

20. (a) Ten students obtained the following percentage of marks in the college internal test ( $x$ ) and in the final university examination ( $y$ ).

$x$ : 51 63 63 49 50 60 65 63 46 50

$y$ : 49 72 75 50 48 60 70 48 60 56

Estimate the university examination mark of a student who got 61 in the college internal test.

Or

- (b) Calculate the coefficient of correlation and obtain the lines of regression for the following data :

$x$ : 1 2 3 4 5 6 7 8 9

$y$ : 9 8 10 12 11 13 14 16 15

Reg. No. : .....

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U.G. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2023.

Third Semester

Mathematics – Non Major Elective

FUNDAMENTALS OF STATISTICS – I

(For those who joined in July 2021 – 2022)

Time : Three hours

Maximum : 75 marks

PART A — ( $10 \times 1 = 10$  marks)

Answer ALL questions.

Choose the correct answer.

1. The person who said “statistics may be called as the science of counting” is \_\_\_\_\_  
(a) Cowden (b) Fisher  
(c) Yule (d) Bowley
2. The Ogive curves intersect at \_\_\_\_\_  
(a) Mean (b) Geometric mean  
(c) Mode (d) Median



3. The geometric mean of 2, 4, 8 and 64 is \_\_\_\_\_
- (a) 4 (b) 8  
(c) 12 (d) 16
4. If the sum of 10 items is 12 and their sum of squares is 16.9, the standard deviation is \_\_\_\_\_
- (a) 0.6 (b) 0.4  
(c) 0.25 (d) 0.2
5. The standard deviation is independent of \_\_\_\_\_
- (a) change of origin only  
(b) change of scale only  
(c) change of origin and scale  
(d) None of the above
6. Coefficient of variation is \_\_\_\_\_
- (a)  $\frac{\sigma}{\bar{x}}$  (b)  $\frac{\sigma}{\bar{x}} \times 100$   
(c)  $\frac{\bar{x}}{\sigma} \times 100$  (d)  $\frac{\bar{x}}{100\sigma}$

7. If  $\sigma_x = 4$ ,  $\sigma_y = 6$ ,  $cor(x, y) = 18$  then the value of correlation coefficient is \_\_\_\_\_
- (a)  $\frac{1}{4}$  (b)  $\frac{1}{2}$   
(c)  $\frac{3}{4}$  (d)  $\frac{1}{3}$
8. If the regression coefficient of  $x$  on  $y$  is 0.4 and the regression coefficient of  $y$  on  $x$  is 0.9, the correlation coefficient between  $x$  and  $y$  is \_\_\_\_\_
- (a) 0.06 (b) 0.36  
(c) 0.6 (d) 0.036
9. The regression coefficient of  $x$  on  $y$  is \_\_\_\_\_
- (a)  $\gamma \frac{\sigma_y}{\sigma_x}$  (b)  $\frac{\sigma_y}{\sigma_x}$   
(c)  $\frac{\sigma_x}{\gamma \sigma_y}$  (d)  $\gamma \frac{\sigma_x}{\sigma_y}$
10. The regression coefficients of  $x$  on  $y$  are independent of \_\_\_\_\_
- (a) change of origin only  
(b) change of scale only  
(c) change of origin and scale  
(d) none





PART B — (5 × 5 = 25 marks)

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

11. (a) Draw a multiple bar diagram from the following data.

Year	Sales (in Rs.)	Gross Profit (in Rs.)	Net Profit (in Rs.)
2000	120	40	20
2001	135	45	30
2002	140	55	35
2003	150	60	40

Or

- (b) Draw a pie diagram for the following data of sixth Five - Year Plan Public sector outlays :

Agriculture and Rural Development	12.9%
Irrigation, etc.	12.5%
Energy	27.2%
Industry and Minerals	15.4%
Transport, Communication etc.	15.9%
Social services and others	16.1%

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12. (a) Calculate the Geometric mean and the Harmonic mean of the following frequency distribution.

Class :	2 - 4	4 - 6	6 - 8	8 - 10
Frequency :	20	40	30	10

Or

- (b) Find the mean, standard deviation for the following data :

Class :	125-175	175-225	225-275	275-325	325-375
Frequency :	2	22	19	14	3
Class :	375-425	425-475	475-525	525-575	
Frequency :	4	6	1	1	

13. (a) Find the variance of the first  $n$  natural numbers.

Or

- (b) Find the standard deviation for the following frequency distribution.

Class :	30-39	40-49	50-59
Frequency :	37	50	42
Class :	60-69	70-79	80-89
Frequency :	21	11	3

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14. (a) Find the correlation coefficient for the following data.

$x:$     10    12    18    24    23    27

$y:$     13    18    12    25    30    10

Or

- (b) Given  $n = 1000$ ,  $\bar{x} = 65$ ,  $\bar{y} = 83$ ,  $\sigma_x = 4.5$ ,  $\sigma_y = 3.6$  and the sum of the products of deviations from the mean of  $x$  and  $y$  is 4800. Find the correlation coefficient between  $x$  and  $y$ .
15. (a) Out of the two lines of regression given by  $x + 2y - 5 = 0$  and  $2x + 3y - 8 = 0$  which one is the regression line of  $x$  on  $y$ ?

Or

- (b) The following data regarding the heights ( $x$ ) and weights ( $y$ ) of 100 college students are given as  $\sum x = 15000$ ;  $\sum y = 6800$ ;  $\sum x^2 = 2272500$ ;  $\sum y^2 = 463025$  and  $\sum xy = 1022250$ .

Find the equation to the regression line of height on weight.

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PART C — (5 × 8 = 40 marks)

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

16. (a) Discuss the types of classification.

Or

- (b) The region wise rainfall indices during the years 2001 to 2003 are given below.

Year	West	North	East	South	Centre
2001	78.4	88.9	83.7	89.9	86.5
2002	75.6	62.5	103.6	75.5	77.4
2003	121.2	116.5	107.6	123.9	90.3

Represent the data by multiple bar diagram.

17. (a) Find the mean, median and mode of the following frequency distribution :

Class :	20-24	25-29	30-34	35-39
Frequency :	3	5	10	20
Class :	40-44	45-49	50-54	55-59
Frequency :	12	6	3	1

Or

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- (b) Calculate the mode for the following distribution :

Marks :	0-9	10-19	20-29	30-39	40-49
No.of students :	6	29	87	181	247
Marks :	50-59	60-69	70-79	80-89	90-99
No.of students :	263	133	43	9	2

18. (a) The following table gives the monthly wages of workers in a factory.

Monthly Wages :	125-175	175-225	225-275	275-325	325-375
No.of Workers:	2	22	19	14	3
Monthly Wages :	375-425	425-475	475-525	525-575	
No.of Workers:	4	6	1	1	

Compute :

- (i) quartile deviation  
(ii) coefficient of variation.

Or

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- (b) The scores of two cricketers A and B in 10 innings are given below. Find who is a better run getter and who is more consistent player.

A's scores $x_i$	40	25	19	80	38
B's scores $y_i$	28	70	31	3	14
A's scores $x_i$	8	67	121	66	76
B's scores $y_i$	111	66	31	25	4

19. (a) Find the correlation coefficient for the following data.

$x :$	20	18	16	15	14	12	12	10	8	5
$y :$	12	14	10	14	12	10	9	8	7	2

Or

- (b) Ten students got the following percentage of marks in two subjects :

Economics :	78	65	36	98	25	75	82	90	62	39
Statistics :	84	53	51	91	60	68	62	86	58	47

Calculate the rank correlation coefficient.

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