



SAIVA BHANU KSHATRIYA COLLEGE
(Aruppukottai Nadargal Uravinmurai Pothu Abi Viruthi Trustuku Pathiyapattathu)
ARUPPUKOTTAI
DEPARTMENT OF MATHEMATICS
QUESTION BANK

Class :	B.Sc., Mathematics		
Semester (UG - III & V; PG - III) :	V	Subject Code :	SMTJC53
Name of the Subject :	Fundamental of Statistics		

Section A (Multiple Choice Questions)

Unit I: (Title of the Unit)

1. Define Measures of central tendency.
2. The Arithmetic mean of n observations x_1, x_2, \dots, x_n is defined by $\bar{x} =$
(a) $\frac{\sum x_i}{n}$ (b) $\frac{\sum x_i}{m}$ (c) x_i (d) 0
3. The algebraic sum of the deviation of a set of n values from their arithmetic mean is ---
(a) zero (b) mean (c) non zero (d) 1
4. The empirical relationship between mean, median, mode then Mode =
(a) 3 Median - 2 Mean (b) 3 Median + 2 Mean (c) 3 Median - Mean (d) 0
5. Define Coefficient of variation.

Unit II: (Title of the Unit)

6. The correlation coefficient is -----of the change of origin and scale
(a) independent (b) dependent (c) Regression (d) zero
7. The limit value of $\gamma =$ -----
(a) [-1,1] (b) [-1,-1] (c) [1,1] (d) 0
8. Define rank correlation.
9. If one of the regression coefficient is greater than unity the other is less than ----
(a) unity (b) zero (c) mean (d) median
10. The regression coefficients are independent of the change of ---but dependent on change of scale.
(a) origin (b) scale (c) zero (d) mean

Unit III: (Title of the Unit)

11. The index number for the current year is $P_{01} =$ -----
(a) $\frac{p_1}{p_0} \times 100$ (b) $\frac{p_0}{p} \times 100$ (c) $\frac{p_1}{p_0}$ (d) none
12. Define arithmetic mean index number.
13. Define Fisher's index number.
14. Define time reversal test
15. Define Fixed base index of current year.

Unit IV: (Title of the Unit)

16. $Y = bx^a$ can be reduced to the linear law
(a) $Y = A + BX$ (b) $Y = AX + B$ (c) $Y = AB + X$ (d) $X = A + BY$
17. The method of fitting the curve of good fit $y = ae^{bx}$ then
(a) $a > 0$ (b) $a < 0$ (c) $a = 0$ (d) $a = b$
18. The principle of least squares states that the parameters involved in $f(x)$ should be chosen in such a way that $\sum d_i^2$ is
(a) Minimum (b) Maximum (c) Equal (d) zero
19. Define fitting a straight line.
20. Define fitting a second degree parabola.

Unit V: (Title of the Unit)

21. The total number of negative class frequencies is-----
(a) $2^n - 1$ (b) $2^n - 2$ (c) $2n - 1$ (d) 0



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22. If A and B are two attributes, then $(\alpha\beta) = \text{-----}$
- (a) $N-(A)-(B)+(AB)$ (b) $N-(A)-(B)-(AB)$ (c) $N-(A)+(B)+(AB)$ (d) AB
23. Define consistent.
24. The attributes A and B are independent if $\delta =$
- (a) 1 (b) 0 (c) -1 (d) none
25. The n attributes then the total number of class frequencies is -----
- (a) 3^n (b) 3 (c) 3n (d) n

Section B (7 mark Questions)

Unit I: (Title of the Unit)

26. Find the median of the following

x	1	2	3	4	5	6	7	8	9
F	8	10	11	16	20	25	15	9	6

27. Calculate the values of β_1 and β_2 from the following distribution

x	0	1	2	3	4	5	6
f	5	15	17	25	19	14	5

28. The sum of the squares of the deviations of a set of n values is minimum when the deviations are taken from their mean.
29. Find the H.M for the following frequency distribution.

class	0-10	10-20	20-30	30-40	40-50
frequency	15	10	7	5	3

30. The standard deviation σ is independent of change of origin and is dependent on change of scale.

Unit II: (Title of the Unit)

31. The correlation coefficient is independent of the change of origin and scale.
32. If x,y and z are uncorrelated variables each having same standard deviation obtain the coefficient of between x+y and y+z.
33. Rank correlation ρ is given by $\rho = 1 - \frac{6\sum(x-y)^2}{n(n^2-1)}$
34. Arithmetic mean of the regression coefficients is greater than or equal to the correlation coefficient.
35. If $x=4y+5$ and $y=kx+5$ are the regression lines of x on y and y on x respectively (i) show that $0 \leq k \leq \frac{1}{4}$ (ii) if $k = \frac{1}{8}$ find the means of the two variables x and y and the correlation coefficient between them.

Unit III: (Title of the Unit)

36. From the following data of the whole sale price of rice for the 5 years construct the index numbers taking (i) 1987 as the base.(ii)1990 as the base

year	1987	1988	1989	1990	1991	1992
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Price of rice per kg	5.00	6.00	6.50	7.00	7.50	8.00
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37. Calculate (i) Laspeyre's (ii) Paasche's (iii) Fisher's index number for the following Data given below. Hence or otherwise find Edgeworth and Bowley's index number

Commodities	Base year 1900		Current year 1992	
	Price	Quantity	Price	Quantity
A	2	10	3	
B	5	16	6.5	11
C	3.5	18	4	16
D	7	21	9	25
E	3	11	3.5	20

38. From the fixed base index number given below prepare a chain base index number

Year	1975	1976	1977	1978	1979	1980
Fixed base index number	90	105	102	98	120	125

39. An enquiry into the budgets of the middle class families in a city in India gave the following information.

	Food	Rent	Clothing	Fuel	Misc
Weights	35%	15%	20%	10%	20%
Prices 1991	1500	300	450	70	500
Prices 1992	1650	325	500	90	550

What changes in cost of living index of 1992 as compared with that of 1991 are seen?

40. Given the following chain base index numbers construct the fixed base index numbers.

Years	1986	1987	1988	1989	1990
Chain index	80	110	120	90	140

Unit IV: (Title of the Unit)

41. Fit a straight line to the following data.

X	0	1	2	3	4
Y	2.1	3.5	5.4	7.3	8.2

42. Explain the method of fitting the curve of good fit $y = ae^{bx}$ ($a > 0$)

43. Fit the curve $y = bx^a$ to the following data

X	1	2	3	4	5	6
Y	1200	900	600	200	110	50

44. Fit a curve $y = ax^b$ for the following data

X	1	2	3	4	5	6
Y	14	27	40	55	68	300

45. Explain the method of fitting the curve $y = ka^{bx}$ ($a, k > 0$) obtaining the normal equations by the method of least squares.



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Unit V: (Title of the Unit)

46. Given n attributes

- i). Total number of class frequencies is 3^n
- ii). Total number of positive class frequencies is 2^n
- iii). Total number of negative class frequencies is $2^n - 1$

47. Given $(A) = 30; (B) = 25; (\alpha) = 30; (\alpha\beta) = 20$. Find (i) N (ii) (β) (iii) (AB) (iv)

$(A\beta)$ (v) (αB)

48. Given $N = 1200, (ABC) = 600, (\alpha\beta\gamma) = 50, (\gamma) = 270, (A\beta) = 36, (B\gamma) = 204, (A) - (\alpha) = 192, (B) - (\beta) = 620$. Find the remaining ultimate class frequencies.

49. In a very hotly fought battle 70% of the soldiers atleast lost an eye 75% atleast lost an ear, 80% atleast an arm and 85% atleast lost a leg. How many at least must have lost all the four?

50. Find whether the following data are consistent

$N = 600, (A) = 300, (B) = 400, (AB) = 50$

Section C (10 mark Questions)

Unit I: (Title of the Unit)

51. The following table gives the monthly wages of workers in a factory. Compute (i) Standard deviation (ii) quartile deviation (iii) Coefficient of variation.

Monthly wages	125-175	175-225	225-275	275-325	325-375	375-425	425-475	475-525	525-575	Total
No. of workers	2	22	19	14	3	4	6	1	1	72

52. The first four moments of a distribution about $x = 2$ are 1, 2.5, 5.5 and 16. Calculate the four moments (i) about the mean (ii) about zero

Unit II: (Title of the Unit)

$$53. \gamma_{xy} = \frac{n \sum x_i y_i - \sum x_i \sum y_i}{\sqrt{[n \sum x_i^2 - (\sum x_i)^2]} \sqrt{[n \sum y_i^2 - (\sum y_i)^2]}}$$

54. The angle between the two regression lines is given by $\theta = \tan^{-1} \left[\left(\frac{1 - \gamma^2}{\gamma} \right) \left(\frac{\sigma_x \sigma_y}{\sigma_x^2 + \sigma_y^2} \right) \right]$

Unit III: (Title of the Unit)

55. Find the missing price in the following data if the ratio between Laspeyre's and paasche's index number is 25 : 24.

Commodities	Base year		Current year	
	Price quantity		Price quantity	
A	1	15	2	15
B	2	15	-	30



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56. From the chain base index numbers given below prepare fixed base index number.

Year	1985	1986	1987	1988	1989	1990	1991
Chain base index number	105	108	110	107	115	120	125

Unit IV: (Title of the Unit)

57. Fit a straight line to the following data and estimate the value of y corresponding to x = 6

X	0	5	10	15	20	25
Y	12	15	17	22	24	30

58. Fit a curve of the form $y = ab^x$ to the following data.

Year(x)	1951	1952	1953	1954	1955	1956	1957
Production in tons(y)	201	263	314	395	427	504	612

Unit V: (Title of the Unit)

59. Fit a straight line to the following data and estimate the value of y corresponding to x = 6

X	0	5	10	15	20	25
Y	12	15	17	22	24	30

60. Fit a curve of the form $y = ab^x$ to the following data.

Year(x)	1951	1952	1953	1954	1955	1956	1957
Production in tons(y)	201	263	314	395	427	504	612