

Reg. No. :

Code No. : SS 30596 E Sub. Code : SNMA 4 B

U.G. (CBCS) DEGREE (Special Supplementary)
EXAMINATION, APRIL 2020.

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. Give ' n ' attributes, the total no. of positive class frequencies is _____
(a) 3^n (b) 2^n
(c) 3^2 (d) $2^n - 1$

2. If $(AB) = 975$ and $(AB) = 25$, then $A =$ _____

(a) 1075 (b) 950

(c) 1000 (d) 900

3. If the Laspeyre's and paasche's index numbers are respectively ' m ' and ' n ' then the Fisher's index number is _____

(a) $\frac{m+n}{2}$ (b) $\sqrt{mn}$

(c) $\frac{2mn}{m+n}$ (d) mn

4. With usual notation, Laspeyre's index number is _____

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

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

5. Geometric mean of Laspeyre's and Paasche's index number is _____

(a) Bowley's (b) Fisher's

(c) Marshall's (d) Kelly's

6. The arithmetic mean of Laspeyre's and Passche's index number is defined to be _____
- (a) Marshall index number
 - (b) Fisher's index number
 - (c) Fixed Base index number
 - (d) Bowley's index number
7. _____ index number is an ideal index number.
- (a) Paasche's (b) Fisher's
 - (c) Laspeyre's (d) Kelly's
8. Laspeyre's index number does not satisfy the _____
- (a) Time reversal test (b) Factor reversal test
 - (c) Both (a) and (b) (d) None of these
9. If $d_i = y_i - f(x_i)$, then the principle of least square is _____
- (a) $\sum d_i$ is minimum (b) $\sum d_i$ is maximum
 - (c) $\sum d_i^2$ maximum (d) $\sum d_i^2$ minimum

10. For fitting a straight line $y = ax + b$, the normal equations are

(a) $a \sum x_i^2 + b \sum x_i = \sum x_i y_i; a \sum x_i + nb = \sum y_i$

(b) $b \sum x_i^2 + a \sum x_i = \sum x_i y_i; b \sum x_i + na = \sum y_i$

(c) $a \sum x_i^2 + b \sum x_i = \sum x_i y_i; b \sum x_i + na = \sum y_i$

(d) $b \sum x_i^2 + a \sum x_i = \sum x_i y_i; a \sum x_i + nb = \sum y_i$

PART B — ($5 \times 5 = 25$ marks)

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

11. (a) Given the following positive class frequencies
 $(A) = 9, (B) = 12; (AB) = 6, N = 20$. Find $(\alpha), (A\beta), (\alpha\beta)$.

Or

- (b) Given $(A) = 30, (B) = 25, (\alpha) = 30, (\alpha\beta) = 20$.
 Find
- (i) N
 - (ii) (β)
 - (iii) (AB)
 - (iv) $(A\beta)$
 - (v) (αB)

12. (a) Find Laspeyres's index number

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

Or

- (b) Find Paache's index number

Commodities	p_0	q_0	p_1	q_1
A	2	10	3	12
B	7	21	9	25

13. (a) Find Bowley's index number

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

Or

- (b) Find Marshall's Edgeworth index number

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

14. (a) Explain the characteristics of index numbers.

Or

- (b) Find Fisher's index number

Commodities	Base year		Current year	
	Price	Quantity	Price	Quantity
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

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

$x :$	0	1	2	3	4
$y :$	1	1.8	1.3	2.5	2.3

Or

- (b) 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

PART C — ($5 \times 8 = 40$ marks)

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

16. (a) If $(A) = (\alpha) = (B) = (\beta) = N/2$. Show that

(i) $(AB) = (\alpha\beta)$

(ii) $(A\beta) = (\alpha B)$

Or

- (b) Given the following positive class frequencies. Find the remaining class frequencies. $N = 20$, $(A) = 9$; $(B) = 12$; $(C) = 8$, $(AB) = 6$; $(BC) = 4$; $(CA) = 4$.

17. (a) Find the missing price in the following data if the ratio between Laspeyre's and Paache's index number is 25 : 24

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

Or

- (b) Calculate Laspeyre's and Paache's index number

Commodities	Base year		Current year	
	Price	Quantity	Price	Quantity
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

18. (a) Find Marshall Edgeworth index number.

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

Or

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

Commodities	Base year 1990		Current year 1992	
	Price	Quantity	Price	Quantity
A	2	10	3	12
B	5	16	6.5	11

Commodities	Base year 1990		Current year1992	
	Price	Quantity	Price	Quantity
C	3.5	18	4	16
D	7	21	9	25
E	3	11	3.5	20

19. (a) Show that the following data statisfies time reversal.

Commodities	Base year		Current year	
	Price	Quantity	Price	Quantity
A	6	50	10	56
B	2	100	2	120
C	4	60	6	60
D	10	30	12	24
E	8	40	12	36

Or

- (b) Compute Fisher's index number and show that it satisfies time reversal test

Year	Tomoto		Brinjal		Onion	
	Price	Quantity	Price	Quantity	Price	Quantity
1980	4	50	3	10	2	5
1990	10	40	8	8	4	4

20. (a) 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

Or

- (b) Show that the line of best fit to the following data is $y = 8 - 0.5x$.

x :	6	7	7	8	8	8	9	9	10
y :	5	5	4	5	4	3	4	3	3
