Reg. No. :.....

Code No. : 20596 E **Sub. Code : SNMA 4 B**

U.G. (CBCS) DEGREE EXAMINATION, APRIL 2021.

Fourth Semester

Mathematics

Non-Major Elective — FUNDAMENTALS OF STATISTICS — II

(For those who joined in July 2017 onwards)

Time : Three hours Maximum : 75 marks

PART A — ($10 \times 1 = 10$ marks)

Answer ALL questions.

Choose the correct answer.

1. If $N = 450$, $(A) = 150$, then $(\alpha) =$ _____.

   (a) 600 (b) 300

   (c) 50 (d) 150

2. For two attributes A and B, the total number of class frequencies is _____.

   (a) 3 (b) 4

   (c) 6 (d) 9

3. With usual notations, Paasche's index number is _____.

(a) $\frac{\Sigma p_1 q_0}{\Sigma p_0 q_1} \times 100$ (b) $\frac{\Sigma p_1 q_0}{\Sigma p_1 q_1} \times 100$

(c) $\frac{\Sigma p_1 q_1}{\Sigma p_0 q_1} \times 100$ (d) $\frac{\Sigma p_1 q_1}{\Sigma p_0 q_0} \times 100$

4. Let p_0, p_1 denote the prices of the base year and prices of the current year respectively. Let q_0, q_1 denote the quantities consumed in the base year and current year respectively. Also, if $\Sigma p_1 q_0 = 200$ and $\Sigma p_0 q_0 = 50$, then Laspeyre's index number is _____.

(a) 25 (b) 400

(c) 125 (d) 200

5. The arithmetic mean of Laspeyre's and Paasche's index number is defined to be _____.

(a) Marshall-Edgeworth's index number

(b) Fisher's index number

(c) Fixed base index numbers

(d) Bowley's index number

6. With the usual notation, Marshall's index number is _____.

(a) $\frac{\Sigma p_1 q_0 + \Sigma p_1 q_1}{\Sigma p_0 q_0 + \Sigma p_0 q_1} \times 100$

(b) $\frac{\frac{\Sigma p_1 q_0 + \Sigma p_1 q_1}{\Sigma p_0 q_0 + \Sigma p_0 q_1} \times 100}{2}$

(c) $\sqrt{\frac{\Sigma p_1 q_0 + \Sigma p_1 q_1}{\Sigma p_0 q_0 + \Sigma p_0 q_1}} \times 100$

(d) $\sqrt{\frac{\Sigma p_1 q_0 + \Sigma p_1 q_1}{\Sigma p_0 q_0 + \Sigma p_0 q_1} \times 100}$

7. With the usual notations, the time reversal test is _____.

(a) $I_{(01)} \times I_{10} = \frac{\Sigma p_1 q_1}{\Sigma p_0 q_1}$ (b) $I_{(01)} \times I_{(10)} = \frac{\Sigma p_0 q_0}{\Sigma p_1 q_1}$

(c) $I_{(pq)} \times I_{(qp)} = 1$ (d) $I_{(01)} \times I_{(10)} = 1$

8. _____ index number is an ideal index number.

(a) Fisher's (b) Paasche's

(c) Kelly's (d) Laspeyre's

9. Let $x_1, x_2, ..., x_n$ be the values of the independent variables x_i and $y_1, y_2, ..., y_n$ be the corresponding values of the variables y_i. If the points (x_i, y_i), $i = 1, 2, ..., n$ are plotted on a graph paper, we obtain a diagram called _____.

(a) Unscatter diagram

(b) Perfect diagram

(c) Scatter diagram

(d) None of these

10. If $d_i = y_i - f(x_i)$, then the principle of least square is _____.

(a) Σd_i is minimum (b) Σd_i is maximum

(c) Σd_i^2 is maximum (d) Σd_i^2 is minimum

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Given the following ultimate class frequencies of two attributes *A* and *B*. Find the frequencies of positive and negative class frequencies and the total number of observations.

$(AB) = 975$, $(\alpha B) = 100$, $(A\beta) = 25$, $(\alpha\beta) = 950$

Or

(b) Given the following positive class frequencies. $(A)=9$, $(B)=12$, $N=20$ and $(AB)=6$. Find the negative class frequency $(\alpha\beta)$.

12. (a) Find Laspeyre's index number for the following data.

Commodities / Year	A		B		C	
	Price	Quantity	Price	Quantity	Price	Quantity
1950	2	8	4	14	4	2
1956	4	6	5	10	8	5

Or

(b) Find Paasche's index number.

Commodities / Year	I		II		III	
	Price	Quantity	Price	Quantity	Price	Quantity
1960	10	2	30	5	20	4
1962	20	4	40	10	30	8

13. (a) Find Bowley's index number.

Items	Base Year		Current year	
	Price	Quantity	Price	Quantity
A	15	3	30	5
B	10	4	30	10

Or

(b) Find Marshall Edgeworth's index number.

Commodities	Base Year		Current year	
	Price	Quantity	Price	Quantity
A	40	4	80	10
B	30	4	60	5

14. (a) Calculate Fisher's index number for the year 1992.

Year	Rice		Wheat	
	Price	Quantity	Price	Quantity
1990	8	100	5	15
1992	9	80	8	10

Or

(b) Explain the characteristics of Index Numbers.

15. (a) Fit a straight line to the following data :

x :	0	1	2	3
y :	1	1.8	3.3	4.5

Or

(b) Fit a straight line to the following data :

x :	0	1	2	3
y :	2.1	3.5	5.4	7.5

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

16. (a) Of 500 men in a locality exposed to cholera, 172 in all were attacked; 178 were inoculated and of these 128 were attacked. Find the number of persons (i) not inoculated not attacked (ii) inoculated not attacked (iii) not inoculated, attacked.

Or

(b) If $(A)=(\alpha)=(B)=(\beta)=\frac{N}{2}$, show that (i) $(AB)=(\alpha\beta)$ (ii) $(A\beta)=(\alpha B)$.

17. (a) Find the value of x in the following data if the ratio between Laspeyre's and Paasche's index number is 28 : 27.

Commodities	p_0	q_0	p_1	q_1
A	1	10	2	5
B	1	5	x	2

Or

(b) Calculate Paasche's and Laspeyre's index numbers for the following data :

Commodities	p_0	q_0	p_1	q_1
A	1	5	1	10
B	2	9	3	6
C	3	15	4	10
D	3	9	4	12

18. (a) Find Bowley's index number for the following data :

Commodities	p_0	q_0	p_1	q_1
A	2	8	4	6
B	5	10	6	4
C	4	12	5	9
D	2	15	3	10

Or

(b) Find Marshall's index no. for the following data :

Commodities	Base Year		Current year	
	Price	Quantity	Price	Quantity
A	20	6	40	6
B	40	8	40	8
C	30	10	30	10
D	10	5	10	15

19. (a) Show that the given data satisfies time reversal test.

Commodity		A	B	C	D
Base Year	Quantity	50	40	120	30
	Price	5	6	4	3
Current Year	Quantity	60	50	110	35
	Price	7	8	5	4

Or

(b) Find Fisher's index number for the following data :

Commodities	Base Year		Current year	
	Price	Quantity	Price	Quantity
A	10	25	12	30
B	8	21	9	25
C	4.5	28	6.5	35
D	3.5	16	4	20

20. (a) Fit a straight line to the following data and estimate the value of y when $x = 5$.

x :	1	3	4	6	8	9	11	14
y :	1	2	4	4	5	7	8	9

Or

(b) Fit a straight line to the following data.

x :	1	2	3	4	6	8
y :	2.4	3	3.6	4	5	6

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