Reg. No. : .....

Code No. : 41388 E Sub. Code : SNMA 4 B

U.G. (CBCS) DEGREE EXAMINATION, APRIL 2019.

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 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. For the two attributes A and B the 2×2 contingency table is given

	B	Non B
A	a	b
Non A	c	d

Then the expected frequency of attribute AB is _____.

(a) $\frac{(a+b)(b+d)}{a+b+c+d}$ (b) $\frac{(a+b)(a+c)}{a+b+c+d}$

(c) $\frac{(c+d)(a+c)}{a+b+c+d}$ (d) $\frac{(c+d)(b+d)}{a+b+c+d}$

2. Given n attributes, the total number of positive class frequencies is ————————.

(a) 3^n (b) 2^n

(c) 2^{n-1} (d) 3^{n-1}

3. In the computation of an index number, if the base year used for comparison is kept constant throughout, then it is called ———————— method.

(a) Chain base

(b) Aggregate

(c) Average of price relative

(d) Fixed base

4. If the current year quantities are taken as weights then that index number is called ———————— index number.

(a) Laspeyre's (b) Paasche's

(c) Marshall's (d) Bowley's

5. The arithmetic mean of Laspeyre's and Paasche's index number is defined as ———————— index number.

(a) Bowley's (b) Marshall's

(c) Fisher's (d) Kelley's

6. According to ———————— method, the weight is the sum of the quantities of the base period and current period.

(a) Bowley's (b) Marshall's

(c) Fisher's (d) Kelley's

7. Which one of the following is not involve in the Fisher's index number?

(a) Fisher's (b) Laspeyre's

(c) Paasche's (d) Bowley's

8. Which one of the following is an ideal index number?

(a) Laspeyre's (b) Paasche's

(c) Bowley's (d) Fisher's

9. The process of finding a functional relationship between two variables is called ————————.

(a) Scatter diagram

(b) Curve fitting

(c) Principle of least square

(d) Normal equations

10. Best fit of a curve is achieved by ————————.

(a) Scatter diagram

(b) Principle of least square

(c) Normal equations

(d) Curve fitting

PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) 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 atleast must have lost all the four?

Or

(b) In a class in which 135 candidates were examined for proficiency in English and Maths. It was discovered that 75 students failed in English, 90 failed in Maths and 50 failed in both. Find how many candidates

(i) have passed in Maths

(ii) have passed in English, failed in Maths

(iii) have passed in both.

12. (a) Construct index numbers of prices from the following data by applying

(i) Laspeyre's method

(ii) Paache's method.

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

Or

(b) Calculate Laspeyre's index number for the following data :

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

13. (a) Find Bowley's index number from the following data :

Commodities	Base Year		Current Year	
	Price	Quantity	Price	Quantity
1	60	30	90	25
2	16	20	25	15
3	140	10	250	5
4	160	3	200	2

Or

(b) Find Marshall's index number from the following data : (Consider 1993-94 as base year)

Commodity	1993-1994		2000-2001	
	Price	Quantity	Price	Quantity
Medical	20	8	40	6
Dress	50	10	60	5
Fruits and vegetables	40	15	50	15
Food	20	29	20	25
Location	60	1	75	1

14. (a) Calculate Fisher's index number for 1992 for the following data :

Year	Rice		Wheat		Flour	
	Price	Quantity	Price	Quantity	Price	Quantity
1988	9.3	100	6.4	11	5.1	5
1992	4.5	90	3.7	10	2.7	3

Or

(b) Compute Fisher's index number from the following data :

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

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

X-Years	1911	1921	1931	1941	1951
Y-Production	10	12	8	10	14

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 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Given the following positive class frequencies. Find the remaining class frequencies. $N = 20$, $(A) = 9$; $(B) = 12$; $(C) = 8$, $(AB) = 6$; $(BC) = 4$; $(CA) = 4$; $(ABC) = 3$.

Or

(b) A company produces tube lights and conducts a test on 5000 lights for production defects of frames (F), Chokes (C), Starters (S) and tubes (T). The following are the records of defects.

(F) = 130; (C) = 120; (S) = 115; (T) = 86; (FC) = 100; (CS) = 130; (ST) = 75; (FT) = 60; (CT) = 54; (FS) = 37; (FCS) = 90; (CST) = 85; (FST) = 112; (FCT) =108; (FCST) = 5.

Find the percentage of the tube light which passes all four tests.

17. (a) Calculate :

(i) Laspeyre's index number

(ii) Paasche's index number for the following data given below.

Commodities	Base Year 1990		Current Year 1992	
	Price	Quantity	Price	Quantity
A	2	10	3	12
B	5	16	6.5	11
C	3.5	18	4	16
D	7	21	9	25
E	3	11	3.5	20

Or

(b) Find :

(i) Laspeyre's

(ii) Paasche's index number from the following data

Commodities	Base Year		Current Year	
	Price	Quantity	Price	Quantity
1	60	30	90	25
2	16	20	25	15
3	140	10	250	5
4	160	3	200	2

18. (a) Find

(i) Bowley's index number

(ii) Marshall's index number from the following data :

Commodity	Base Year		Current Year	
	Price (Rs.)	Quantity	Price (Rs.)	Quantity
Food	20	3	40	5
Cloth	25	4	50	6
Fuel	30	2	60	3
House	10	1	20	2

Or

(b) Find

(i) Bowley's

(ii) Marshall's index numbers from the following data :

Commodity	Base Year		Current Year	
	Price	Quantity	Price	Quantity
A	16	5	20	6
B	12	10	12	12
C	14	6	16	6
D	20	3	22	2
E	18	4	22	3

19. (a) Consider 1996 year as base year and 2004 year as current year. Find Fisher's index number from the following data :

Commodity	Quantity		Price	
	1996	2004	1996	2004
A	100	150	600	1400
B	80	100	350	600
C	60	75	250	550
D	30	35	350	250

Using these values find its satisfies time reversal test.

Or

(b) Construct, with the help of data given below, Fisher's index number and show that it satisfies the time reversal test.

Commodity	Base year		Current year	
	Price (Rs.)	Quintals	Price (Rs.)	Quintals
A	5	50	7	60
B	6	40	8	50
C	4	120	5	110
D	3	30	4	35

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

Year	1986	1987	1988	1989	1990	1991	1992
Monthly production	64	73	93	73	84	106	110

Or

(b) 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