17	1	**Tutorial**	
18	1	Recapitulation and discussion of possible questions	
Total number of hours planed for unit IV 18 hours			
UNIT-V			
1	1	Chebyshev's inequality	S2: Ch 1, 58
2	1	law of large numbers	S2: Ch 1, 58
3	1	**Tutorial**	
4	1	Central Limit theorem	S2: Ch 1, 59
5	1	Central Limit theorem	S2: Ch 1, 59
6	1	Central Limit theorem	S2: Ch 1, 60
7	1	**Tutorial**	
8	1	Markov Chains	S4, Ch 4, 185-187
9	1	Markov Chains	S4, Ch 4, 189-191
10	1	Markov Chains	S4, Ch 4, 192-195
11	1	**Tutorial**	
12	1	classification of states.	S4, Ch 4, 196-198
13	1	classification of states.	S4, Ch 4, 199-200
14	1	**Tutorial**	
15	1	classification of states.	S4, Ch 4, 200
16	1	classification of states.	S4, Ch 4, 201
17	1	classification of states.	S4, Ch 4, 202
18	1	**Tutorial**	
19	1	Recapitulation and discussion of possible questions	
20	1	Discusion of previous year ESE qns	
21	1	Discusion of previous year ESE qns	
22	1	Discusion of previous year ESE qns	
Total number of hours planed for unit V 22 Hours			

Unit	Hours(L+T)

I	**18(14+4)**
II	**20(16+4)**
III	**18(14+4)**
IV	**18(14+4)**
V	**22(18+4)**
Total	**96(76+20)**

SUGGESTED READINGS

1. Gupta S.P., (2001). Statistical Methods, Sultan Chand & Sons, New Delhi.
2. Robert V. Hogg, Joseph W. McKean and Allen T. Craig., (2007). Introduction to Mathematical Statistics, Pearson Education, Asia.
3. Irwin Miller and Marylees Miller, John E. Freund, (2006). Mathematical Statistics with Application, Seventh Edition, Pearson Education, Asia.
4. Sheldon Ross., (2007). Introduction to Probability Model, Ninth Edition, Academic Press, Indian Reprint.
5. Pillai R.S.N., and Bagavathi V., (2002). Statistics , S. Chand & Company Ltd, New Delhi.
6. Srivastava T.N., and ShailajaRego., (2012). 2e, Statistics for Management, McGraw Hill Education, New Delhi.
7. Dr.P.N.Arora, (2002). A foundation course statistics, S.Chand& Company Ltd, New Delhi.

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
The word statistics is used as----------	singular word	a plural word	both singular and plural words	neither singular nor plural word	both singular and plural words
Classification is a process of arranging data in----------	grouping of related facts in different classes	different rows	different columns and rows	different columns grouping of related facts in different classes	grouping of related facts in different classes
To represent two or more sets of interrelated data , we use ----------	bar diagram	pie diagram	histogram	multiple bar diagram	multiple bar diagram
Histogram is a graph of ----------	Time series	frequency distribution	cumulative frequency distribution	normal distribution	frequency distribution
Univariate data consists of ----------	one variable	two variables	three variable	four	one variable
Data are generally obtained from----------	Primary sources	Secondary sources	Both primary and secondary sources	neither primary nor secondary sources	Both primary and secondary sources
In geographical classification data are classified on the basis of----------	area	attributes	time	location	area
In qualitative classification data are classified on the basis of----------	area	attributes	time	location	attributes
In quantitative classification data are classified on the basis of----------	area	attributes	time	magnitude	magnitude
Number of source of data is----------	2	3	4	1	2
Squares and rectangles are----------	Two dimensional diagram	One dimensional diagram	Three dimensional diagram	Multi dimensional diagram	Two dimensional diagram
Data originally collected for an investigation is known as----------	Tabulation	Primary data	Secondary data	Published data	Primary data
The heading of a row in a statistical table is known as ----------	stub	caption	title	heading	stub

Statistics can ----------	prove anything	disprove anything	neither prove nor disprove anything but it is just a tool	none of these	neither prove nor disprove anything but it is just a tool
Statistics is also a science of----------	estimates	both a and b	probabilities	neither a nor b	both a and b
Statistics is---------	quantitative science	a qualitative science	both quantitative and qualitative science	neither quantitative nor qualitative	both quantitative and qualitative science
Statistics considers----------	a single item	a set of item	either a single item or a set of item	neither a single item or a set of item	a set of item
Statistics can be considered as----------	an art	a science	both an art and science	neither an art nor a science	both an art and science
The other name of cumulative frequency curve is ----	Ogive	Bars	Histogram	Pie diagram	Ogive
Number of methods of collection of primary data is----------	2	3	4	5	5
Number of questions in a questionnaire should be----------	5	10	maximum	minimum	minimum
Sources of secondary data are----------	Published sources	Unpublished sources	Either Published sources or Unpublished sources	primary source	Either Published sources or Unpublished sources
Compared with primary data , secondary data are----------	more reliable	less reliable	equally reliable	uniformly reliable	less reliable
---------- are column headings	stub	heading	bar	captions	captions
Mid value= ------	lower boundary/2	upper boundary/2	lower boundary+ upper boundary)/2	lower boundary+ upper boundary	lower boundary+ upper boundary)/2
The origin of the word statistics has been traced to the Latin word -------	statista	status	statistik	statistique	status
Graphs of frequency distribution are----------	histogram	pie diagram	bar chart	circle	histogram

cubes are----------	Two dimensional diagram	One dimensional diagram	Three dimensional diagram	Multi dimensional diagram	Three dimensional diagram
---------- is the difference between the value of the smallest item and the valueof the largest item.	class interval	frequency	number of items	range	range
---------- is one which is used by the individual or agency which collect it.	primary data	secondary data	both		primary data
Exclusive class intervals suit ----------	discrete variables	continuous variables	both	neither	continuous variables
A table is a systematic arrangement of statistical data in----------	columns	rows	both columns and rows	stubs	both columns and rows
The collected data in any statistical investigation are known as ----------	raw data	arranged data	classified data	tabulated data	raw data
The emitting form of a frequency polygon is called ----------	histogram	ogive	bar diagram	frequency curve	frequency curve
In chronological classification data are classified on the basis of----------	time	attributes	class intervals	location	time
Bar diagrams are ---------- dimensional diagrams	two	three	one	multi	one
Diagrams and graphs are tools of ----------	collection of data	presentation	analysis	summarization	presentation
In a two dimensional diagram ----------	only height is considered	only width is considered	height,width and thickness are considered	Both height and width are considered	only height is considered
Which one of the following is a measure of central	Median	range	variation	correlation	Median
The total of the values of the items divided by their number of items is known as	Median	Arithmetic mean	mode	range	Arithmetic mean
In the short-cut method of arithmetic mean, the deviation is taken as	$x - A$	$A - x$	$(x - A) / c$	$(A - x) / c$	$x - A$
The sum of the deviations of the values from their arithmetic mean is	– 1	one	two	zero	zero
The formula for the weighted arithmetic mean is	$\sum wx / \sum w$	$\sum w / \sum wx$	$\sum x / n$	$\sum x / \sum f$	$\sum wx / \sum w$
Find the Mean of the following values. 5, 15, 20, 10,	5	18	41	20	18
Which of the followings represents median?	First quartile	Third quartile	Second quartile	Q.D	Second quartile

Which of the measure of central tendency is not affected by extreme values?	Mode	Median	sixth deciles	Mean	Median
Sum of square of the deviations about mean is	Maximum	one	zero	Minimum	Minimum
Median is the value of ---------- item when all the items are in order of magnitude.	First	second	Middle most	last	Middle most
Find the Median of the following data 160, 180, 175, 179, 164, 178, 171, 164, 176.	160	175	176	180	175
The position of the median for an individual series is	(N + 1) / 2	(N + 2) / 2	N/2	N/4	(N + 1) / 2
Mode is the value, which has	Average frequency density	less frequency density	greatest frequency density	graetest frequency	greatest frequency density
A frequency distribution having two modes is said to	unimodal	bimodal	trimodal	modal	bimodal
Mode has ---------- stable than mean.	less	more	same	most	less
Which of the following is not a measure of dispersion?	Range	quartile deviation	standard deviation	median	median
Range of the given values is given by	L- S	L+S	S+L	LS	L- S
Which one of the following is relative measure of dispersion?	Range	Q.D	S.D	coefficient of variation	coefficient of variation
Coefficient of variation is defined as	(AM * 100)/S.D	(S.D* 100)/A.M	S.D/A.M	(1/S.D)*100	(S.D* 100)/A.M
If the values of median and mean are 72 and 78 respectively, then find the mode.	16	60	70	76	60
Find Mean for the following 3, 4, 5.	4	2.25	3	2.28	4
The coefficient of range	L-S /L+S	L+S /L-S	L-S	L+S	L-S /L+S
Second quartile is also called as	Mode	mean	median	G.M	median
If A.M = 8, N=12, then find $\sum X$.	76	80	86	96	96
If the value of mode and mean is 60 and 66 then, find the value of median.	64	46	54	44	64
The formula for median for continuous series is	M = (N+1) / 2	M = L + [(N/2 + cf) / f] * i	M =L - (N/2+cf)/f* i	M = L + [(N/2 - cf) / f] * i	M = L + [(N/2 - cf) / f] * i

Median is	Average point	Midpoint	Most likely point	Most remote point	Midpoint
Mode is the value which	Is a mid point	Occur the most	Average of all	Most remote Likely	Occur the most
. ……. Is known as positional average	Median	Mean	Mode	Range	Median
The median of marks 55, 60, 50, 40, 57, 45, 58, 65, 57, 48 of 10 students is	55	57	52.5	56	56
The middle most value of a frequency distribution table is known as	Mean	Median	Mode	Range.	Median
The middle most value of a frequency distribution table is known as	Mean	Median	Mode	Range	Median
Measures of central tendency is also known as	Dispersion	averages	correlation	tendency	correlation
From the given data 35,40,43,32,27 the coefficient	23	0.23	13	0.13	13
If S.D = 6, then find variance.	6	36	42	12	36
Which one of the following shows the relation between variance and standard deviation?	var = square root of S.D	S.D = square root of variance	variance = S.D	variance / S.D = 1	S.D = square root of variance
If variance is 64, then find S.D.	8	13	14	11	8
Which of the following measures of averages divide the observation into two parts	Mean	Median	Mode	Range	Median
Which of the following measures of averages divide the observation into four equal parts	Mean	Median	Mode	Quartile	Quartile
Arithmetic mean of the series 1, 3, 5, 7, 9 is	5	6	5.5	6.5	5
Arithmetic mean of the series 3, 4, 5, 6, 7 is ……	5.5	6	5	6.5	5
The Arithmetic mean for the series 3, 5, 5, 2, 6, 2, 9, 5, 8, 6, is…….	5	6	5.5	6.5	5
The median value for the series 3, 5, 5, 2, 6, 2, 9, 5,	6	5	5.5	6.5	5
The mode for the series 3, 5, 6, 2, 6, 2, 9, 5, 8, 6 is	5	6	5.5	6.5	6
The Arithmetic mean for the series 51.6, 50.3, 48.9, 48.7, 48.5 is…….	49.8	50	48.9	49.6	49.8
The Median for the series 51.6, 50.3, 48.9, 48.7, 49.5, is……	49.8	50	48.9	49.6	49.6

The Mode for the series 51.6, 50.3, 48.9, 48.7, 49.5 is……	49.8	50	48.9	49.6	48.9
If standard deviation is 5, then the variance is	5	625	25	2.23068	25
Standard deviation is also called as	Root mean square deviation	mean square deviation	Root deviation	Root median square deviation	Root mean square deviation

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. ……. Is known as positional average	Median	Mean	Mode	Range	Median
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The middle most value of a frequency distribution table is known as	Mean	Median	Mode	Range	Median
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From the given data 35,40,43,32,27 the coefficient	23	0.23	13	0.13	13
If S.D = 6, then find variance.	6	36	42	12	36
Which one of the following shows the relation between variance and standard deviation?	var = square root of S.D	S.D = square root of variance	variance = S.D	variance / S.D = 1	S.D = square root of variance
If variance is 64, then find S.D.	8	13	14	11	8
Which of the following measures of averages divide the observation into two parts	Mean	Median	Mode	Range	Median
Which of the following measures of averages divide the observation into four equal parts	Mean	Median	Mode	Quartile	Quartile
Arithmetic mean of the series 1, 3, 5, 7, 9 is	5	6	5.5	6.5	5
Arithmetic mean of the series 3, 4, 5, 6, 7 is ……	5.5	6	5	6.5	5
The Arithmetic mean for the series 3, 5, 5, 2, 6, 2, 9, 5, 8, 6, is…….	5	6	5.5	6.5	5
The median value for the series 3, 5, 5, 2, 6, 2, 9, 5,	6	5	5.5	6.5	5
The mode for the series 3, 5, 6, 2, 6, 2, 9, 5, 8, 6 is	5	6	5.5	6.5	6
The Arithmetic mean for the series 51.6, 50.3, 48.9, 48.7, 48.5 is…….	49.8	50	48.9	49.6	49.8
The Median for the series 51.6, 50.3, 48.9, 48.7, 49.5, is……	49.8	50	48.9	49.6	49.6

The Mode for the series 51.6, 50.3, 48.9, 48.7, 49.5 is……	49.8	50	48.9	49.6	48.9
If standard deviation is 5, then the variance is	5	625	25	2.23068	25
Standard deviation is also called as	Root mean square deviation	mean square deviation	Root deviation	Root median square deviation	Root mean square deviation

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
The regression line cut each other at the point of-------	Average of X only	Average of Y only	Average of X and Y	the median of X on Y	Average of X and Y
Given the coefficient of correlation being 0.8, the coefficient of determination will be	0.98	0.64	0.66	0.54	0.64
Given the coefficient of correlation being 0.9, the coefficient of determination will be	0.98	0.81	0.66	0.54	0.81
If the coefficient of determination being 0.49, what is the coefficient of correlation	0.7	0.8	0.9	0.6	0.7
Given the coefficient of determination being 0.36, the coefficient of correlation will be	0.3	0.4	0.6	0.5	0.6
Which one of the following refers the term Correlation?	Relationship between two values	Relationship between two variables	Average relationship between two variables	Relationship between two things	Relationship between two variables
If r = +1, then the relationship between the given two variables is	perfectly positive	perfectly negative	no correlation	high positive	perfectly positive
If r = - 1, then the relationship between the given two variables is	perfectly positive	perfectly negative	no correlation	low Positive	perfectly negative
If r = 0, then the relationship between the given two variables is	Perfectly positive	perfectly negative	no correlation	both positive and negative	no correlation
Coefficient of correlation value lies between	1 and –1	0 and 1	0 and ∞	0 and –1.	1 and –1
While drawing a scatter diagram if all points appear to form a straight line getting Downward from left to right, then it is inferred that there is	Perfect positive correlation	simple positive correlation	Perfect negative correlation	no correlation	Perfect negative correlation
The range of the rank correlation coefficient is	0 to 1	–1 to 1	0 to ∞	– ∞ to ∞	–1 to 1
If r =1, then the angle between two lines of regression is	Zero degree	sixty degree	ninety degree	thirty degree	ninety degree

Regression coefficient is independent of	Origin	scale	both origin and scale	neither origin nor scale.	Origin
If the correlation coefficient between two variables X and Y is negative, then the Regression coefficient of Y on X is	Positive	negative	not certain	zero	negative
If the correlation coefficient between two variables X and Y is positive, then the Regression coefficient of X on Y is	Positive	negative	not certain	zero	Positive
There will be only one regression line in case of two variables if	r =0	r = +1	r = –1	r is either +1 or –1	r =0
The regression line cut each other at the point of	Average of X only	Average of Y only	Average of X and Y	the median of X on Y	Average of X and Y
If b_{xy} and b_{yx} represent regression coefficients and if $b_{yx} > 1$ then b_{xy} is	Less than one	greater than one	equal to one	equal to zero	Less than one
Rank correlation was discovered by	R.A.Fisher	Sir Francis Galton	Karl Pearson	Spearman	Spearman
Formula for Rank correlation is	$1- (6\Sigma d^2 /(n(n2-1)))$	$1- (6\Sigma d^2 /(n(n2+1)))$	$1+ (6\Sigma d^2 /(n(n2+1)))$	$1 /(n(n2-1))$	$1- (6\Sigma d^2 /(n(n2-1)))$
With b_{xy}=0.5, r = 0.8 and the variance of Y=16, the standard deviation of X=	6.4	2.5	10	25.6	2.5
The coefficient of correlation r =	$(b_{xy.} b_{yx})^{1/4}$	$(b_{xy .} b_{yx})^{-1/2}$	$(b_{xy .} b_{yx})^{1/3}$	$(b_{xy.} b_{yx})^{1/2}$	$(b_{xy.} b_{yx})^{1/2}$
If two regression coefficients are positive then the coefficient of correlation must be	Zero	negative	positive	one	positive
If two-regression coefficients are negative then the coefficient of correlation must be	Positive	negative	zero	one	Positive
The regression equation of X on Y is	X = a + bY	X = a + bX	X= a - bY	Y= a + bX	X = a + bY
The regression equation of Y on X is	X = a + bY	X = a + bX	X= a - bY	Y= a + bX	Y= a + bX
The given two variables are perfectly positive, if	r = +1	r = -1	r = 0	$r \neq +1$	r = +1
The relationship between two variables by plotting the values on a chart, known as-	coefficient of correlation	Scatter diagram	Correlogram	rank correlation	Scatter diagram

If x and y are independent variables then,	cov(x,y)≠ 0	cov(x,y)= 1	cov(x,y)= 0	cov(x,y) >1	cov(x,y)= 0
Correlation coefficient is the ---------- of the two regression coefficients.	Mode	Geometric mean	Arithmetic mean	median	Geometric mean
b_{xy} = 0.4, b_{yx} = 0.9 then r =	0.6	0.3	0.1	-0.6	0.6
b_{xy}=1/5, r=8/15, s_x = 5 then s_y=	40/13	13/40	40/3	3	40/3
The geometric mean of the two regression coefficients.	Correlation coefficient	regression coefficients	coefficient of range	coefficient of variation	Correlation coefficient
If two variables are uncorrelated, then the lines of regression	Do not exist	coincide	Parallel to each other	perpendicular to each other	perpendicular to each other
If the given two variables are correlated perfectly negative, then	r = +1	r = -1	r = 0	r ≠ +1	r = -1
If the given two variables have no correlation, then	r = +1	r = -1	r = 0	r ≠ +1	r = 0
If the correlation coefficient between two variables X and Y is ---------, the Regression coefficient of Y on X is positive	Negative	positive	not certain	zero	positive
If the correlation coefficient between two variables X and Y is ---------, the Regression coefficient of Y on X is negative	Negative	positive	not certain	zero	Negative
---------- is independent of origin and scale.	Correlation coefficient	regression coefficients	coefficient of range	coefficient of variation	Correlation coefficient
The angle between two lines of regression is ninety degree, if ----------	r = 2	r = 0	r = 1	r = -1	r = 1
--------- is used to measure closeness of relationship between variables.	Regression	mean	Rank correlation	correlation	correlation
If r is either +1 or –1, then there will be only one -------- line in case of two variables	Correlation	regression	rank correlation	mean	regression
When b_{xy}=0.85 and b_{yx}= 0.89, then correlation coefficient r =	0.98	0.5	0.68	0.87	0.87

If b_{xy} and b_{yx} represent regression coefficients and if $b_{xy} < 1$, then b_{yx} is	less than 1	greater than one	equal to one	equal to zero	greater than one
While drawing a scatter diagram if all points appear to form a straight line getting Downward from left to right, then it is inferred that there is--------	Perfect positive correlation	simple positive correlation	Perfect negative correlation	no correlation	Perfect negative correlation
If r =1, the angle between two lines of regression is----------	Zero degree	sixty degree	ninety degree	thirty degree	ninety degree
Regression coefficient is independent of----------	Origin	scale	both origin and scale	neither origin nor scale.	Origin
There will be only one regression line in case of two variables if----------	r =0	r = +1	r = –1	r is either +1 or –1	r =0

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
Completely randomized design is similar to ----------	three way	one way	two way	t test	one way
Randomized block design is similar to ----------	two way	three way	one way	many	two way
ANOVA is the technique of analysis of ----------	standard deviation	variance	mean	range	variance
Under one way classification , the influence of only ----- attribute or factor is considered	two	three	one	many	one
Under two way classification , the influence of only ----- attribute or factor is considered	four	two	three	one	two
The word ---------- is used to indicate various statistical measures like mean, standard deviation, correlation etc, in the universe.	Statistic	parameter	hypothesis	none of these	parameter
The term STATISTIC refers to the statistical measures relating to the ----------.	Population	hypothesis	sample	universe	sample
A hypothesis may be classified as ----------.	Simple	Composite	null	all the above	all the above
Level of significance is the probability of ----------.	Type I error	Type II error	Not committing error	any of the above	any of the above
Degrees of freedom are related to ----------.	No. of observations in a set	hypothesis under test	No. of independent observations in a set	No. of dependent observations in a set	No. of independent observations in a set
A critical function provides the basis for ----------.	Accepting H_0	rejecting H_0	no decision about H_0	all the above	all the above

Student's t-test is applicable in case of ----------.	Small samples	for sample of size between 5 and 30	Large samples	none of the above	Small samples
Student's t-test is applicable only when ----------.	The variate values are independent	the variable is distributed normally	The sample is not large	all the above	all the above
If the calculated value is less than the table value then we accept the ---------- hypothesis.	Alternative	null	both	sample	null
Small sample test is also known as ----------.	Exact test	t – test	normal test	F-test	t – test
The formula for c^2 is ----------	å(O–E) ^{2}/E	å(E+O) ^{2}/E	å(O-E) /E	å(O-E) ^{2}/O	å(O–E) ^{2}/E
If a statistic 't' follows student's t distribution with n degrees of freedom then t^2 follows ------	c^2distribution with (n-1) degrees of freedom	c^2distribution with n degrees of freedom	c^2distribution with n^2 degrees of freedom	c^2distribution with (n+1) degrees of freedom	c^2distribution with (n-1) degrees of freedom
The distribution used to test goodness of fit is----------	F distribution	c^2distribution	t distribution	Z distribution	c^2distribution
Degree of freedom for statistic chi-square incase of contingency table of order 2x2 is----------	3	4	2	1	1
Larger group from which the sample is drawn is called ----------.	Sample	sampling	universe	parameter	universe
Any hypothesis concerning a population is called a ----------.	Sample	population	statistical measure	statistical hypothesis	statistical hypothesis
Rejecting Ho when it is true leads ----------.	Type I error	Type II error	correct decision	either (a) or (b)	Type I error
Accept Ho when it is true leads ----------.	Type I error	Type II error	correct decision	either (a) or (b)	correct decision
Type II error occurs only if ----------.	Reject Ho when it is true	Accept Ho when it is false	Accept Ho when it is true	reject Ho when it is false	Accept Ho when it is false

The correct decision is ----------.	Reject Ho when it is true	Accept Ho when it is false	Reject Ho when it is false	none of these	Reject Ho when it is false
The maximum probability of committing type I error, which we specified in a test is known as ----------.	Null hypothesis	alternative hypothesis	DOF	level of significance	level of significance
If the computed value is less than the critical value, then ----------.	Null hypothesis is accepted	Null hypothesis is rejected	Alternative hypothesis is accepted	population	Null hypothesis is accepted
If the computed value is greater than the critical value, then ----------.	Null hypothesis is accepted	Null hypothesis is rejected	Alternative hypothesis is accepted	small sample	Null hypothesis is rejected
In sampling distribution the standard error is ----------.	np	pq	npq	sqrt(npq)	sqrt(npq)
If the sample size is greater than 30, then the sample is called ----------.	Large sample	small sample	population	Null hypothesis	Large sample
If the sample size is less than 30, then the sample is called ----------.	Large sample	small sample	population	alternative hypothesis	small sample
Z – test is applicable only when the sample size is ----------.	zero	one	small	large	large
The degrees of freedom for two samples in t – test is ---------.	$n_1 + n_2 + 1$	$n_1 + n_2 – 2$	$n_1 + n_2 + 2$	$n_1 + n_2 – 1$	$n_1 + n_2 – 2$
An assumption of t – test is population of the sample is ----------.	Binomial	Poisson	normal	exponential	normal
The degrees of freedom of chi – square test is ----------.	(r – 1)(c – 1)	(r + 1)(c + 1)	(r + 1)(c – 1)	(r – 1)(c + 1)	(r – 1)(c – 1)
In chi – square test, if the values of expected frequency are less than 5, then they are combined together with the neighbouring frequencies. This is known as ----------.	Goodness of fit	DOF	LOS	pooling	pooling

The expected frequency of chi – square test can be calculated as ----------.	(RT + CT) / GT	(RT – CT) / GT	(RT * CT) / GT	(RT*CT)	(RT * CT) / GT
In F – test, the variance of population from which samples are drawn are ----------.	equal	not equal	small	large	equal
If the data is given in the form of a series of variables, then the DOF is ---------.	n	n-1	n+1	(r – 1)(c – 1)	n-1
The characteristic of the chi–square test is ----------.	DOF	LOS	ANOVA	independence of attributes	independence of attributes
If $S_1^2 > S_2^2$, then the F – statistic is ----------.	S_1 / S_2	S_2 / S_1	S_1^2 / S_2^2	S_1^3 / S_2^3	S_1^2 / S_2^2
The value of Z test at 5% level of significance is ----------.	3.96	2.96	1.96	0.96	1.96
In -------, the variance of population from which samples are drawn are equal	t-test	Chi-Square test	Z-test	F-test	F-test
F – statistics is ----------.	Variance between the samples / variance within the samples	Variance within the samples / variance between the samples	Variance between the rows / variance between the columns	Variance within the rows / variance within the columns	Variance between the samples / variance within the samples
Analysis of variance utilizes:	t-test	Chi-Square test	Z-test	F-test	F-test
F – test whish is also known as ------	Chi-Square test	Z-test	varience ratio test	t-test	varience ratio test
The technique of analysis of variance refered to as ------	ANOVA	F – test	Z – test	Chi- square test	ANOVA
The two variations, variation within the samples and variations between the samples are tested for their significance by -------	Chi- square test	F – test	t-test	Z – test	F – test

Under ------- classification , the influence of only one attribute or factor is considered.	two way	three way	one way	many	one way
Under --------- classification , the influence of two attribute or factors is considered	two way	three way	one way	many	two way

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
Study to portray accurately characteristics of a particular individual, situation or a group is called ---------- research	Exploratory	Diagnostic	Descriptive	Hypothesis testing	Descriptive
Critical evaluation made by the researcher with the facts and information already available is called ---------- research.	Analytical	Exploratory	Diagnostic	Hypothesis testing	Analytical
Research to find reason, why people think or do certain things is an example of ----------	Quantitative Research	Applied Research	Qualitative research	Fundamental research	Qualitative research
Which one is considered a major component of the research study	Interpretation	research report	finding	draft	research report
Research task remains incomplete till the _____ has been presented.	Report	objective	finding	objective and finding	Report
What is the last step in a research study	Writing report	writing finding	limitations	research report	Writing report
Which is the final step in report writing……..	Writing report	writing finding	writing drafts	writing limitations	writing drafts
What is usually appended to the research work	Editing	bibliography	coding	research report	bibliography
The _____ is one which gives emphasis on simplicity and attractiveness	popular report	research report	article report	writing limitations	popular report
_____ should slow originality and should necessarily be on attempt to solve some intellectual problem	Interpretation	research report	finding	draft	research report
The researcher must remain caution about the _____ that can possibly arise in the process of interpreting results	Analysis	conclusions	findings	error	error
Which one should be considered while interpreting a given data	Validity	reliability	both validity and reliability	technical jargon	reliability

_____ is asking questions face to face	Indirect method	mailed questionnaire	through post	personal interview	personal interview
Journals, books, magazines etc are useful sources of collecting----------	Primary data	secondary data	both primary and secondary data	objective	secondary data
The collected raw data to detect errors and are called,	Editing	coding	classification	all the above	Editing
The formal, systematic and intensive process of carrying on a scientific method of analysis is _____	Research Design	research	interpretation	research analysis	research
------ Refers to the process of assigning numerals or symbols to answers of response	Coding	editing	classification	all the above	Coding
The research study, which is based on describing the characteristic of a particular individual or group	Experience survey	Descriptive	Diagnostic	Exploratory	Descriptive
Research is a_____	Finding	assumption	statement	all the above	all the above
The research, which has the purpose of improving a product or a process testing theoretical concepts in actual problem situations is-------research.	Statistical	Applied	Domestic	Biological	Applied
The chart of research process indicates that the process consists of a number of ---.	Closely related activities	unrelated activities	Closely unrelated activities	moderately related activities	Closely related activities

The objective of a good design is ----------.	Maximize the bias andmaximize the reliability of data	Minimize the bias and minimize the reliability of data	Minimize the bias and maximize the reliability of data	Maximize the bias and maximize the reliability of data	Maximize the bias and maximize the reliability of data
A ---------- is used whenever a full written report of the study is required.	Popular report	Technical report	article	monograph	Technical report
The ---------- is one which gives emphasis on simplicity and attractiveness.	Popular report	Technical report	article	monograph	Popular report
Study to portray accurately characteristics of a particular individual, situation or a group is called ---------- research	Exploratory	Diagnostic	Descriptive	Hypothesis testing	Descriptive
Critical evaluation made by the researcher with the facts and information already available is called ---------- research.	Analytical	Exploratory	Diagnostic	Hypothesis testing	Analytical
Research to find reason, why people think or do certain things is an example of ----------	Quantitative Research	Applied Research	Qualitative research	Fundamental research	Qualitative research
Which one is considered a major component of the research study	Interpretation	research report	finding	draft	research report
Research task remains incomplete till the _____ has been presented.	Report	objective	finding	objective and finding	Report
What is the last step in a research study	Writing report	writing finding	limitations	research report	Writing report
Which is the final step in report writing……..	Writing report	writing finding	writing drafts	writing limitations	writing drafts
What is usually appended to the research work	Editing	bibliography	coding	research report	bibliography
The _____ is one which gives emphasis on simplicity and attractiveness	popular report	research report	article report	writing limitations	popular report

_____ should slow originality and should necessarily be on attempt to solve some intellectual problem	Interpretation	research report	finding	draft	research report
The researcher must remain caution about the _____ that can possibly arise in the process of interpreting results	Analysis	conclusions	findings	error	error
Which one should be considered while interpreting a given data	Validity	reliability	both validity and reliability	technical jargon	reliability
_____ is asking questions face to face	Indirect method	mailed questionnaire	through post	personal interview	personal interview
Journals, books, magazines etc are useful sources of collecting----------	Primary data	secondary data	both primary and secondary data	objective	secondary data
The collected raw data to detect errors and are called,	Editing	coding	classification	all the above	Editing
The formal, systematic and intensive process of carrying on a scientific method of analysis is _____	Research Design	research	interpretation	research analysis	research
------ Refers to the process of assigning numerals or symbols to answers of response	Coding	editing	classification	all the above	Coding
The research study, which is based on describing the characteristic of a particular individual or group	Experience survey	Descriptive	Diagnostic	Exploratory	Descriptive
Research is a_____	Finding	assumption	statement	all the above	all the above
The research, which has the purpose of improving a product or a process testing theoretical concepts in actual problem situations is-------research.	Statistical	Applied	Domestic	Biological	Applied

The chart of research process indicates that the process consists of a number of ---.	Closely related activities	unrelated activities	Closely unrelated activities	moderately related activities	Closely related activities
The objective of a good design is ----------.	Maximize the bias andmaximize the reliability of data	Minimize the bias and minimize the reliability of data	Minimize the bias and maximize the reliability of data	Maximize the bias and maximize the reliability of data	Maximize the bias and maximize the reliability of data
A ---------- is used whenever a full written report of the study is required.	Popular report	Technical report	article	monograph	Technical report
The ---------- is one which gives emphasis on simplicity and attractiveness.	Popular report	Technical report	article	monograph	Popular report
The square of the S.D is …….	Variance	Coefficient of variation	Square of variance	Square of coefficient of variation	Variance
Analysis of variance is a statistical method of comparing the _____ of several populations.	Standard deviations	Means	Variances	Proportions	Means
The analysis of variance is a statistical test that is used to compare how many group means?	Three	More than three	Three or more	Two or more	Two or more
Analysis of variance utilizes:	F-test	Chi-Square test	Z-test	t-test	F-test
What is two-way ANOVA?	An ANOVA with two variables and one factor	An ANOVA with one variable and two factors	An ANOVA with one variable and three factors	An ANOVA with both categorical and scale variables	An ANOVA with one variable and two factors
Which of the following is the correct F ratio in the one-way ANOVA?	MSA/MSE	MSBL/MSE	MST/MSE	MSE/MST	MST/MSE
For validity of F-test in Anova, parent population should be…….	Binomial	Poisson	Normal	Exponential	Normal

_____ sum of squares measures the variability of the observed values around their respective tabulated values	Treatment	Error	Interaction	Total	Error
The _____ sum of squares measures the variability of the sample treatment means around the overall mean.	Total	Treatment	Error	Interaction	Treatment
If the true means of the k populations are equal, then MST/MSE should be:	more than 1.00	Close to 1.00	Close to -1.00	A negative value between 0 and - 1	Close to 1.00
If MSE of ANOVA for six treatment groups is known, you can compute……	Degree of freedom	The standard deviation of each treatment group	Variance	The pooled standard deviation	The pooled standard deviation
To determine whether the test statistic of ANOVA is statistically significant,to determine critical value we need	Sample size, number of groups	Mean, sample standard deviation	Expected frequency, obtained frequency	MSTR, MSE	Sample size, number of groups
Which of the following is an assumption of one-way ANOVA comparing samples from 3 or more experimental treatments?	Variables follow F-distribution	Variables follow normal distribution	Samples are dependent each other	Variables have different variances	Variables follow normal distribution
The error deviations within the SSE statistic measure distances:	Within groups	Between groups	Between each value and the grand mean	Betweeen samples	Within groups
In one-way ANOVA, which of the following is used within the F-ratio as a measurement of the variance of individual observations?	SSTR	MSTR	SSE	MSE	SSE
When conducting a one-way ANOVA, the _____ the between-treatment variability is when compared to the within-treatment variability	More random larger	Smalller	Larger	More random smaller	Smaller

When conducting a one-way ANOVA,the value of *F* DATA will be tend to be ……..	More random larger	Smalller	More random smaller	Larger	Smaller
When conducting an ANOVA, *F* DATA will always fall within what range?	Between negative infinity and infinity	Between 0 and 1	Between 0 and infinity	Between 1 and infinity	Between 0 and infinity
If F DATA = 5, the result is statistically significant	Always	Sometimes	Never	Is impossible	Sometimes
If F DATA= 0.9, the result is statistically significant	Always	Sometimes	Never	Is impossible	Never
When comparing three treatments in a one-way ANOVA ,the alternate hypothesis is…..	All three treatments have different effect on the mean response.	Exactly two of the three treatments have the same effect on the mean response.	At least two treatments are different from each other in terms of their effect on the mean response	All the treatments have same effect	At least two treatments are different from each other in terms of their effect on the mean response
If the sample means for each of *k* treatment groups were identical,the observed value of the ANOVA test statistic?	1	0	A value between 0.0 and 1.0	A negative value	0
If the null hypothesis is rejected, the probability of obtaining a *F* - ratio > the value in the *F* table as the 95th % is:	0.5	>0.5	<0.5	1	<0.5
ANOVA was used to test the outcomes of three drug treatments. Each drug was given to 20 individuals. If MSE =16, What is the standard deviation for all 60 individuals sampled for this study?	6.928	48	16	4	4
Analysis of variance technique originated in the field of……	Agriculture	Industry	Biology	Genetics	Agriculture

With 90, 35, 25 as TSS, SSR and SSC , in case of two way classification, SSE is…..	50	40	30	20	30
Variation between classes or variation due to different basis of classification is commonly known as ……...	Treatments	Total sum of squares	Sum of squares	Sum of squares due to error	Treatments
The total variation in observations in Anova is classified as:	Treatments and inherent variation	SSE and SST	MSE and MST	TSS and SSE	Treatments and inherent variation
In Anova, variance ratio is given by…….	MST/MSE	MSE/MST	SSE/SST	TSS/SSE	MST/MSE
Degree of freedom for TSS is……..	N-1	k-1	h-1	(k-1)(h-1)	N-1
For Anova, MST stands for……...	Mean sum of squares of treatment	Mean sum of squares of varieties	Mean sum of squares of tables	Mean sum of sources of treatment	Mean sum of squares of treatment
An ANOVA procedure is applied to data of 4 samples,where each sample contains 10 observations.Then degree of freedom for critical value of F are	4 numerator and 9 denominator	3 numerator and 40 denominator	3 numerator and 36 denominator	4 numerator and 10 denominator	3 numerator and 36 denominator
The power function of a test is denoted by…….	M(w,Q)	M(Q,Qo)	P(w,Q)	P(w,Qo)	M(w,Q)
Sum of power function and operation characteristic is…….	Unity	Zero	two	Negative	Unity
Operation characteristic is denoted by……	L(w,Q)	M(w,Q)	L(w,Qo)	M(w,Qo)	L(w,Q)
Operation characteristic is also known as ……	Test characteristic	Power function	best characteristic	unique characteristic	Test characteristic
The formula to find OC is L(w,Q)=	1-Power Function	2xPower Function	Power Funtion -1	2xConfidance Interval	1-Power Function
Operation Characteristic is of a test is related to…	Power Function	Best Test	Unique Test	Uniformally Best Test	Power Function

If the Hypothesis is correct the operation charectristics will be……	1	0	-1	0.5	1
If the Hypothesis is wrong the operation charectristics will be…….	0	1	0.5	0.333333	0
In which test we verify a null hypothesis against any other definite alternate hypothesis?	Best Test	Unique Test	Uniformally Best Test	Unbiased Test	Best Test
A Best Test is a Test such that the critical region for which _____ attains least value for a given α.	Beta	1-Beta	Alpha	1-Alpha	1-Beta
A Test whose power funtion attains its mean at point Q = Qo is called ____ Test	Unique	Unbiased	Power	Operation Characteristic	Unique
A Best Unique Test exist _____	Always	Never	Sometimes	When Q not = to Qo	Sometimes
Operation Characteristic is related to	Power Function	Unique Test	Best Test	Uniformally Best Test	Power Function
Power is the ability to detect:	A statistically significant effect where one exists	A psychologically important effect where one exists	Both (a) and (b) above	Design flaws	A statistically significant effect where one exists
Calculating how much of the total variance is due to error and the experimental manipulation is called:	Calculating the variance	Partitioning the variance	Producing the variance	Summarizing the variance	Partitioning the variance
ANOVA is useful for:	Teasing out the individual effects of factors on an Independent Variables	Analyzing data from research with more than one Independent Variable and one Dependent Variable	Analyzing correlational data	Individual effects of factors on an Dependent Variables	Analyzing data from research with more than one Independent Variable and one Dependent Variable

What is the definition of a simple effect?	The effect of one variable on another	The difference between two conditions of one Independent Variable at one level of another Independent Variable	The easiest way to get a significant result	Difference between two Dependent Variables	The difference between two conditions of one Independent Variable at one level of another Independent Variable
In a study with gender as the manipulated variable, the Independent Variable is:	Within participants	Correlational	Between participants	Regressional	Between participants
Which of the following statements are true of experiments?	The Independent Variable is manipulated by the experimenter	The Dependent Variable is assumed to be dependent upon the IV	They are difficult to conduct	both (a) and (b)	both (a) and (b)
All other things being equal, repeated-measures designs:	Have exactly the same power as independent designs	Are often less powerful than independent designs	Are often more powerful than independent designs	Are rarely less powerful when compare to than independent designs	Are often more powerful than independent designs
Professor P. Nutt is examining the differences between the scores of three groups of participants. If the groups show homogeneity of variance, this means that the variances for the groups:	Are similar	Are dissimilar	Are exactly the same	Are enormously different	Are similar
Differences between groups, which result from our experimental manipulation, are called:	Individual differences	Treatment effects	Experiment error	Within-participants effects	Treatment effects

Herr Hazelnuss is thinking about whether he should use a related or unrelated design for one of his studies. As usual, there are advantages and disadvantages to both. He has four conditions. If, in a related design, he uses 10 participants, how many would he need for an unrelated design?	40	20	10	100	40
Individual differences within each group of participants are called:	Treatment effects	Between-participants error	Within-participants error	Individual biases	Within-participants error
Calculating how much of the total variance is due to error and the experimental manipulation is called:	Calculating the variance	Partitioning the variance	Producing the variance	Summarizing the variance	Partitioning the variance
The decision on how many factors to keep is decided on:	Statistical criteria	Theoretical criteria	Both (a) and (b)	Neither (a) nor (b)	Both (a) and (b)
It is possible to extract:	As many factors as variables	More factors than variables	More variables than factors	Correlation between the actual and predicted variables	As many factors as variables
Four groups have the following means on the covariate: 35, 42, 28, 65. What is the grand mean?	43.5	42.5	56.7	58.9	42.5
You can perform ANCOVA on:	Two groups	Three groups	Four groups	All of the above	All of the above
When carrying out a pretest--posttest study, researchers often wish to:	Partial out the effect of the dependent variable	Partial out the effect of the pretest	Reduce the correlation between the pretest and posttest scores	Correlation between the two tests scores	Partial out the effect of the pretest

Using difference scores in a pretest--posttest design does not partial out the effect of the pretest for the following reason:	The pretest scores are not normally correlated with the posttest scores	The pretest scores are normally correlated with the different scores	The posttest scores are normally correlated with the different scores	Up normal relationship with the different scores	The pretest scores are normally correlated with the different scores
Experimental designs are characterized by:	Two conditions	No control condition	Random allocation of participants to conditions	More than two conditions	Random allocation of participants to conditions
Between-participants designs can be:	Either quasi-experimental or experimental	Only experimental	Only quasi-experimental	Only correlational	Either quasi-experimental or experimental
A continuous variable can be described as:	Able to take only certain discrete values within a range of scores	Able to take any value within a range of scores	Being made up of categories	Being made up of variables	Able to take any value within a range of scores
In a within-participants design with two conditions, if you do not use counterbalancing of the conditions then your study is likely to suffer from:	Order effects	Effects of time of day	Lack of participants	Effects of participants	Order effects
Demand effects are possible confounding variables where:	Participants behave in the way they think the experimenter wants them to behave	Participants perform poorly because they are tired or bored	Participants perform well because they have practiced the experimental task	Participants perform strongly	Participants behave in the way they think the experimenter wants them to behave

Power can be calculated by a knowledge of:	The statistical test, the type of design and the effect size	The statistical test, the criterion significance level and the effect size	The criterion significance level, the effect size and the type of design	The criterion significance level, the effect size and the sample size	The criterion significance level, the effect size and the sample size
Relative to large effect sizes, small effect sizes are:	Easier to detect	Harder to detect	As easy to detect	As difficult to detect	As difficult to detect
Differences between groups, which result from our experimental manipulation, are called:	Individual differences	Treatment effects	Experiment error	Within-participants effects	Treatment effects
Completely randomized design is similar to ----------	three way	one way	two way	t test	one way
Randomized block design is similar to ----------	two way	three way	one way	many	two way
ANOVA is the technique of analysis of ------	standard deviation	variance	mean	range	variance
Under one way classification , the influence of only ----- attribute or factor is considered	two	three	one	many	one
Under two way classification , the influence of only ----- attribute or factor is considered	four	two	three	one	two

Question	Opt 1	Opt 2	Opt 3	Opt 4	Answer
Psychometric Methods book is written by_____	J.P.Guilford	Likert	L.L.Thurstone	Louis Guttman	J.P.Guilford
Respondents are asked to rank their choices in_____	Comparative scaling	arbitrary scaling	rating scale	differential scale	Comparative scaling
_____ is developed on ad-hoc basis	Differential scale	arbitrary scale	rating scale	ranking scale	arbitrary scale
_____scale is developed by utilizing item analysis approach	Comparative scale	likert scale	differential scale	rating scale	likert scale
Scalogram analysis is developed by_____	J.P.Guilford	Likert	L.L.Thurstone	Louis Guttman	Louis Guttman
A complete enumeration of all items in the population is known as _____	sampling unit	sample design	census inquiry	all the above	census inquiry
The selected respondents constitute_____	population	sample	sample size	population size	sample
The selection process of respondents is called_____	survey	sampling technique	sample survey	census inquiry	sampling technique
The survey conducted to select the respondents is called_____	sampling technique	sample survey	census inquiry	population size	sample survey
A sample design is a definite plan for obtaining a sample from a given_____	universe	sample design	population	sample survey	population
The number of items in universe can be_____	finite	infinite	both	zero	both
The population of a city, number of workers in a company is_____	infinite	finite	both	zero	finite
Source list is also known as_____	sampling size	sampling size	sampling frame	population size	sampling frame
The size of the sample should be _____	large	optimum	small	all the above	optimum

Inappropriateness in sampling frame will result in _____	systematic bias	optimum	problems	sampling error	systematic bias
Sampling error _____ with increase in size of sample	decrease	increase	both	optimum	decrease
Sampling error can be measured from_____	sample design	sample size	population	sample design and sample size	sample design and sample size
On the representation basis samples may be_____	probability sampling	non-probability sampling	both	restricted	both
On element selection basis the samples may be_____	restricted	unrestricted	both	probability sampling	both
Non-probability sampling is also known as_____	quota sampling	purposive sampling	deliberate sampling	all the three	all the three
Quota sampling is an example of_____	probability sampling	non-probability sampling	both	purposive sampling	non-probability sampling
Probability sampling is also known as_____	random sampling	choice sampling	random and choice sampling	multistage sampling	random and choice sampling
Lottery method of selecting data is an example of_____	random sampling	choice sampling	purposive sampling	quota sampling	random sampling
Systematic sampling is an improved version of_____	quota sampling	simple random sampling	choice sampling	purposive sampling	simple random sampling
If population is not drawn from homogeneous group_____ technique is applied	simple random sampling	quota sampling	choice sampling	stratified sampling	stratified sampling
In_____ total population is divided into number of relatively small sub divisions	cluster sampling	choice sampling	stratified sampling	quota sampling	cluster sampling
When a particular lot is to be accepted or rejected on the basis of single sampling it is known as_____	double sampling	single sampling	area sampling	purposive sampling	single sampling

Survey designed to determine attitude of students toward new teaching plan is known as_____-	cross stratification sampling	stratification sampling	cluster sampling	multi stage sampling	cross stratification sampling
Sample design is determined_____ datas are collected	before	after	both	based on the survey	before
Indeterminary principle step comes in_____	step in sample design	criteria to select sample procedure	both	step doesnot occur	criteria to select sample procedure
The measurement of sampling error is called as_____	precision of sampling plan	sampling survey	sampling plan	representation basis	precision of sampling plan
The different sub populations divided to constitute a sample is known as_____	stratified sampling	survey	population	strata	strata
Every nth item is selected in_____	stratified sampling	systematic sampling	judgement sampling	all the above	systematic sampling
_____is conducted for determining a more appropriate and efficient stratification plan	survey	sample	pilot study	sample plan	pilot study
_____is considered more appropriate when universe happens to be small	purposive sampling	area sampling	cluster sampling	simple random sampling	purposive sampling
When we use rating scales we judge an object in _____terms against some specified criteria.	real	absolute	imaginary	perfect	absolute
Rating scale is also known as_____	Categorical scale	arbitrary scale	cumulative scales	all the above	Categorical scale
The graphical scale is _____and is commonly used in practice.	Problematic	critical	simple	real	simple
_____is also known as numerical scale	Itemized rating scale	graphical rating scale	cumulative scale	likert scale	Itemized rating scale

The chief merit of itemized rating scale is it provides_____ information	more	deep	critical	all the above	more
_____occurs when the respondents are either easy raters or hard raters	error of hallo effect	error of leniency	error of central tendency	cumulative scales	error of leniency
_____ occurs when the rater carries a generalized impression of the subject from one rating to another.	error of hallo effect	error of leniency	error of central tendency	graphical rating scale	error of hallo effect
When the raters are reluctant to give extreme judgments, the result is_____	error of hallo effect	error of leniency	error of central tendency	cluster sampling	error of central tendency
Systematic bias is also known as_____	Error of hallo effect	error of leniency	error of central tendency	cumulative scales	Error of hallo effect
_____occurs when the rater is asked to rate more factors, which has no evidence for judgment.	error of hallo effect	error of leniency	error of central tendency	cluster sampling	error of hallo effect
_____ is also known as ranking scale	rating scale	comparative scale	likert scale	graphical rating scale	comparative scale
We make relative judgments against similar objects in _____	comparative scale	likert scale	differential scale	rating scale	comparative scale
Paired comparisions provide_____ data.	nominal	ordinal	ratios	interval	ordinal
Ordinal data can be converted to _____ data through Law of comparative judgment.	nominal	ordinal	ratio	interval	interval
Law of comparative judgment is developed by_____	J.P.Guilford	Likert	L.L.Thurstone	all the three	L.L.Thurstone
--------- Scales have an absolute or true zero of measurement	Ordinal	Nominal	interval	ratio	ratio

The section of ---------- constitutes the main body of the report where in the results of the study are presented in clear.	Appendix	results	methods	Ordinal	results
Study to portray accurately characteristics of a particular individual, situation or a group is called ---------- research	Exploratory	Diagnostic	Descriptive	Hypothesis testing	Descriptive
Critical evaluation made by the researcher with the facts and information already available is called ---------- research.	Analytical	Exploratory	Diagnostic	Hypothesis testing	Analytical
Research to find reason, why people think or do certain things is an example of ----------	Quantitative Research	Applied Research	Qualitative research	Fundamental research	Qualitative research
Which one is considered a major component of the research study	Interpretation	research report	finding	draft	research report
Research task remains incomplete till the _____ has been presented.	Report	objective	finding	objective and finding	Report
What is the last step in a research study	Writing report	writing finding	writing limitations	research report	Writing report
Which is the final step in report writing……..	Writing report	writing finding	writing drafts	writing limitations	writing drafts
What is usually appended to the research work	Editing	bibliography	coding	research report	bibliography
The _____ is one which gives emphasis on simplicity and attractiveness	popular report	research report	article report	writing limitations	popular report
_____ should slow originality and should necessarily be on attempt to solve some intellectual problem	Interpretation	research report	finding	draft	research report

The researcher must remain caution about the _____ that can possibly arise in the process of interpreting results	Analysis	conclusions	findings	error	error
Which one should be considered while interpreting a given data	Validity	reliability	both validity and reliability	technical jargon	reliability
_____ is asking questions face to face	Indirect method	mailed questionnaire	through post	personal interview	personal interview
Journals, books, magazines etc are useful sources of collecting----------	Primary data	secondary data	both primary and secondary data	objective	secondary data
The collected raw data to detect errors and are called,	Editing	coding	classification	all the above	Editing
The formal, systematic and intensive process of carrying on a scientific method of analysis is _____	Research Design	research	interpretation	research analysis	research
------ Refers to the process of assigning numerals or symbols to answers of response	Coding	editing	classification	all the above	Coding
The research study, which is based on describing the characteristic of a particular individual or group	Experience survey	Descriptive	Diagnostic	Exploratory	Descriptive
Research is a_____	Finding	assumption	statement	all the above	all the above
The research, which has the purpose of improving a product or a process testing theoretical concepts in actual problem situations is-------research.	Statistical	Applied	Domestic	Biological	Applied

The chart of research process indicates that the process consists of a number of ----.	Closely related activities	unrelated activities	Closely unrelated activities	moderately related activities	Closely related activities
The objective of a good design is ----------.	Maximize the bias andmaximize the reliability of data	Minimize the bias and minimize the reliability of data	Minimize the bias and maximize the reliability of data	Maximize the bias and maximize the reliability of data	Maximize the bias and maximize the reliability of data
A ---------- is used whenever a full written report of the study is required.	Popular report	Technical report	article	monograph	Technical report
The ---------- is one which gives emphasis on simplicity and attractiveness.	Popular report	Technical report	article	monograph	Popular report
Which of the following are measurements of scale?	Nominal	ordinal	interval	all the above	all the above
____Scale is a system of assigning numbers, symbols to events in order to label them.	Interval	ordinal	Nominal	ratio	Nominal
The qualitative phenomena are considered in the ---------- scale.	Ordinal	Nominal	interval	ratio	Ordinal
---------- Scales can have an arbitrary zero, but it is not possible to determine the absolute zero.	Ordinal	Nominal	interval	ratio	interval

Reg. No.....

17MMU502A

Karpagam Academy of Higher Education
Coimbatore-21
Department of Mathematics
Fifth Semester- I Internal test
Probability & Statistics

Date :□□.07.2019(FN) Time: 2 hours
Class: III B.Sc Mathematics Max Marks: 50

Answer ALL questions
PART A ($20 \times 1 = 20$ marks)

1. Two events A and B are called mutually exclusive if
   A. $A \cap B = \emptyset$ B. A and B are non disjoint
   C. $A \cap B = A$ D. $A \cap B = B$

2. Every subset of S is an event if S is
   A. finite B. infinite
   C. countable D. uncountable

3. If A and B are mutually exclusive events, $P(A \cup B) =$
   A. $P(A)P(B)$ B. $P(AB)$
   C. $P(A) + P(B)$ D. $P(A)$

4. If A and B are any two events, then $P(A) + P(B) - P(A \cap B) =$
   A. $P(A)$ B. $P(B)$
   C. $P(A \cup B)$ D. $P(\emptyset)$

5. Three horses A, B and C are in a race; A is twice as likely to win as B and B is twice as likely to win as C. Then $P(A) =$
   A. $\frac{1}{7}$ B. $\frac{4}{7}$
   C. $\frac{3}{7}$ D. $\frac{2}{7}$

6. $P(A|E) =$
   A. $\frac{P(A \cup E)}{P(E)}$ B. $P(A \cap E)P(E)$
   C. $P(A \cup E)P(E)$ D. $\frac{P(A \cap E)}{P(E)}$

7. An event B is said to be independent of an event A if $P(B) =$
   A. $P(A|B)$ B. $P(A)$
   C. $P(B|A)$ D. 0

8. A man is dealt 5 cards one after the other from an ordinary deck of 52 cards. What is the probability p that they are all spades?
   A. $\frac{33}{66640}$ B. $\frac{31}{66640}$
   C. $\frac{32}{66640}$ D. $\frac{30}{66640}$

9. If A is a subset of B, $P(B|A) =$
   A. $\frac{1}{3}$ B. 1
   C. 0 D. $\frac{1}{2}$

10. If A and B are mutually exclusive, $P(B|A) =$
    A. $\frac{1}{3}$ B. 1
    C. 0 D. $\frac{1}{2}$

11. A box contains three coins; one coin is fair, one coin is two-headed, and one coin is weighted so that the probability of heads appearing is 9. A coin is selected at random and tossed. Then the probability that heads appears =
    A. $\frac{11}{18}$ B. $\frac{1}{18}$
    C. $\frac{12}{18}$ D. $\frac{13}{18}$

12. A die is rolled three times, the probability of getting large number than the previous number is $- - -$
    A. $\frac{1}{54}$ B. $\frac{5}{54}$
    C. $\frac{5}{108}$ D. $\frac{13}{108}$

13. A pair of fair dice is tossed. Let X assign to each point (a, b) in S the maximum of its numbers. Then $P(X = 3) =$
A. $\frac{5}{36}$ B. $\frac{4}{36}$
C. $\frac{3}{36}$ D. $\frac{1}{36}$

14. If the sum of the ordinate and the abscissa of a point $P(x, y)$ is $2n$ (x, y are natural numbers), then the probability that P does not lie on the line $y = x$ is
A. $\frac{n-1}{n+3}$ B. $\frac{2n-2}{2n-1}$
C. $\frac{2n+1}{2n+3}$ D. $\frac{2n_{C_n}}{2^{2n}}$

15. From a set of 40 cards numbered 1 to 40, 5 cards drawn at random and arranged in ascending order of magnitude $x_1 < x_2 < x_3 < x_4 < x_5$. The probability that $x_3 = 24$ is $---$
A. $\frac{16_{C_2}}{40_{C_5}}$ B. $\frac{23_{C_2}}{40_{C_5}}$
C. $\frac{16_{C_2} \times 23_{C_2}}{40_{C_5}}$ D. $\frac{16_{C_2} + 23_{C_2}}{40_{C_5}}$

16. From a set of 100 cards numbered 1 to 100, one card is drawn at random. e probability that the number obtained on the card is divisible by 6 or 8 but not by 24 is $---$
A. $\frac{6}{25}$ B. $\frac{8}{25}$
C. $\frac{2}{5}$ D. $\frac{1}{5}$

17. Two circles are constructed taking two sides of a triangle as diameters, then the probability of these two circles intersecting on the 3^{rd} side of the triangle is
A. 0 B. 1
C. $\frac{1}{2}$ D. $\frac{1}{3}$

18. Suppose X is a continuous random variable. Then $P(X = x) =$
A. 0 B. ∞
C. 1 D. $-\infty$

19. If selecting an integer from a set $S = \{1, 2, 3, \cdots, 100\}$ is an random experiment, the probability that a selecting integer to be prime is
A. $\frac{1}{100}$ B. $\frac{52}{100}$
C. $\frac{25}{100}$ D. $\frac{53}{100}$

20. Let $\mathbb{Z}_{800}$ be a cyclic group with addition modulo 800. Let p the probability that selecting an element from $\mathbb{Z}_{800}$ of order is 8. Then $p =$
A. $\frac{1}{800}$ B. $\frac{2}{800}$
C. $\frac{3}{800}$ D. $\frac{4}{800}$

Part B-($3 \times 10 = 30$ **marks)**

21. a) State and prove multiplication theorem

OR

b) State and prove Baye's lemma

22. a) A box contains three coins, two of them fair and one two-headed. A coin is selected at random and tossed. If heads appears the coin is tossed again; if tails appears, then another coin is selected from the two remaining coins and tossed.
(i) Find the probability that heads appears twice.
(ii) If the same coin is tossed twice, find the probability that it is the two-headed coin.

(iii) Find the probability that tails appears twice.

OR

b) A fair coin is tossed until a head or five tails occurs. Find the expected number of tosses of the coin.

23. a) Let X be a continuous random variable whose distribution f is constant on an interval, say $I = \{a \leq x \leq b\}$, and 0 elsewhere:

$$f(x) = \begin{cases} k & \text{if } a \leq x \leq b \\ 0 & \text{elsewhere} \end{cases} .$$

Then (i) Determine k. (ii) Find the mean of X. (iii) Determine the cumulative distribution function F of X.

OR

b) A fair die is tossed. Let X denote twice the number appearing, and let Y denote 1or 3 according as an odd or an even number appears. Find the distribution, expectation, variance and standard deviation of (i) X, (ii) Y, (iii) $X + Y$, (iv) XY.

Reg. No.....

17MMU502A

Karpagam Academy of Higher Education
Coimbatore-21
Department of Mathematics
Fifth Semester- II Internal test-July 2019
Probability & Statistics

Date :28.08.2019(AN) Time: 2 hours
Class: III B.Sc Mathematics Max Marks: 50

Answer ALL questions
PART A ($20 \times 1 = 20$ marks)

1. The characteristic function of a r.v X is
   a. $E[e^{itX}]$ b. $E[e^{tX}]$
   c. $E[e^{-itX}]$ d. $E[e^{-tX}]$

2. $|\phi(t)|$
   a. ≤ 1 b. < 1
   c. $= 1$ d. $= 0$

3. $\phi(0) =$
   a. 0 b. 1
   c. 2 d. 3

4. $\phi(-t) =$
   a. $-\phi(t)$ b. $\phi(t)$
   c. $\overline{\phi(t)}$ d. $-\overline{\phi(t)}$

5. The central moment of the second order of Poisson distribution is
   a. $\sqrt{\lambda}$ b. $\frac{1}{\lambda}$
   c. λ d. 0

6. Suppose X follows a normal distribution. Then $m_{1003} =$
   a. 0 b. 1
   c. 2 d. 3

7. Suppose X follows a normal distribution. Then $m_4 =$
   a. 0 b. 1
   c. 2 d. 3

8. $\phi(t)$ is a characteristic function of X, then the characteristic function of $Y = X + b$ is
   a. $b\phi(t)$ b. $\phi(tb)$
   c. $e^{itb}\phi(t)$ d.$e^{itb}\phi(tb)$

9. If X is a continuous r.v with c.f $\phi(t)$. then $\int_{-\infty}^{+\infty} e^{-itx}\ \phi(t)\ dt =$
   a. $F(x)$ b. $f(x)$
   c. $F'(x)$ d.$f'(x)$

10. The random varaible X has a one-point distribution if there exists a point x_0 such that $P(X = x_0) =$
    a. 0 b. 1
    c. 2 d. 3

11. If a r.v X has a one point distribution, then variance of X=
    a. 0 b. 1
    c. 2 d. 3

12. Suppose X is a standardized r.v then $E[X] =$
    a. 0 b. 1
    c. 2 d. 3

13. If X has symmetry distribution then center of symmetry=
    a. $Var(X)$ b. $E(X)$
    c. $E(X^2)$ d. 0

14. If X is a discrete r.v with $P(X = 1) = p$ and $P(X = 0) = 1 - p$ $(0 < p < 1)$, $m_{100} =$
    a. $p - 1$ b. p
    c. $1 - p$ d. 0

15. The c.f of Poisson distribution is
    a. $e^{\lambda t}$ b. $e^{\lambda(e^{it}-1)}$
    c. $e^{\lambda e^{it}}$ d. $3t$

16. In a Poisson distribution, $m_1 - m_2$
    a. 0 b. 1
    c. 2 d. 3

17. Suppose X follows a normal distribution. Then $\mu_{1003} =$
    a. 0 b. 1
    c. 2 d. 3

18. Suppose X follows a normal distribution. Then $\mu_4 =$
    a. 0 b. 1
    c. 2 d. 3

19. Gamma function defined for
    a. $p \geq 0$ b. $p > 0$
    c. $p < 0$ d.$p \leq 0$

20. The mean value of a Gamma distribution is
    a. p b.b
    c. p/b d. b/p

Part B-($3 \times 2 = 6$ **marks)**

21. Define exponential random variable

22. Define binomial random variable

23. Define Gamma distribution

Part C-($3 \times 8 = 24$ **marks)**

24. a) If X has an expoential distribution with mean find $P(X < 1|X < 2)$

OR

b) State and prove Markov property of exponential distribution

25. a) Let X and Y be integer valued random variables with $P(X = m, Y = n) = q^2p^{m+n-2}$, $m, n = 1, 2, \cdots$ with $p + q = 1$. Are X and Y independent?

OR

b) Find the characteirstic function and moments of a r.v with density function $f(x) = \frac{1}{\sqrt{2\pi}}e^{-\frac{x^2}{2}}$

26. a) Prove that Poisson distribution is the limit of a sequence of probability functions of the binomial distribution

OR

b) Define normal distribution and find the characteristic function of normal distribution