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Question Bank

Class: S.Y.B. Sc.IT **Semester: IV**

Subject: Computer Oriented Statistical Techniques

UNIT 1

1 If $5, 8, 6\ and\ 2$ occur with frequencies 3, 2, 4 and 1 respectively, the arithmetic mean is
   a) 5.7
   b) 7.5
   c) 5
   d) 7

2 The coding method for computing the mean is given by
   a) $\underline{X} = A + \frac{\Sigma \quad fu}{N}$
   b) $\underline{X} = A + \frac{\Sigma \quad fu}{N} c$
   c) $\underline{X} = A + \frac{\Sigma \quad fd}{N}$
   d) $\underline{X} = \frac{\Sigma \quad fu}{N}$

3 The median of set of numbers 5, 5, 7, 9, 11, 12, 15 and 18 is
   a) 7
   b) 8
   c) 9
   d) 10

4 The relation between mean, median and mode is
   a) Mean−median = 3 mode
   b) Mean−Mode= 3(Mean-Median)
   c) Mean−$Mode = Mean - Median$
   d) $Median - Mode = Mean$

5 The formula for finding mode for grouped data is
   a) $Mode = L_1 + \left(\frac{\Delta_1}{\Delta_1 + \Delta_2}\right) c$
   b) $Mode = L_1 + \left(\frac{\Delta_1}{\Delta_1 - \Delta_2}\right) c$

c) $Mode = L_1 - \left(\frac{\Delta_1}{\Delta_1+\Delta_2}\right) c$

d) $Mode = L_1 + \left(\frac{\Delta_1}{\Delta_1+\Delta_2}\right)$

6 The following formula is for

$$\sqrt[N]{x_1 x_2 x_3 \dots \dots \dots . . x_N}$$

a) Arithmetic Mean
b) Geometric Mean
c) Harmonic Mean
d) Root Mean Square

7 If H is harmonic mean, G is geometric mean and A is arithmetic mean then the relation between them is given by

a) G <= A <= H
b) A <= G <= H
c) H<= G <= A
d) A <= H <= G

8 The root mean square of the set of numbers 1, 3, 4, 5 and 7 is

a) 4
b) 4.47
c) 5.57
d) 6

9 Two variables X and Y assumes the values $x_1 = 2, x_2 = -5, x_3 = 4, x_4 = -8$ and $y_1 = -3, y_2 = -8, y_3 = 10, y_4 = 6$ respectively then the value of $\sum \quad XY^2$

a) 190
b) 200
c) -190
d) -200

10 A student's final grades in mathematics, physics, English and hygiene are respectively 82, 86, 90 and 70. If the respective credits received for these courses are 3, 5, 3 and 1. Determine an appropriate average grade

a) 82
b) 83
c) 84
d) 85

11 Find the median weight of the 40 male college students at State university

Weight (lb)	Frequency
$118 - 126$	3
$127 - 135$	5
$136 - 144$	9
$145 - 153$	12
$154 - 162$	5
$163 - 171$	4
$172 - 180$	2
Total	40

a) 140
b) 146.8
c) 100.2
d) 40

12 The number of ATM transaction per day were recorded at 15 locations in a large city were: 35, 49, 225, 50, 30, 65, 40, 55, 52, 76, 48, 325, 47, 32 and 60. Then the median number of transactions are

a) 30
b) 50
c) 65
d) 52

13 formula for calculating arithmetic mean for group data

a) $\sum \frac{x_i}{N}$
b) $\sum \frac{f_i x_i}{N}$
c) $\sum \frac{f_i}{N}$
d) $\sum \frac{5x_i}{N}$

14 Standard deviation is _____of variance

a) Square
b) Cube
c) Square root
d) Cube root

15 What is mode of distribution of Numbers: 1,1,1,2,2,3,3,3,4,5,7,7

a) 1 and 3
b) 2 and 7
c) Only 1
d) 4 and 5

16 The root mean square of Numbers 1,2,3,4 is

a) 55
b) 11

c) $\sqrt{55}$
d) $\sqrt{11}$

17 The mean deviation of 2,3,7
a) 2
b) 3
c) 7
d) 4

18 $If\ N\ =\ 100, \sum fx\ = 6745\ and\ \sum fx^2\ =\ 455803\ then\ the\ standard\ deviation\ is$
a) 8.5275
b) 2.9201
c) 2
d) 8

19 The value of P[redacted]$_{25}$ is 24.5 then the value of Q_1 is given by
a) 49
b) 12.25
c) 24.5
d) 0

20 The median of following data is

Size	5	6	7	8	9	10	11	12	13
Frequency	48	52	56	60	63	57	55	50	52

a) 9
b) 10
c) 11
d) 12

21 The standard deviation of the heights of 10 students is

Heights in cm	161	162	160	163	160	163	164	164	170	164

a) 160.2
b) 161.56
c) 162.62
d) 165

22 If X is {1,2,3} and Y is {2,1,3} then ∑XY is
a) 36
b) 13
c) 7
d) 14

23 If mean = 40 and standard deviation is 50 then value of coefficient of variance is

a) 2.25
b) 1
c) 0
d) 1.25

24 Which of the following statements is always true?
a) The mean has an effect on extreme scores
b) The median has an effect on extreme scores
c) Extreme scores have an effect on the mean
d) Extreme scores have an effect on the median

25 The frequency distribution of the hourly wage rate of 60 employees of a paper mill is as follows:

Wage rate (Rs.)	54-56	56-58	58-60	60-62	62-64
Number of workers	10	10	20	10	10

The mean wage rate is:
a) $RS.58.60$
b) $RS.59.00$
c) $RS.57.60$
d) $RS.57.10$

26 When the values in a series are not of equal importance, we calculate the:
a) Arithmetic mean
b) Geometric mean
c) Weighted mean
d) Mode

27 If any value in a series is negative, then we cannot calculate the:
a) Mean
b) Median
c) Geometric mean
d) Harmonic mean

28 The ratio among the number of items and the sum of reciprocals of items is called:
a) Arithmetic mean
b) Geometric mean
c) Harmonic mean
d) Mode

29 For calculation of D_7 we use
a) $N/10$
b) $3N/100$
c) $7N/10$
d) $N/30$

30 Which of the following is a positional average?

a) Arithmetic mean
b) Median
c) Geometric mean
d) Harmonic mean

31 If the arithmetic mean and the geometric mean of two numbers are 4 and 2 respectively, then their harmonic mean is

a) 1
b) 1/8
c) 8
d) 2

32 Suppose that for a data set mean and mode are 5 and 2 respectively then the median is

a) 2
b) 3
c) 4
d) 5

33 Fifth decile of a distribution coincides with

a) First quartile
b) Second quartile
c) Third quartile
d) Fifth percentile

34 The arithmetic mean of 10 observations is 13.46 and if each observation is increased by 2 then the mean of resulting data set is

a) Increased by 2
b) Increased by 0.2
c) Increased by 20
d) Increased by 5

35 In a class of 100 students, the arithmetic mean of amount of pocket money is Rs. 35 per student. If the arithmetic mean is Rs. 25 for girls and Rs. 50 for boys, then the number of girls in the class will be

a) 20
b) 40
c) 60
d) 80

36 The standard deviation of first n natural number is

a) $\frac{n(n+1)(2n+1)}{6}$
b) $\frac{(n^2-1)}{12}$
c) $\sqrt{\frac{n^2-1}{12}}$

d) $n^2 - 1$

37 If the standard deviation of the numbers 2, 4, 5 and 6 is a constant say α, the standard deviation of the numbers 4, 6, 7 and 8 is

a) $(\alpha + 2)$
b) α
c) 2α
d) $\sqrt{2\alpha}$

38 The quartile deviation includes

a) Middle 50 percent of the data observations
b) All the data observations
c) First 50 percent of the data observations
d) Least 50 percent of the data observations

39 Assuming the variance of three numbers a, b and c as 9, the variance of numbers 5a, 5b and 5c is

a) 45
b) 5/9
c) 9/5
d) 225

40 Which of the following measures of dispersion is based on all the data observations?

a) Range
b) Inter-quartile range
c) 10-90 percentile range
d) Standard deviation

41 Suppose the ages (in years) of 5 patients admitted in a hospital are 7, 62, 35, 40, 43 and their corresponding blood pressure (in mm/Hg) are 110, 120, 90, 150 and 95. To compare the consistency in ages and blood pressure we shall use:

a) Any absolute measure of dispersion
b) Any relative measure of dispersion
c) Any of the absolute or relative measure of dispersion
d) Consistency of ages and blood pressures cannot be compared

42 Of the following which is not a measure of dispersion

a) Range
b) Standard deviation
c) Median
d) Quartile deviation

43 Which of the following depends only on extreme values of given observations?

a) Range
b) Quartile deviation
c) Standard deviation
d) Mean deviation

44 If $\sum f = 20, \sum fx = 1 \; and \; \sum fx^2 = 29$ then V(X) is

a) 1.45

b) 1.65
c) 1.85
d) 2.05

45 A car travels 25 miles at 25 miles per hour (mi/h), 25 miles at 50 mph, and 25 miles at 75 mph. Find the harmonic mean of the three velocities.
a) 50
b) 40.9
c) 25
d) 150

46 If the absolute dispersion is the standard deviation s and if the average is the mean X, then the relative dispersion is called the
a) Coefficient of variation
b) Coefficient of skewness
c) Coefficient of moment of kurtosis
d) Mean deviation

47 Answer of P_{20} lies in the range of

Maximum Load	No. of cables
9.3-9.7	2
9.8-10.2	5
10.3-10.7	12
10.8-11.2	17
11.3-11.7	14
11.8-12.2	6
12.3-12.7	3
12.8-13.2	1

a) 11.25-11.75
b) 10.75-11.25
c) 9.75-10.25
d) 10.25-10.75

48 Semi-interquartile Range = 2/3 (_____)
a) Mean
b) Median
c) Standard deviation
d) Quartile deviation

49 Mean deviation = _____ (Standard Deviation)
a) 5/4
b) 4/5
c) 3/5
d) 5/3

50 _____ of the cases are included between Mean ± Standarad Deviation.
a) 90%
b) 80%
c) 74.27%

d) 68.27%

Q. UNIT 2

1 For a perfectly symmetrical curve, the Pearson's first coefficient of skewness is
   a) 0
   b) 1
   c) -1
   d) 3

2 A negative value of coefficient of skewness implies that
   a) Mode is more than the arithmetic mean
   b) Arithmetic mean is same as median
   c) Arithmetic mean is same as mode
   d) Mode is less than the arithmetic mean

3 When moment coefficient of skewness is negative, the distribution is said to be
   a) Leptokurtic
   b) Mesokurtic
   c) Platykurtic
   d) Negatively skewed distribution

4 For a mesokurtic curve, kurtosis of the distribution is
   a) 3
   b) -3
   c) 2
   d) -2

5 Kurtosis is used to find the
   a) Symmetry of the distribution
   b) Peak of the distribution
   c) Dispersion of the distribution
   d) Central value of the distribution

6 The sum of a set of 100 observations is 4000 and the sum of their squares is 1625000 and the median is 41, then the coefficient of skewness is
   a) -0.6
   b) -0.5
   c) 0
   d) -1

7 The first moment about the mean is
   a) 0
   b) 1
   c) 2
   d) 32

8 The second moment about the origin zero of the set 2, 3, 5, 7, 8, 10 is
   a) 0
   b) 2
   c) 45.2

d) 45

9 Choose the correct relationship between raw moment and central moment

a) $m_2 = m_2' - (m_1')^2$
b) $m_2 = m_2' - 2(m_1')^2$
c) $m_3 = m_3' + 3m_1'm_2' + 2(m_1')^3$
d) $m_3 = m_3' - 6m_1'm_2' + 2(m_1')^3$

10 Quartile coefficient of skewness is given by

a) $\frac{Q_3-2Q_2+Q_1}{Q_3-Q_1}$
b) $\frac{Q_3-5Q_2+Q_1}{Q_3-Q_1}$
c) $\frac{P_3-2P_2+P_1}{P_3-P_1}$
d) $\frac{D_3-2D_2+D_1}{D_3-D_1}$

11 The fourth moments for the set 4, 7, 5, 9, 8, 3, 6

a) 1876
b) 2495
c) 2188
d) 3396

12 Moment coefficient of skewness a_3 is

a) $\frac{m_2}{s^2}$
b) $\frac{m_1}{s^3}$
c) $\frac{m_3}{s}$
d) $\frac{m_3}{s^3}$

13 Moment coefficient of kurtosis a_4 is

a) $\frac{m_4}{s^4}$
b) $\frac{m_1}{s}$
c) $\frac{m_3}{s^3}$
d) $\frac{m_2}{s^4}$

14 Percentile coefficient of kurtosis k

a) $\frac{Q}{p_{90}-p_{10}}$
b) $p_{90} - p_{10}$
c) $\frac{1}{2}(Q_3 - Q_1)$
d) $Q_3 - Q_1$

15 Find the probability of a 4 turning up at least once in two tosses of a fair die

a) 1/9
b) 5/18

c) 8/18
d) 11/36

16 Two cards are drawn from a well-shuffled ordinary deck of 52 cards. Find the probability that they are both aces if the first card is replaced.
a) 2/169
b) 1/169
c) 4/169
d) 8/169

17 If it rains, an umbrella salesman can earn $30 per day. If it is fair, he can lose $6 per day. What is his expectation if the probability of rain is 0.3?
a) 4.8
b) 12
c) 18
d) 10.8

18 Let E_1 and E_2 be two independents' events with $P(E_1 \cup E_2) = 0.7$ and $P(E_1) = 0.5$, then $P(E_2) =$
a) 0.4
b) 0.5
c) 0.6
d) 0.7

19 If for two events E_1 and E_2, $P(E_1 \cap E_2) = 0.5$, $P(E_1^c \cap E_2^c) = 0.5$ and $2P(E_1) = P(E_2) = \alpha$ ($a\ constant$) then the value of α is
a) 1/3
b) ¼
c) 2/3
d) 3/4

20 A student appears for three tests. The student is considered successful if he passes either in first and second test or in first and third test. The probability that the student passes in first, second and third tests are α, β and 0.5 respectively. If the probability that the student is successful is 0.5 then
a) $\alpha = 1, \beta = 0$
b) $\alpha = \beta = 1$
c) $\alpha = 0, \beta = 1$
d) $\alpha = \beta = 0.25$

21 Suppose a random variable X has the following probability distribution

X	0	1	2	3
P(X=x)	0.1	0.3	0.4	0.2

Then expected value of the random variable X is:
a) 1
b) 1.5
c) 1.7
d) 0.9

22 A software company has received the demand of statistical analyst each from its three

departments- Human Resource, Research and Development and Quality maintenance. There are 6 applicants available for this job. In how many ways three statistical analyst be selected from six applicants and assigned to three departments?

a) 20
b) 60
c) 120
d) 240

23 Three officers of the same rank are recruited in an organization. Determine the number of ways by which three different officers be assigned to these three officers:

a) 3
b) 6
c) 9
d) 27

24 A ball is drawn at random from a box containing 6 red balls, 4 white balls and 5 blue balls. The probability of drawing not red ball is

a) 1/5
b) 2/5
c) 3/5
d) 4/5

25 If A and B are two independent events then

a) $P(A \cap B) = P(A).P(B)$
b) $P(A \cup B) = P(A).P(B)$
c) $P(A \cap B) = P(A).P(B|A)$
d) $P(A \cup B) = P(A).P(B|A)$

26 How many four digit numbers can be formed with 10 digits 0, 1, 2,……,9 if repetitions are allowed

a) 1000
b) 4000
c) 7000
d) 9000

27 In how many ways can a committee of 5 people be chosen out of 9 people?

a) 126
b) 120
c) 11
d) 110

28 Five cards are drawn from a pack of 52 well shuffled cards. The probability of drawing 4 ace cards is

a) 1/54145
b) ¼
c) 1/25
d) 1/52

29 In how many ways can 7 people be seated at a round table if they can sit anywhere?

a) 6!

b) $7!$
c) $8!$
d) $5!$

30 Four different mathematics books, 6 different physics books, and 2 different chemistry books are to be arranged on a shelf. How many different arrangements are possible if the books in each particular subjects must stand all together?
a) $4!\,6!\,2!\,3!$
b) $8!\,6!\,2!\,3!$
c) $4!\,12!\,2!\,3!$
d) 2560

31 If A and B are mutually exclusive events then
a) $P(A+B) = P(A) + P(B)$
b) $P(A \cap B) = \emptyset$
c) $P(A \cup B) = P(A).P(B)$
d) $P(A+B) = P(A) + P(B) - P(A \cap B)$

32 There are 30 people in a group. If all shake hands with one another, how many handshakes are possible?
a) 870
b) 435
c) 30!
d) 29! + 1

33 In how many ways can we arrange the word 'FUZZTONE' so that all the vowels come together?
a) 1440
b) 6
c) 2160
d) 4320

34 In Cricket League, in first round every team plays a match with every other team. 9 teams participated in the Cricket league. How many matches were played in the first round?
a) 36
b) 72
c) 9!
d) $9! - 1$

35 It is required to seat 5 men and 4 women in a row so that the women occupy the even places. How many such arrangements are possible?
a) 5040
b) 120
c) 2880
d) 5

36 The mean of the sampling distribution of standard deviation from a finite population without replacement is given by

a) $\sigma_{\underline{x}} = \frac{\sigma}{\sqrt{N}}\sqrt{\frac{N_P - N}{N_P - 1}}$
b) $\sigma_{\underline{x}} = \frac{\sigma}{\sqrt{N}}$
c) $\sigma_{\underline{x}} = \sigma$
d) $\sigma_{\underline{x}} = \frac{\sigma}{N}$

37 The mean $\underline{x}$ of a sample in standard units is given by
a) $z = \frac{\underline{X} - \mu_{\underline{X}}}{\sigma_{\underline{X}}}$
b) $z = \frac{\underline{X} + \mu_{\underline{X}}}{\sigma_{\underline{X}}}$
c) $z = \underline{X} - \sigma_{\underline{X}}$
d) $z = \underline{X} + \sigma_{\underline{X}}$

38 A population consists of the five numbers 2, 3, 6, 8 and 11. The mean of the population is
a) 6.0
b) 5.0
c) 2.0
d) 3.0

39 A population consists of the four numbers 3, 7, 11 and 15. Consider all possible samples of size 2 that can be drawn with replacement from this population then the mean of the sampling distribution of means is given by
a) 3
b) 15
c) 9
d) 19

40 The election returns showed that a certain candidate received 46% of the votes. The probability that a poll of 200 people selected at random from the voting population would have shown a majority of votes in favour of the candidate

$$(z_{1.21} = 0.3869)$$

a) 0.1131
b) 0.2231
c) 0.3331
d) 0.4431

41 It has been found that 2% of the tools produced by a certain machine are defective. The probability that in a shipment of 400 such tools 3% or more will prove defective?

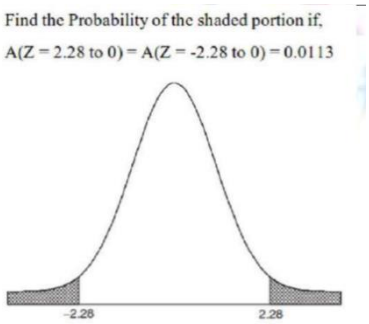
$$(z_{1.25} = 0.1056)$$

a) 0.1056
b) 0.5714
c) 0.0036
d) 0.0025

42 The sampling error is defined as?

a) Difference between population and parameter
b) Difference between sample and parameter
c) Difference between population and sample
d) Difference between parameter and sample

43



a) -0.0226
b) -0.0113
c) 0
d) 0.0226

44 The mean of sampling distribution of the difference of means for two independent and infinite populations with means and standard deviation $(\mu_1, \sigma_1) and\ (\mu_2, \sigma_2)$ respectively is

a) $(\mu_1 - \mu_2)$
b) $(\mu_1 + \mu_2)$
c) $(\mu_1 + \mu_2 - 2\mu_1\mu_2)$
d) $(\mu_1 + \mu_2 + 2\mu_1\mu_2)$

45 The standard deviation of a sampling distribution of a statistic is called its

a) Root mean square
b) Standard error
c) Second moment about mean
d) Third moment about mean

46 The sampling distribution of means is considered to be nearly normal even when the underlying population is non-normal for a sample of size

a) Less than 30
b) Less than 50
c) More than or equal to 30
d) More than or equal to 50

47 For an infinite population the sampling distribution of median is

a) Very nearly normal
b) Very nearly normal only if the underlying population is normal (or approximately normal)
c) A positively skewed distribution
d) A negatively skewed distribution

48 The unknown population quantities associated with the population are often called

a) Statistic

b) Standard error
c) Parameter
d) Normal distribution

49 The sampling distribution of mean for a sample drawn from a normally distributed population is
a) Normally distributed
b) Has a mean equal to the population mean
c) Has a standard deviation equal to the population standard deviation divided by the square root of the sample size
d) All of the above

50 Ball bearings of a given brand weigh 0.50 g with a standard deviation of 0.02 g. What is the probability that two lots of 1000 ball bearings each will differ in weight by more than 2 g? Use (probability ($Z \geq 2.23$) = probability ($Z \leq - 2.23$) = 0.4871)
a) 0.4871
b) 0.0258
c) 0.9742
d) 0.0129

Q UNIT 3

1 A value of an estimator is called:
a) Estimation
b) Estimate
c) Variable
d) Constant

2 The type of estimates are:
a) Point estimate
b) Interval estimate
c) Estimation of confidence region
d) All of the above

3 Estimation is of two types:
a) One sided and two sided
b) Type I and type II
c) Point estimation and interval estimation
d) Biased and unbiased

4 A 95% confidence interval for the mean of a population is such that:
a) It contains 95% of the values in the population
b) There is a 95% chance that it contains all the values in the population
c) There is a 95% chance that it contains the mean of the population
d) There is a 95% chance that it contains the standard deviation of the population

5 If the population standard deviation σ is known and the sample size n is equal to or

more than 30, the confidence interval for the population mean μ is:

a) $\underline{X} \pm z_{\frac{\alpha}{2}}\left(\frac{\sigma}{\sqrt{N}}\right)$

b) $\underline{X} \pm z_{\frac{\alpha}{2}}\left(\frac{s}{\sqrt{N}}\right)$

c) $\underline{X} \pm t_{\frac{\alpha}{2}}\left(\frac{s}{\sqrt{N}}\right)$

d) $p \pm z_{\frac{\alpha}{2}}\sqrt{\frac{pq}{N}}$

6 The following statistics are unbiased estimators:

a) The sample Mean

b) The sample variance $s^2 = \sum \frac{(x-\underline{x})^2}{n-1}$

c) The sample Proportion

d) All of the above

7 Which of the following is biased estimator?

a) $\underline{X} = \frac{\sum x}{n}$

b) $p = \frac{x}{n}$

c) $s^2 = \sum \frac{(x-\underline{x})^2}{n-1}$

d) $s^2 = \sum \frac{(x-\underline{x})^2}{n}$

8 (1 – α) is called:

a) Critical value

b) Level of significance

c) Level of confidence

d) Interval estimate

9 The end points of a confidence interval are called:

a) Confidence coefficient

b) Confidence limits

c) Error of estimation

d) Parameters

10 The probability associated with confidence interval is called:

a) Level of confidence

b) Confidence coefficient

c) Both (a) and (b)

d) Confidence limits

11 A statement made about a population for testing purpose is called?

a) Statistics

b) Hypothesis
c) Level of significance
d) T-statistics

12 If the assumed hypothesis is tested for rejection considering it to be true is called?
a) Null Hypothesis
b) Statistical Hypothesis
c) Simple Hypothesis

Composite Hypothesis

13 The rejection probability of Null Hypothesis when it is true is called as?
a) Level of Confidence
b) Level of significance
c) Level of Margin
d) Level of Rejection

14 The point where the Null Hypothesis gets rejected is called as?
a) Significant Value
b) Rejection Value
c) Acceptance Value
d) Critical Value

15 Consider a hypothesis H_0 where $u_0 = 5$ against H_1 where $u_0 > 5$. The test is?
a) Right tailed
b) Left tailed
c) Centre tailed
d) Cross tail

16 Type 1 error occurs when?
a) We reject H_0 if it is False
b) We accept H_0 if it is True
c) We reject H_0 if it is True
d) We accept H_0 if it is False

17 The probability of Type 1 error is referred as?
a) $1 - \alpha$
b) β
c) α
d) $1 - \beta$

18 Alternative Hypothesis is also called as?
a) Composite hypothesis
b) Research Hypothesis

c) Simple Hypothesis
d) Null Hypothesis

19 A type II errors occur when we
a) Reject a false null hypothesis
b) Reject a true null hypothesis
c) Do not reject a false null hypothesis
d) Do no reject a true null hypothesis

20 The p-value of a test is the: …
a) Smallest significance level at which the null hypothesis cannot be rejected
b) Largest significance level at which the null hypothesis cannot be rejected
c) Smallest significance level at which the null hypothesis can be rejected
d) Largest significance level at which the null hypothesis can be rejected

21 If the mean of the sampling distribution of a statistic equals the corresponding population parameter, the statistic is called an _____.
a) biased Estimator
b) unbiased estimator
c) efficient estimator
d) inefficient estimator

22 If the sampling distributions of two statistics have the same mean (or expectation), then the statistic with the smaller variance is called an _____ of the mean,
a) biased Estimator
b) unbiased estimator
c) efficient estimator
d) inefficient estimator

23 Sample mean is _____estimate of population mean
a) biased
b) unbiased
c) inefficient
d) efficient

24 If we say that distance is 3.23 ± 0.02m, then we are giving _____
a) point estimate
b) interval estimate
c) efficient estimate
d) inefficient estimate

25 If we say that distance is 5.72cm, then we are giving _____
a) point estimate
b) interval estimate
c) efficient estimate

d) inefficient estimate

26 We can expect to find μ_s in the interval $S \pm 1.96\ \sigma_s$ about ____of time.

a) 50%
b) 75%
c) 95%
d) 99%

27 The value of z_c for 99% confidence level is given by _____

a) 1.96
b) 2.00
c) 2.33
d) 2.58

28 An estimate of a population parameter given by a single number is called _____of the parameter

a) point estimate
b) interval estimate
c) efficient estimate
d) inefficient estimate

29 A random sample of 100 students from ABC university has mean 68 inches and Standard deviation 3.23 in then 95% confidence limit for population mean is given by

a) 68 ± 0.633 in
b) 3.23 ± 0.633 in
c) 68 ± 0.833 in
d) 3.23 ± 0.833 in

30 A random sample of 100 students from ABC university has mean height 68 inches and Standard deviation 3.23 in then 99% confidence limit for population mean is given by

a) 68 ± 0.633 in
b) 3.23 ± 0.633 in
c) 68 ± 0.833 in
d) 3.23 ± 0.833 in

31 A sample poll of 100 voters chosen at random from all voters in a given district indicated that 58% of them were in favor of a particular candidate then 95% confidence limit for the proportion of all the voters in favor of this candidate is given by ____.

a) 0.58 ± 0.063
b) 0.42 ± 0.063
c) 0.58 ± 0.0825
d) 0.42 ± 0.0825

32 A sample poll of 100 voters chosen at random from all voters in a given district

indicated that 58% of them were in favor of a particular candidate then 99% confidence limit for the proportion of all the voters in favor of this candidate is given by ____.

a) 0.58 ± 0.063
b) 0.42 ± 0.063
c) 0.58 ± 0.0825
d) 0.42 ± 0.0825

33 The value of z_c for 50% confidence level is given by ___

a) 1.5
b) 0.6745
c) 0.95
d) 0.99

34 The Quantity $0.6745\sigma_s$ is also called as _____

a) Standard error
b) Probable error
c) Human error
d) Calculation error

35 The voltages of 50 batteries of the same type have a mean of 18.2 volts (V) and a standard deviation of 0.5 V then the probable error is _____

a) 0.6745 V
b) 18.2 V
c) 0.5 V
d) 0.048 V

36 If value of test statistic is calculated as 3.02 where as critical value at 95% is 1.96 then Null Hypothesis is to be _____.

a) Rejected
b) Accepted
c) True
d) Data is insufficient.

37 Consider a hypothesis H_0 where $u_0 = 7$ against H_1 where $u_0 < 7$. The test is?

a) Right tailed
b) Left tailed
c) Centre tailed
d) Cross tail

38 The Critical value of z for significance level 0.05 for one tailed test is

a) 1.96
b) 1.645
c) 2.33
d) 2.58

39 The Critical value of z for significance level 0.05 for two tailed test is

a) 1.96
b) 1.645
c) 2.33
d) 2.58

40 The breaking strengths of cables produced by a manufacturer have a mean of 1800 pounds (lb) and a standard deviation of 100 lb. By a new technique in the manufacturing process, it is claimed that the breaking strength can be increased. To test this claim, a sample of 50 cables is tested and it is found that the mean breaking strength is 1850 lb. then the z score for testing hypothesis is _____.

a) 2.55
b) -2.55
c) 3.55
d) -3.55

41 While testing hypothesis $H_0 : \mu = 18$ vs $H_1: \mu \neq 18$ the z-score is computed to be 2.05 then at significant level 0.05 we will

a) Accept H_0 and reject H_1
b) Accept H_1 and reject H_0
c) Reject H_0 as well as H_1
d) Accept H_0 as well as H_1

42 If for testing Hypothesis using two tailed test, the z-score is computed to be – 1.43 then p-value is given by _____

a) $P(Z < -1.43)$
b) $P(Z > -1.43)$
c) $P(Z < -1.43) + P(Z > 1.43)$
d) $P(-1.43 < Z < 1.43)$

43 If p-value for testing certain hypothesis is calculated as 0.0436 then at Significant level 0.01

a) Accept H_0 and reject H_1
b) Accept H_1 and reject H_0
c) Reject H_0 as well as H_1
d) Accept H_0 as well as H_1

44 If p-value for testing certain hypothesis is calculated as 0.0357 then at Significant level 0.05

a) Accept H_0 and reject H_1
b) Accept H_1 and reject H_0
c) Reject H_0 as well as H_1
d) Accept H_0 as well as H_1

45 An examination was given to two classes consisting of 40 and 50 students,

respectively. In the first class the mean grade was 74 with a standard deviation of 8, while in the second class the mean grade was 78 with a standard deviation of 7. To test the Hypothesis that There is significant difference in Performance of two classes, the z score is given by ____

a) 1.49
b) -1.49
c) 2.49
d) -2.49

46 To test the Hypothesis that 40% people receive their salary in their bank account, a sample of 100 people were interviewed and it was found out that 34% of them receive their salary in bank account, then the value of z-score is given by _____

a) 1.225
b) -1.225
c) 1.525
d) -1.525

47 To test the claim that average height of students in university of pune is 170cm and Standard deviation 6.42 cm, A random sample of 50 students from pune university has mean height 165 cm then value of z score is given by _____

a) -5.507
b) -4.507
c) 4.507
d) 5.507

48 The formula to find z score for means from sample of size N, where sample mean is $\underline{X}$, population mean is μ and standard deviation σ is given by

a) $z = \frac{\underline{X}-\mu}{\sigma}$
b) $z = \frac{\underline{X}-\mu}{\frac{\sigma}{\sqrt{N}}}$
c) $z = \frac{(\underline{X}-\mu)}{N\sigma}$
d) $z = \frac{\underline{X}-\mu}{\frac{\sigma}{N}}$

49 The formula to find z score for proportions from sample of size N, the proportion from sample is P and proportions from population is p, is given by

a) $z = \frac{P-p}{pq/N}$
b) $z = \frac{(P-p)}{Npq}$
c) $z = \frac{P-p}{\sqrt{\frac{pq}{N}}}$
d) $z = \frac{Npq}{P-p}$

50 If p-value < α (significance level) then the Null Hypothesis is _____.

a) Rejected
b) Accepted
c) Rejected in One tailed test but accepted in two tailed test.
d) Accepted in one tailed test but rejected in two tailed test.

Q UNIT 4

1 In Students t distribution, the value of Statistic is given by the formula

a) $t = \frac{\hat{X} - \mu}{\sigma/\sqrt{N}}$
b) $t = \frac{\hat{x} - u}{\hat{s}/\sqrt{N}}$
c) $t = \frac{\hat{X} - \mu}{\sigma/\sqrt{N-1}}$
d) $t = \frac{\hat{X} - \mu}{\hat{s}/\sqrt{N-1}}$

2 In students t distribution, the degree of freedom is given by

a) N
b) $N - 1$
c) μ
d) $\mu - 1$

3 What is the criteria to determine whether sample is small sample?

a) $N > 30$
b) $N < 30$
c) $N = 30$
d) $N = 100$

4 95% confidence interval for t is

a) $-t_{0.975} < \frac{\hat{X}-\mu}{s}\sqrt{N-1} < t_{0.975}$
b) $-t_{0.95} < \frac{\hat{X}-\mu}{s}\sqrt{N-1} < t_{0.95}$
c) $-t_{0.95} < \frac{\hat{X}-\mu}{s} < t_{0.95}$
d) $-t_{0.975} < \frac{\hat{X}-\mu}{\sigma}\sqrt{N} < t_{0.975}$

5 The value $t_{0.975}$ represents

a) 95th percentile value of students t distribution
b) 97.5th percentile value of students t distribution
c) 5th percentile value of students t distribution
d) 2.5th percentile value of students t distribution

6 A sample of 10 measurements of the diameter of a sphere gave a mean $\hat{X} = 438$

centimetres (cm) and a standard deviation s = 0.06 cm. then no. of degrees of freedom in t distribution is given by

a) $\nu = 10$
b) $\nu = 11$
c) $\nu = 9$
d) $\nu = 15$

7 The chi-squared statistic is given by

a) $\chi^2 = \frac{Ns^2}{\sigma^2}$
b) $\chi^2 = \frac{Ns}{\sigma}$
c) $\chi^2 = \frac{N\sigma^2}{s^2}$
d) $\chi^2 = \frac{s^2}{\sigma^2}$

8 The chi-square distribution is _____ but student's t distribution is _____.

a) Symmetric, Not Symmetric
b) Skewed, not skewed.
c) Not symmetric, Symmetric.
d) Not skewed, skewed.

9 The 95% confidence interval for σ in Chi-Squared distribution is

a) $\frac{-s\sqrt{N}}{\chi_{0.95}} < \sigma < \frac{s\sqrt{N}}{\chi_{0.95}}$
b) $\frac{s\sqrt{N}}{\chi_{0.05}} < \sigma < \frac{s\sqrt{N}}{\chi_{0.95}}$
c) $\frac{s\sqrt{N}}{\chi_{0.975}} < \sigma < \frac{s\sqrt{N}}{\chi_{0.025}}$
d) $\frac{s\sqrt{N}}{\chi_{0.025}} < \sigma < \frac{s\sqrt{N}}{\chi_{0.975}}$

10 In F-distribution statistic F is defined as

a) $\frac{N_1 S_1^2}{N_2 S_2^2}$
b) $\frac{N_1 \sigma_1^2}{N_2 \sigma_2^2}$
c) $\frac{N_1/\sigma_1^2}{N_2/\sigma_2^2}$
d) $\frac{\widehat{S_1}^2/\sigma_1^2}{\widehat{S_2}^2/\sigma_2^2}$

11 Two samples of sizes 9 and 12 are drawn from two normally distributed populations having variances 16 and 25, respectively. If the sample variances are 20 and 8, determine value of F statistic.

a) 4.01
b) 4.02
c) 4.03
d) 4.04

12 In 200 tosses of a coin, 120 heads and 80 tails were observed. Then value of χ^2 is

a) 4
b) 6
c) 8
d) 10

13 A measure of the discrepancy existing between the observed and expected frequencies is supplied by the statistic χ^2 given by

a) $\chi^2 = \sum \frac{o_i - e_i}{e_i}$
b) $\chi^2 = \sum \frac{(e_i - o_i)^2}{o_i}$
c) $\chi^2 = \sum \frac{o_i - e_i}{o_i}$
d) $\chi^2 = \sum \frac{(o_i - e_i)^2}{e_i}$

14 The number of degrees of freedom, υ of chi-squared distribution in $h \times k$ contingency table is given by

a) $h \times k$
b) $(h-1) \times k$
c) $h \times (k-1)$
d) $(h-1) \times (k-1)$

15 Coefficient of contingency for χ^2 is given by

a) $C = \frac{\sqrt{(\chi^2+N)}}{\chi^2}$
b) $C = \frac{(\chi^2+N)}{\chi^2}$
c) $C = \sqrt{\frac{\chi^2}{(\chi^2+N)}}$
d) $C = \frac{\chi^2}{(\chi^2+N)}$

16 To test the hypothesis H_0, an experiment is performed 3 times, the resulting values of χ^2 are 2.37, 2.86 and 3.54 respectively, each with one degree of freedom then value of χ^2 combining all 3 experiments is given by

a) 8.07
b) 8.77

c) 5.11
d) 26.13

17 In the 60 tosses of coin 37 heads and 23 tails were observed. Find the value of χ^2

a) 3.267
b) 3
c) 3.333
d) 4.3

18 In F-distribution degree of freedom, v_1 and v_2 are given by

a) $N_1 - 1$ and $N_2 - 1$ respectively.
b) N_1 and N_2 respectively.
c) $N_2 - 1$ and $N_1 - 1$ respectively.
d) $N_2 - 2$ and $N_1 - 2$ respectively.

19 To test the hypothesis H_0, an experiment is performed 3 times, the resulting values of χ^2 are 2.37, 2.86 and 3.54 respectively, each with one degree of freedom then combined χ^2 have degree of freedom

a) 1
b) 2
c) 3
d) 4

20 Yate's correction for continuity is applied when data is of

a) Continuous distribution
b) Discrete Distribution
c) Both continuous and discrete.
d) Random distribution

21 A dice is tossed 120 times with the following results

No. of turn up	1	2	3	4	5	6
Frequency	30	25	18	10	22	15

Test the hypothesis that the dice is unbiased ($X^2 = 11.7$). Calculate the frequency observed for Chi Square distribution.

a) Dice is unbiased, 11.3
b) Dice is biased, 12.9
c) Dice is unbiased, 10.9
d) Dice is biased, 12.3

22 Which of the following distributions is Continuous?
a) Binomial Distribution
b) Hyper-geometric Distribution
c) F-Distribution
d) Poisson Distribution

23 Which of the following distributions is used to compare two variances?
a) t – Distribution
b) F – Distribution
c) Normal Distribution
d) Poisson Distribution

24 A sample size is considered large in which of the following cases?
a) n > or = 30
b) n > or = 50
c) n < or = 30
d) n < or = 50

25 A bag contains 80 chocolates. This bag has 4 different colours of chocolates in it. If all four colours of chocolates were equally likely to be put in the bag, what would be the expected number of chocolates of each colour?

a) 12
b) 11
c) 20
d) 9

26 Larger values of the computed value of the goodness of fit test statistic indicate
a) Larger discrepancy between observed and expected frequencies
b) Smaller discrepancy between observed and expected frequencies
c) There is no discrepancy between observed and expected frequencies
d) Discrepancy between observed and expected frequencies is 1

27 Yates' correction for continuity is applied when
a) Results for continuous distribution are applied to discrete data
b) Results for discrete distribution are applied to continuous data
c) Results for continuous distribution are applied to continuous data
d) Results for discrete distribution are applied to discrete data

28 The number of degrees of freedom for a 3×9 contingency tables are
a) 27
b) 24
c) 18

d) 16

29 The largest value of coefficient of contingency is

a) 0
b) 1
c) ∞
d) -1

30 In a 6 × 6 contingency table, the maximum value of coefficient of contingency is

a) $\sqrt{3}$
b) $\sqrt{\frac{2}{3}}$
c) $\sqrt{\frac{5}{6}}$
d) $\sqrt{\frac{7}{8}}$

31 The sum of three independent chi-square random variable with degrees freedom as 2, 3 and 4 respectively has

a) Chi-square distribution with 6 degree of freedom
b) Chi-square distribution with 7 degree of freedom
c) Chi-square distribution with 8 degree of freedom
d) Chi-square distribution with 9 degree of freedom

32 Students t distribution is discovered by

a) R. A. Fisher
b) W. S. Gossett
c) Karl Pearson
d) Euler

33 To test the hypothesis $H_0: \mu_1 = \mu_2$ based on two independent samples from two normal populations with equal variances, in the usual notations of sample means and sample variances, we use the statistic

a) $\frac{\underline{X}_1 - \underline{X}_2}{\sqrt{N_1 S_1^2 + N_2 S_2^2}}$
b) $\frac{\underline{X}_1 - \underline{X}_2}{\sigma\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}, \quad where\ \sigma = \sqrt{\frac{N_1 S_1^2 + N_2 S_2^2}{N_1 + N_2 - 2}}$
c) 0
d) $\frac{\underline{X}_1 - \underline{X}_2}{\sigma\sqrt{\frac{1}{N_1} + \frac{1}{N_2}}}, \quad where\ \sigma = \sqrt{\frac{S_1^2 + S_2^2}{N_1 + N_2}}$

34 Suppose a random variable X has chi square distribution with 10 degree of freedom. Then the plot of its density function against the variable x takes its maximum value at

a) $X = 5$
b) $X = 6$
c) $X = 7$
d) $X = 8$

35 Let X be a chi-square with degree of freedom 40, then $\sqrt{2X} - \sqrt{79}$ is approximately normally distributed with

a) Mean =0 and variance =1
b) Mean =0 and variance =2
c) Mean =1 and variance =1
d) Mean =1 and variance =2

36 To determine whether two samples drawn from two independent normal populations have the same variances, we use

a) t distribution
b) Standard normal distribution
c) F distribution
d) Chi – square distribution

37 For a random variable X with number of degree of freedom υ considered to be fairly large, which one of the following is nearly normal

a) $\sqrt{2\chi} - \sqrt{2\upsilon - 1}$
b) $\sqrt{2\chi} - \sqrt{2\upsilon}$
c) $\sqrt{2\chi} - \sqrt{\upsilon}$
d) $\sqrt{2\chi} - \sqrt{2\upsilon - 2}$

38 Tables in which the observed frequencies occupy h rows and k columns. Such tables are often called _____.

a) Rectangular tables
b) Contingency table
c) Marginal tables
d) Two-way tables

39 Tests of hypotheses and significance, or decision rules are easily extended to problems involving small samples, the only difference being that the z score, is replaced by a suitable _____

a) P-score
b) Z-score
c) t-score
d) chi square score

40 The mean lifetime of electric light bulbs produced by a company has in the past been 1120 h with a standard deviation of 125 h. A sample of eight electric light bulbs recently chosen from a supply of newly produced bulbs showed a mean lifetime of 1070 h. Test the hypothesis that the mean lifetime of the bulbs has not changed, using significance levels of 0.05. Null Hypothesis is _____.

a) Rejected
b) Partially rejected
c) Accepted
d) Partially accepted

41 A sample of 12 measurements of the breaking strength of cotton threads gave a mean

of 7.38 grams (g) and a standard deviation of 1.24 g. Find the 99% confidence limits for the actual breaking strength.

a) 7.38 ± 0.83
b) 7.38 ± 0.79
c) 7.38 ± 0.74
d) 7.38 ± 0.71

42 Find the critical values of t for which the area of the right-hand tail of the t distribution is 0.01 if the number of degrees of freedom, v, is equal to 12.

a) 2.95
b) 3.34
c) 2.68
d) 1.42

43 The specifications for the production of a certain alloy call for 23.2% copper. A sample of 10 analyses of the product showed a mean copper content of 23.5% and a standard deviation of 0.24%. Can we conclude at 0.01 significance levels that the product meets the required specifications?

a) May be Meet requirement
b) Meet requirement
c) May not be meet requirement
d) Doesn't meet requirement

44 Table in which the observed frequencies occupy a single row, is called a _____.

a) Two -way classification
b) One way classification
c) Mixed classification
d) Linear classification

45 The total frequency in each row or each column is called the _____.

a) Column frequency
b) Row frequency
c) Marginal frequency
d) Table frequency

46 In 200 tosses of a coin, 120 heads and 80 tails were observed. Then value of χ^2 is

a) 2
b) 4
c) 6
d) 8

47 In his experiments with peas, Gregor Mendel observed that 315 were round and yellow, 108 were round and green, 101 were wrinkled and yellow, and 32 were wrinkled and green. According to his theory of heredity, the numbers should be in the proportion 9 : 3 : 3 : 1 then the value of $\chi^2$is

a) 0.470

b) 0.9
c) 0.1
d) 0.24

48 In 360 tosses of a pair of dice, 74 sevens and 24 elevens are observed. Calculate the value of χ^2

a) 4.07
b) 4
c) 5.02
d) 6.97

49 To test the hypothesis H_0, an experiment is performed 3 times, the resulting values of χ^2 are 2.37, 2.86 and 3.54 respectively, each with one degree of freedom then combining χ^2 have_____degrees of freedom.

a) 1
b) 2
c) 3
d) 4

50 If small sample size is 13 then degree of freedom is _____.

a) 1
b) 12
c) 13
d) 14

Q UNIT 5

1 For given Data points, Let $D_1, D_2, \ldots, D_N$ be the deviations(errors) then Best fitting curve is the curve where_____.

a) $D_1 + D_2 + \ldots + D_N$ is a minimum.
b) $D_1^2 + D_2^2 + \ldots + D_N^2$ is a minimum.
c) $\sqrt{D_1 + D_2 + \cdots + D_N}$ is a minimum.
d) $D_1^2 + D_2^2 + \ldots + D_N^2$ is a maximum.

2 To fit straight line to given data point, the normal equations are

a) $Y = a_0 + a_1 X$ and $\sum Y = a_0 N + a_1 \sum X$
b) $\sum Y = a_0 N + a_1 \sum X$ and $\sum Y^2 = a_0 N + a_1 \sum X^2$
c) $\sum Y = a_0 N + a_1 \sum X$ and $\sum XY = a_0 \sum X + a_1 \sum X^2$
d) $\sum Y^2 = a_0 N + a_1 \sum X^2$

3 If the equation of straight line is given as $Y = 3 + 2X$, then value of a_1 is _____.

a) 3
b) 2

c) $\sqrt{3}$
d) $\sqrt{2}$

4 To fit least square line $Y = a_0 + a_1 X$ the formula for a_1 is given by

a) $a_1 = \frac{N\sum XY - (\sum X)(\sum Y)}{N\sum X^2 - (\sum X)^2}$
b) $a_1 = \frac{(\sum Y)(\sum X^2) - (\sum X)(\sum XY)}{N\sum X^2 - (\sum X)^2}$
c) $a_1 = \frac{N\sum XY - (\sum X)(\sum Y)}{N\sum Y^2 - (\sum Y)^2}$
d) $a_1 = \frac{(\sum Y)(\sum X^2) - (\sum X)(\sum XY)}{N\sum Y^2 - (\sum Y)^2}$

5 To fit least square line $Y = a_0 + a_1 X$ the formula for a_0 is given by

a) $a_0 = \frac{N\sum XY - (\sum X)(\sum Y)}{N\sum X^2 - (\sum X)^2}$
b) $a_0 = \frac{(\sum Y)(\sum X^2) - (\sum X)(\sum XY)}{N\sum X^2 - (\sum X)^2}$
c) $a_0 = \frac{N\sum XY - (\sum X)(\sum Y)}{N\sum Y^2 - (\sum Y)^2}$
d) $a_0 = \frac{(\sum Y)(\sum X^2) - (\sum X)(\sum XY)}{N\sum Y^2 - (\sum Y)^2}$

6 To estimate the value of X from a given value of Y, we use

a) Regression curve of X on Y
b) Regression curve of Y on X
c) Any of Regression curves.
d) Correlation

7 If the equation of least square lines are given by 2x+4y = 8 and 4x +2y =10 then $(\underline{X}, \underline{Y})$ is

a) (1,2)
b) (2,1)
c) (1,1)
d) (2,2)

8 Data arranged according to time are called _____.

a) Timely data
b) Chronological data
c) Time series
d) Line series

9 In Time series, time t is an _____variable.

a) Dependent
b) Independent
c) Constant
d) Estimated

10 The regression line of Y on X in case of time series is often called a _____.

a) Time line
b) Trend line
c) Scattered line
d) Least value line

11 The diagram obtained by plotting Data values on a rectangular coordinate system is called

a) Argand's Diagram
b) Shwartz's Diagram
c) Scatter Diagram
d) Cartesian Diagram

12 If Y tends to increase as X increases, then correlation is called

a) Positive correlation
b) Negative correlation
c) Right correlation
d) Left correlation

13 If N=5, $\Sigma X = 15$, $\Sigma Y=80$, $\Sigma XY = 305$ and $\Sigma X^2 = 55$ then value of a_1 is

a) 3.5
b) 6.5
c) -6.5
d) -3.5

14 Standard error of estimate of Y on X, is given by the formula

a) $S_{Y,X} = \sqrt{\frac{\sum(Y-Y_{est})}{N}}$
b) $S_{Y,X} = \sqrt{\frac{\sum(X-X_{est})}{N}}$
c) $S_{Y,X} = \sqrt{\frac{\sum(X-X_{est})^2}{N}}$
d) $S_{Y,X} = \sqrt{\frac{\sum(Y-Y_{est})^2}{N}}$

15 The total variation of Y is defined as

a) $\sum(Y - Y_{est})^2$
b) $\sum\left(Y - \underline{Y}\right)^2$
c) $\sum\left(Y_{est} - \underline{Y}\right)^2$

d) $\sqrt{\sum(Y - Y_{est})^2}$

16 In the formula, $\sum(Y - \underline{Y})^2 = \sum(Y - Y_{est})^2 + \sum(Y_{est} - \underline{Y})^2$, the first sum in R.H.S. is called:

a) Unexplained variation.
b) Explained Variation.
c) First Variation.
d) Second Variation.

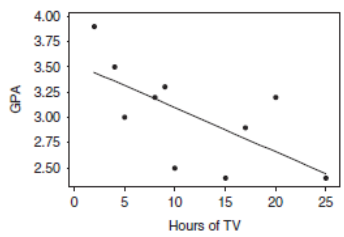
17 The quantity given by $r = \pm\sqrt{\frac{explained\ variation}{Total\ variation}}$, is called

a) Scatter coefficient
b) Covariance
c) Standard deviation
d) Correlation coefficient

18 $S_{XY} = \frac{\sum(X-\underline{X})(Y-\underline{Y})}{N}$ is called _____.

a) Covariance
b) Standard deviation
c) Mean deviation
d) Standard Error.

19 In the following diagram, correlation is _____



a) Positive correlation
b) Negative correlation
c) Right correlation
d) Left correlation

20 If N=5, ΣX = 15, ΣY=80, ΣXY = 305 and ΣX^2 = 55 then value of a_0 is

a) 3.5
b) 6.5
c) -6.5
d) -3.5

21 The normal equations for a straight line $y = ax + b$ are:

a) $\sum y = a\sum x + nb$ and $\sum xy = a\sum x^2 + b\sum x$
b) $\sum xy = a\sum x + nb$ and $\sum y = a\sum x^2 + b\sum x$
c) $\sum y = a\sum x + nb$ and $\sum xy = a\sum x^2 + b\sum xy$
d) $\sum y = a\sum x + nb$ and $\sum x^2y = a\sum x^2 + b\sum x$

22 The parameter E which we use for least square method is called as

a) Sum of residues

b) Residues
c) Error
d) Sum of errors

23 If the value of any regression coefficient is zero, then two variables are:
a) Qualitative
b) Correlation
c) Dependent
d) Independent

24 A measure of the strength of the linear relationship that exists between two variables is called:
a) Slope
b) Intercept
c) Correlation coefficient
d) Regression equation

25 $If\ b_{yx} = 1.6\ and\ b_{xy} = 0.4, then\ r_{xy}$ will be:
a) 0.4
b) 0.64
c) 0.8
d) -0.8

26 The equation of a line with slope -2 and Y intercept as 8 is
a) $Y = 8 - 2X$
b) $Y = -2 + 8X$
c) $X = 8 - 2Y$
d) $X = -2 + 8Y$

27 The equation of a line passing through (2, 1) that is parallel to the line $X + 3Y = 4$
a) $2X + Y = 4$
b) $X + 6Y = 4$
c) $X + 3Y = 5$
d) $2X + Y = 5$

28 A line passing through the points $(2, -3) and\ (-4, 5)$ is
a) $3X + 4Y = 1$
b) $3X + 4Y = -1$
c) $4X + 3Y = 1$
d) $4X + 3Y = -1$

29 The X intercept of a line $2X + 3Y = 9$ is
a) $Y = 3$
b) $Y = -3$
c) $X = 4.5$

d) $X = -4.5$

30 The least squares lines $3X + 2Y = 26$ and $6X + Y = 31$ have their centroid at

a) $(7, 4)$
b) $(4, 7)$
c) $(2, 3)$
d) $(3, 2)$

31 The equation relating two variables X and Y in the form $log\ log\ Y\ = log\ log\ 2\ + 3X$ represents

a) Exponential curve
b) Geometric curve
c) Hyperbola
d) Modified geometric curve

32 If slopes of the two regression lines are negative then correlation coefficient is

a) Positive
b) Negative
c) 0
d) 1

33 If $Y = \frac{X}{2} + 2\ and\ X = \frac{Y}{8} - 1$ are regression lines of Y on X and X on Y respectively, then correlation coefficient between X and Y is given by,

a) ¼
b) -1/4
c) $\pm\frac{1}{4}$
d) 1

34 If the correlation coefficient between two lines of regression is 1, then two lines

a) Coincides
b) Are at right angles
c) Are at 45^0
d) Are at 65^0

35 The two regression lines become identical when the correlation coefficient r is

a) 1
b) 0
c) Either $+1\ or - 1$
d) 2

36 Individual judgment can often be used to draw an approximating curve to fit a set of data. This is called a _____ of curve fitting.

a) Freehand method
b) Formula method
c) Binomial method
d) Distribution method

37 If all values of the variables satisfy an equation exactly, we say that the variables are_____.

a) Partially correlated
b) Perfectly correlated
c) Negative Correlated
d) No Correlated

38 .....attempts to determine the degree of relationship between variables.

a) Regression analysis
b) Correlation analysis
c) Inferential analysis
d) Coincidence analysis

39 The _____ represent slopes of regression lines.

a) Coefficient of Variation
b) Coefficient of Range
c) Regression coefficients
d) Correlation coefficient

40 If both the regression coefficients are 3 and 27, then correlation coefficient is _____.

a) 9
b) -9
c) 81
d) +9 & -9

41 The correlation coefficient is the _____ mean of the regression coefficients.

a) Arithmetic
b) Harmonic
c) Weighted
d) Geometric

42 In regression analysis, the variable that is being predicted is the

a) response, or dependent, variable

b) independent variable

c) intervening variable

d) is usually x

43 The ratio of the explained variation to the total variation is called the _____.

a) Coefficient of error
b) Coefficient of mean deviation
c) Coefficient of determination
d) Coefficient of relation

44 We can determine in a _____ manner how well a given line or curve describes the relationship between variables by direct observation of the scatter diagram itself.

a) Qualitative
b) Quantitative
c) Numerical
d) Statistical

45 When more than two variables are involved, we speak of _____.

a) Mixed correlation
b) Simple correlation
c) Complex correlation
d) Multiple correlation

46 The method of curve fitting has the disadvantage that different observers will obtain _____ curves and equations.

a) Different
b) Simple
c) Similar
d) Multiple

47 the least-squares line passes through the point (X,Y), called the _____.

a) Axis points
b) End points
c) Centroid
d) Moment points

48 If 3X + 2Y = 18, find X when Y = 3.

a) 4
b) -4
c) 6
d) -6

49 If we wanted to estimate the value of X from a given value of Y, we would use a regression curve of _____

a) Y on X
b) Y-axis
c) X on Y
d) X-axis

50 If Y tends to increase as X increases, the correlation is called _____

a) Negative or inverse correlation
b) Positive or direct correlation
c) No correlation
d) Polynomial correlation