Booklet No. 110011 (GCF-8, GCF-10 to GCF-13 & SCF-4)
DATE: 12.10.2018 **MAXIMUM MARKS: 100** **TIMING: 2Hours**

PAPER: BUSINESS MATHEMATICS, REASONING & STATISTICS

(1) Roots of the equation $5x^2+8x+7=0$ are α,β then $\frac{\alpha}{\beta^2}+\frac{\beta}{\alpha^2}$ equals to

(a) $\frac{326}{245}$

(b) $\frac{329}{245}$

(c) $\frac{331}{245}$

(d) None of these

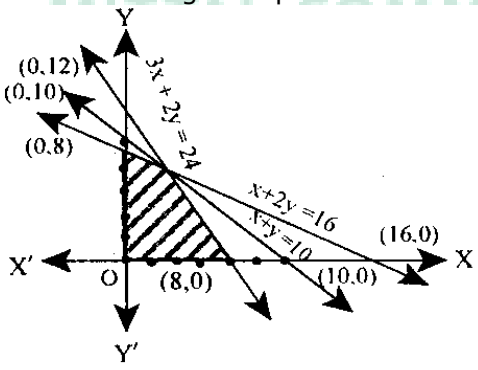
(2) Ratio of $\log_{.01}.00000001$ and $\log_{\sqrt{3}}81$ is

(a) 1 : 1
(b) 2 : 1
(c) 1 : 2
(d) 1 : 4

(3) In an organization Employer required maximum ten employees. X and Y are numbers of male and female respectively then which inequality shows right relation.

(a) $x+y=10$
(b) $x+y\le 10$
(c) $x+y\ge 10$
(d) $x\ge 10$

(4) The shaded region represents:



(a) $3x+2y\le 24, x+2y\ge 16, x+y\le 10 x, x\ge 0, y\ge 0,$

(b) $3x+2y\le 24, x+2y\le 16, x+y\ge 10, x\ge 0, y\ge 0$

(c) $3x+2y\le 24, x+2y\le 16, x+y\le 10, x\ge 0, y\ge 0$

(d) None

(5) If $x=7^{\frac{1}{3}}-7^{-\frac{1}{3}}$, then the value of $7x^3+21x$ is :

(a) 40
(b) 49

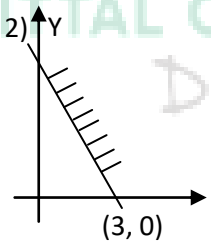
(c) 35
(d) 48

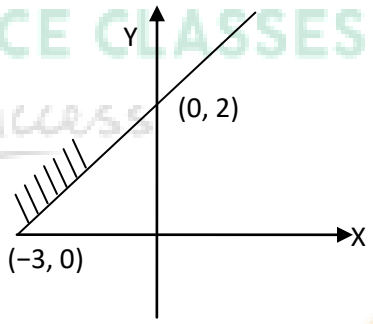
(6) If $\log_2 \log_2 \log_3 x = 0$ then find out value of x
(a) 9
(b) 81
(c) 729
(d) None of these

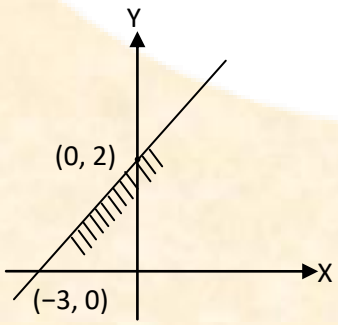
(7) A square is drawn by joining mid-points of the sides of a square. Another square is drawn inside the second square in the same way and the process is continued indefinitely. If the side of the first square is 16 cm, then what is the sum of the areas of all the squares ?
(a) 341 sq. cm
(b) 512 sq. cm
(c) 1024 sq. cm
(d) $\frac{512}{3}$ sq. cm

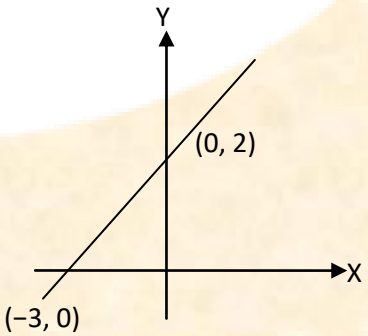
(8) If $\frac{\log x}{2} = \frac{\log y}{3} = \frac{\log z}{5}$, then the value of yz in term of x is
(a) x
(b) x^2
(c) x^3
(d) x^4

(9) Which option shows inequality $-2x + 3y \geq 6$

(a)


(b)


(c)


(d)


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(10) A man invested $\frac{1}{3}$ of his capital at 7% , $\frac{1}{4}$ at 8% and the remainder at 10% Simple interest.If his annual income is Rs. 561, the capital is:

(a) Rs. 5400
(b) Rs. 6000
(c) Rs. 6600
(d) Rs. 7200

(11) The future value of an annuity of Rs. 6000 is made annually for 8 years at interest rate of 9% compounded annually is :

(a) Rs. 66170.84
(b) Rs. 62195.93
(c) Rs. 58125.24
(d) None of these

(12) If a sum triple itself in 6 years at C.I. In how many years it will be 27 times itself at the same rate?

(a) 18
(b) 54
(c) 12
(d) 27

(13) The ratio of the money with Ram and Shyam is 3:4 and that with Shyam and Mohan is 4:5. If Ram has Rs.600, how much money does Mohan have?

(a) 400
(b) 300
(c) 1000
(d) None of these

(14) The ratio of the number of boys to the number of girls in a school of 720 students is 3 : 5. If 18 new girls are admitted in the school, find how many new boys may be admitted so that the ratio of the number of boys to the number of girls may change to 2 : 3.

(a) 42
(b) 24
(c) 43
(d) None of these

(15) A number of men went to a hotel and each spent as many rupees as there were men. If the money spent was Rs, 15625; find the number of men.

(a) 110
(b) 125
(c) 145
(d) None of these

(16) If $a+b+c=0$, then the value of $\frac{a^2+b^2+c^2}{c^2-ab}$ is equal to

(a) 0
(b) 1

(c) 2
(d) -2

(17) Find the value of $\frac{(243)^{\frac{n}{5}}.3^{2n+1}}{9^n \times 3^{n-1}}$
(a) 4
(b) 5
(c) 9
(d) 10

(18) I am three times as old as my son. Five years later, I shall be two and a half times as old as my son. How old am I?
(a) 40 years
(b) 45 years
(c) 50 years
(d) none of these

(19) A, B, C, D are four numbers so that A:B=2:3, B:C=4:5, C:D=5:8 then A:D is :-
(a) 2:3
(b) 3:2
(c) 1:3
(d) 3:1

(20) $\int \frac{8^{1+x}+4^{1-x}}{2^x}dx$
(a) $\frac{2^{2x+3}}{\log 3}-\frac{2^{2-3x}}{\log 2}+c$
(b) $\frac{2^{3x+2}}{\log 2}-\frac{2^{3x-2}}{3\log 2}+c$
(c) $\frac{2^{2x+3}}{2\log 2}-\frac{2^{2-3x}}{3\log 2}+c$
(d) None of these

(21) If a:b = b:c then $a^4:b^4$=
(a) b^2:ac
(b) $c^2:a^2$
(c) $a^2:c^2$
(d) $ac:b^2$

(22) A manufacturer produces 80 T.V. sets at a cost Rs. 2,20,000 and 125 T.V. sets at a copy of Rs.2,87,500. Assuming the cost curve to be linear find the cost of 95 sets.
(a) Rs. 3,52,500
(b) Rs. 1,45,550
(c) Rs. 2,42,500
(d) None of these

(23) Which of the equation roots are $-3, 1, 2$

(a) $x^3 - 6x^2 + 11x - 6 = 0$

(b) $x^3 - 7x + 6 = 0$

(c) $x^3 - 3x^2 + 2x = 0$

(d) None of these

(24) If x = $\sqrt{1+\sqrt{1+\sqrt{1+\sqrt{--}}}}\ -\infty$ then the positive value of x is

(a) $\frac{\sqrt{7}+1}{2}$

(b) $\frac{\sqrt{6}+1}{2}$

(c) $\frac{\sqrt{3}+1}{2}$

(d) $\frac{\sqrt{5}+1}{2}$

(25) If ${}^{n+2}Cr = {}^{n+2}C_{10-r}$ then ${}^{n}C_{6}$ equals to

(a) 8
(b) 28
(c) 56
(d) None of these

(26) How many words can be formed from the letters of the word "DIRECTOR" so that the vowels are always together ?

(a) 2610
(b) 1260
(c) 2160
(d) None

(27) How many 3-digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9 Which are divisible by 5 and none of the digits is repeated ?

(a) 5
(b) 60
(c) 100
(d) 20

(28) There are 7 Men and 3 Ladies. Find the number of ways in which a committee of 6 can be formed of them if the committee is to include at least two ladies ?

(a) 160
(b) 180
(c) 150
(d) None

(29) In a city, three daily news paper A, B and C are published, 42% read A, 51% read B, 68% read C, 30% read A and B, 28% read B and C, 36% read A and C, 8% do not read any of the three newspapers. What is the percentage of person who read only one paper ?

(a) 38%
(b) 48%
(c) 51%
(d) None

(30) What is the sum of $\sqrt{3}+\frac{1}{\sqrt{3}}+\frac{1}{3\sqrt{3}}+...\infty$?

(a) $\frac{\sqrt{3}}{2}$

(b) $\frac{3\sqrt{3}}{2}$

(c) $\frac{2\sqrt{3}}{3}$

(d) $\sqrt{3}$

(31) If $f(x)=\sqrt{x+\sqrt{x+\sqrt{x+...\infty}}}$, then what is f'(x) equal to ?

(a) $\frac{1}{1-2f(x)}$

(b) $\frac{1}{2f(x)-1}$

(c) $\frac{1}{1+2f(x)}$

(d) $\frac{1}{2+f(x)}$

(32) What is the number of ways of arranging the letters of the word "BANANA" so that no two N's appear together ?

(a) 40
(b) 60
(c) 80
(d) 100

(33) If $A=\{a,b,c\}$ and $R=\{(a,a),(a,b),(b,c),(b,b),(c,c),(c,a)\}$ is a relation on A, then which one of the following is correct?

(a) R is reflexive, symmetric and transitive
(b) R is reflexive and symmetric, but not transitive
(c) R is reflexive and transitive, but not symmetric
(d) R is reflexive, but neither symmetric nor transitive

(34) If $n(A) = 115$, $n(B) = 326$ and $n(A - B) = 47$ then what is $n(A \cup B)$ equal to?
(a) 373
(b) 165
(c) 370
(d) 394

(35) Value of $\int_{-1}^{1}(x^5 - 3x^3 + 2x)\,dx$
(a) 0
(b) 5
(c) -2
(d) None

(36) If the order of matrix A is m x p. And the order of B is p x n. then the order of matrix AB is?
(a) m x n
(b) n x m
(c) n x p
(d) m x p

(37) $\begin{pmatrix}1\\2\\5\end{pmatrix} \times \begin{pmatrix}3 & 4 & 5 & 6\end{pmatrix}$

(a) $\begin{bmatrix}3 & 4 & 5 & 6\\6 & 8 & 10 & 12\\15 & 20 & 25 & 30\end{bmatrix}$

(b) $\begin{bmatrix}3 & 5 & 4 & 6\\6 & 8 & 10 & 12\\12 & 16 & 20 & 24\end{bmatrix}$

(c) $\begin{bmatrix}3 & 4 & 5 & 6\\6 & 8 & 10 & 12\\12 & 16 & 20 & 24\end{bmatrix}$

(d) $\begin{bmatrix}3 & 4 & 5 & 6\\6 & 8 & 10 & 12\\24 & 16 & 16 & 12\end{bmatrix}$

(38) If $A = \begin{bmatrix}3 & 1 & 2\\2 & 0 & 4\end{bmatrix}$, $B = \begin{bmatrix}1 & 2 & 3 & 0\\2 & 3 & 0 & 1\\3 & 0 & 1 & 2\end{bmatrix}$

Find AB. Does BA exist?

(a) AB exists but BA not exists
(b) AB not exists BA Exists
(c) Both AB and BA not exists
(d) None of these

(39) If A= $[a_{ij}]_{2\times3}$ where $a_{ij} = \frac{1}{2}|2i-3j|$ then A is equal to

(a) $\begin{bmatrix} -\frac{1}{2} & 2 & -\frac{7}{2} \\ \frac{1}{2} & 1 & \frac{5}{2} \end{bmatrix}$

(b) $\begin{bmatrix} \frac{1}{2} & 2 & \frac{7}{2} \\ \frac{1}{2} & 1 & \frac{5}{2} \end{bmatrix}$

(c) $\begin{bmatrix} 1 & 2 & -3 \\ \frac{1}{2} & \frac{1}{3} & \frac{1}{4} \end{bmatrix}$

(d) $\begin{bmatrix} -\frac{1}{2} & -2 & \frac{7}{2} \\ \frac{1}{2} & 1 & \frac{5}{2} \end{bmatrix}$

(40) A = $\begin{bmatrix} 1 & -1 & 2 \\ 3 & 0 & -2 \\ 1 & 0 & 3 \end{bmatrix}$

adj A is equal to :

(a) $\begin{bmatrix} 0 & 3 & 2 \\ -11 & 1 & 8 \\ 0 & -1 & 3 \end{bmatrix}$

(b) $\begin{bmatrix} 0 & 3 & 2 \\ 11 & 1 & 8 \\ 0 & -1 & 3 \end{bmatrix}$

(c) $\begin{bmatrix} 0 & -11 & 0 \\ 3 & 1 & -1 \\ 2 & 8 & 3 \end{bmatrix}$

(d) None

(41) 120, 99, ?, 63, 48, 35
(a) 80 (b) 36

(c) 45 (d) 40

(42) 1, 4, 10, 22, ?, 94
(a) 46 (b) 48
(c) 49 (d) 47

(43) 1, 1, 4, 8, 9, ?, 16, 64
(a) 27 (b) 28
(c) 32 (d) 40

(44) 2, 3, 3, 5, 10, 13, 39, ?, 172, 177
(a) 42 (b) 44
(c) 43 (d) 40

(45) 5, 2, 7, 9, 16, 25, 41, ?
(a) 65 (b) 66
(c) 67 (d) 68

(46) If RED is coded as 6720 then GREEN would be coded as
(a) 9207716 (b) 167129
(c) 1677209 (d) 1972091

(47) If A = 1, FAT = 27, FAITH = ?
(a) 44 (b) 45
(c) 46 (d) 36

(48) If GOLD is written as IQNF, how WIND can be written as code ?
(a) YKPF (b) VHCM
(c) XJOE (d) DNIW

Directions: Find odd One out of the following (49 - 51):

(49) 4, 5, 7, 10, 14, 18, 25, 32
(a) 7 (b) 14
(c) 18 (d) 33

(50) 156, 468, 780, 1094, 1404, 1760
(a) 468 (b) 780
(c) 1094 (d) 1716

(51) 8, 14, 26, 48, 98, 194, 386
(a) 14 (b) 48
(c) 98 (d) 194

(52) A driver left his village and drove North for 20 km, after which he stopped for breakfast. Then he turned left and drove another 30 km, when he stopped for lunch. After some rest, he again turned left and drove 20 kms before stopping for evening tea. Once more he turned left and drove 30 kms to reach the town where he had supper. After evening tea in which direction did he drive ?
(a) West (b) East
(c) North (d) South

(53) Five boys A, B, C, D, E, are sitting in a park in a circle. A is facing South-West, D is facing South-East, B and E are right opposite A and D respectively and C is equidistant between D and B. Which direction is C facing ?

(a) West (b) South
(c) North (d) East

(54) Six persons M, N, O, P, Q and R are sitting in two row with three persons in each row, Both the row are in front of each other. Q is not at the end of any row. P is second the left of R. O is the neighbour of Q and diagonally opposite to P. N is the neighbour of R. Who is in front N ? (UPSC (CSAT) 2011)

(a) R (b) Q
(c) P (d) M

(55) In a college party, 5 girls are sitting in a row. P is to the left of M and to the right of O. R is sitting to the right of N but to the left of O. Who is sitting in the middle?

(a) O (b) R
(c) P (d) M

Question 56: Seven friends T, U, V, W, X, Y and Z are sitting in a straight line facing north. W sits fifth to the right of T. W does not sit at any of extreme ends. Two people sit between Z and X. Y sits third to the left of U. Y sits exactly in the middle. Z is not an immediate neighbour of Y.

(56) What is Z's position with respect to W ?

(a) Second to the left (b) Third to the right
(c) Fourth to the left (d) Third to the left

(57) If P is the husband of Q and R is the mother of S and Q. What is R to P ?

(a) Mother (b) Sister
(c) Aunt (d) Mother-in-law

(58) X and Y are the children of A. A is the father of X but Y is not his son. How is Y related to A?

(a) Sister (b) Brother
(c) Son (d) Daughter

(Question 59&60) : Each of the following questions contains two statements followed by conclusions numbered I and II. You have to consider the two statements to be true, even if they to be at variance at the commonly known facts. You have to decide which of the given conclusion definitely follows from the given statements.

Given answer (a) if only I follows; (b) if only conclusion II follows; (c) if either I or II follows; and (d) neither I nor II follows

(59) **Statement:** Some Chairs are glasses.
All tree are Chairs
Conclusions: I. Some trees are glasses.
II. Some glasses are trees.

(60) **Statement:** No man is a lion
Ram is a man.

Conclusions: I. Ram is not a lion.
II. All men are not Ram.

(61) Find 82 percentile from the following data
Rs. 82, Rs. 56, Rs. 90, Rs. 50, Rs. 120, Rs. 75, Rs. 75, Rs. 80, Rs. 130, and Rs. 65.
(a) Rs. 120.20
(b) Rs. 135.20
(c) Rs. 85.30
(d) Rs. 150.75

(62) For a moderately skewed distribution, quartile deviation and the standard deviation are related by:
(a) S.D. = 2/3 Q.D
(b) S.D. = ¾ Q.D
(c) S.D. = 4/3 Q.D
(d) S.D. = $\frac{3}{2}$ Q.D.

(63) If the median of $\frac{x}{5}, \frac{x}{3}, \frac{x}{6}, \frac{x}{2}, \frac{x}{7}$ *and* x *is* 24. Find the value of x.
(a) 72
(b) 49
(c) 90
(d) 52

(64) A lady travel at a speed of 120km/h and returned at quicker speed. If her average speed of the whole journey is 150km/h, find the speed of return journey (in km/h).
(a) 250
(b) 300
(c) 200
(d) None

(65) The G.M. of 4, 20 and 36 is
(a) $2\sqrt[3]{80}$
(b) $8\sqrt[3]{340}$
(c) $2\sqrt[3]{8}$
(d) $4\sqrt[3]{45}$

(66) Which measure of dispersion is best for open end classes?
(a) Range
(b) Quartile deviation
(c) Mean deviation
(d) Standard deviation

(67) Which of the following is false? (for moderately skewed distribution)
(a) Mean – mode = 3(Mean-Median)
(b) Mode = 3 Median – 2 Mean

(c) Mode + 2 Mean = 3 Median
(d) None

(68) Coefficient of Variation if Median = 23, Mode = 29 and Variance = 100 is
(a) 10%
(b) 50%
(c) 20%
(d) None of these

(69) If the standard deviation of 0, 1, 2, 3... 9 is k, than standard deviation of 10, 11, 12, 13,.... 19 is
(a) 10k
(b) k+10
(c) k
(d) $k + \sqrt{10}$

(70) The standard deviation calculated from a set of 32 observations is 5. If the sum of the observations is 80, what is the sum of the squares of these observations ?
(a) 10
(b) 1000
(c) 100
(d) 2000

(71) Sum of deviation from mean for any set of observation is -
(a) Negative
(b) Positive
(c) Zero
(d) None of these

(72) If the correlation coefficient $r = \pm 1$ for the random variables X and Y, then the lines of regressions of Y on X and Y on Y
(a) are perpendicular to each other
(b) coincide
(c) intersect with acute angle $\pi/4$.
(d) are parallel to each other.

(73) If byx = 1.24, bxy = 0.36, $\bar{x} = 5.5$, $\bar{y} = 8.8$, then regression equation of y on x is given by
(a) y = 1.24 x + 1.98
(b) y = –1.24 x + 1.98
(c) x = 0.3 y + 2.86
(d) None of these

(74) The two lines of regression are 2x – 7y + 6 = 0 and 7x – 2y + 1 = 0. What is the correlation coefficient between x and y?
(a) -2/7
(b) 2/7
(c) 4/49
(d) None of these

(75) Spearman's correlation co-efficient from 10 pairs of observations was calculated at 0.8. Subsequently, it was discovered that the difference in ranks relating to one pair of items was wrongly taken as 7 instead of 9. Correct the co-efficient of rank correlation.
(a) 0.51
(b) 0.61
(c) 0.71
(d) 0.81

(76) Laspeyre's index is based on
(a) Base Year Quantities
(b) Current Year Quantities
(c) Average of base and current year Quantity
(d) None of these.

(77) For the data given calculate Fisher's index
$\Sigma P_1Q_0 = 3365$, $\Sigma P_0Q_0 = 3530$,
$\Sigma P_1Q_1 = 3400$, $\Sigma P_0Q_1 = 3600$
(a) 99
(b) 90
(c) 90.25
(d) 94.88

(78) Regression coefficient are ……
(a) dependent of change of origin and of scale.
(b) independent of both change of origin and of scale.
(c) dependent of change of origin but not of scale.
(d) independent of change of origin but not of scale

(79) Chain index is equal to:
(a) $\text{link relative of current year} \times \frac{\text{Chain index of the current year}}{100}$
(b) $\text{link relative of current year} \times \frac{\text{Chain index of the previous year}}{100}$
(c) $\text{link relative of previous year} \times \frac{\text{Chain index of the current year}}{100}$
(d) None of these

(80) The consumer price index over a certain period increased from 120 to 215 and the wages of worker increased from Rs. 1,680 to Rs. 3000. What is the loss of the worker?
(a) 5.58
(b) 6.58
(c) 7.58
(d) None of these

(81) _____ is the entire upper part of the table which includes columns and

sub-column and unit of measurement.
(a) Stub
(b) Box-head
(c) Body
(d) Caption

(82) Hidden trend, if any, in the data can be noticed in
(a) Textual presentation
(b) Tabulation
(c) Diagrammatic representation
(d) All of these

(83) $\Sigma P_1Q_1 = 248, \Sigma P_0Q_0 = 150$, Paasche's index number = 150 and Dorbish-Bowley's index number = 145. Then the Fisher's ideal index number is:
(a) 75
(b) 144.91
(c) 145.97
(d) None of these

(84) If two letters are taken at random from the word PENCIL, what is the probability that none of the letters would be vowels ?
(a) 1/6
(b) 1/2
(c) 1/3
(d) 1/4

(85) Spatial classification is :
(a) classification of units on the basis of time
(b) classification of units on the basis of geographical area
(c) classification of units according to the characteristic of attributes
(d) classification of units according to the characteristic of variables

(86) For any two events A_1, A_2 let $P(A_1) = \frac{2}{3}$, $P(A_2) = \frac{3}{8}$ and $P(A_1 \cap A_2) = \frac{1}{4}$ then A_1, A_2 are:
(a) Mutually exclusive but not independent events
(b) Mutually exclusive and independent events
(c) Independent but not mutually exclusive
(d) None of these

(87) The interval $(\mu-3\sigma, \mu+3\sigma)$ covers _____ area of a normal distribution.
(a) 90%
(b) 95%
(c) 99%
(d) 99.73%

(88) From the following data

Commodity	A	B	C	D	E	F
Group Index	120	132	98	115	108	98

Weight	6	3	4	2	1	4

The general Index I is given by:

(a) 111.90
(b) 113.45
(c) 117.25
(d) 114.75

(89) The probability of getting an occupational disease to the workers of a factory is found to be (1/5000). If there are 10000 workers in a factory, then the probability that none of them will get the disease is

(a) e
(b) e^{-2}
(c) e^{-3}
(d) e^{-4}

(90) Frequency distribution of weights of 30 students is:

Weight in kgs.	No. of students
44-48	6
49-53	5
54-58	8
59-63	11

What is the frequency density for the class interval 49-53.

(a) 1.25
(b) 1.67
(c) 6
(d) 1

(91) When the two curves of ogive intersect, the point of intersection provides:

(a) First Quartile
(b) Second Quartile
(c) Third Quartile
(d) Mode

(92) The Probability distribution of a random variable is as follows

X	1	2	3	4	5	6
P	3k	5k	2k	4k	3k	3k

The expected value of X is:

(a) 2.8
(b) 12.2
(c) 6.8
(d) 3.4

(93) If a Binomial distribution mean = 20, S.D. = 4, then *n* is equal to :

(a) 90
(b) 100
(c) 80
(d) None of these

(94) For a poissonvariate x its $P(x = 1) = P(x = 2)$, variance is

(a) 2
(b) 3
(c) 1
(d) None

(95) When the product of price index and the quantity index is equal to the corresponding value index then it is known as :
(a) Unit test
(b) Time reversal test
(c) Factor reversal test
(d) None

(96) Bar diagrams are _____ dimensional diagrams.
(a) multi
(b) two
(c) one
(d) three

(97) The average of 17 numbers is 45. The average of first 9 of these numbers is 51 and the last 9 of these numbers is 36. Find the 9th number?
(a) 5
(b) 14
(c) 18
(d) None of these

(98) If u + 5x = 6 and 3y -7v = 20 and the correlation coefficient between x and y is 0.58, then what would be the correlation coefficient between u and v?
(a) 0.58
(b) – 0.58
(c) – 0.84
(d) 0.84

(99) An orderly set of data arranged in accordance with their time of occurrence is called:
(a) Arithmetic series
(b) Harmonic series
(c) Geometric series
(d) Time series

(100) Damages due to floods, droughts, strikes fires and political disturbances are:
(a) Trend
(b) Seasonal
(c) Irregular
(d) Cyclical

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