15. a1) Compute the correlation coefficient between X and Y, using the following data : (9

X	1	3	5	7	8	10
Y	8	12	15	17	18	20

a2) Given that $x = 4y + 5$ and $y = kx + 4$ are the regression lines of X on Y and Y on X respectively. Show that $0 \leq k \leq \frac{1}{4}$. If $k = \frac{1}{16}$ find the mean of X and Y and Y × Y. (4

(OR)

b) Calculate seasonal indicies by the ratio to moving average method from the following data : (13

Wheat Prices (in rupees per quintal)

Quarter/Year	1972	1973	1974	1975
I	75	86	90	100
II	60	65	72	78
III	54	63	66	72
IV	59	80	85	93

PART – C (1×15=15 Marks)

16. a) Obtain the equations of the lines of regression from the following data : (15)

X :	1	2	3	4	5	6	7
Y :	9	8	10	12	11	13	14

(OR)

b) Four doctors each test four treatments for a certain disease and observe the number of days each patient takes for recover. The result follows (recovery time in days)

	Treatment			
Doctor	1	2	3	4
A	10	14	19	20
B	11	15	17	21
C	9	12	16	19
D	8	13	17	20

Discuss the difference between (a) doctors and (b) treatments. (15)

b) In an engineering examination a student is considered to have failed, secured second class, first class and distinction. According as he scores less than 45%, between 45% and 60%, between 60% and 75% and above 75% respectively. In a particular year 10% of the students failed in the examination and 5% of the students got distinction. Find the percentage of students who got first class and second class. **(13)**

12. a) The mean value of a random sample of 60 items was found to be 145 with a S.D. of 40. Find the 95% confidence limits for the population mean. What size of the sample is required to estimate the population mean within five of its actual value with 95% or more confidence, using the sample mean. **(13)**

(OR)

b) A distribution with unknown mean μ has variance equal to 1.5. Use central limit theorem to find how large a sample should be taken from the distribution in order that the probability will be atleast 0.95 that the sample mean will be within 0.5 of the population mean. **(13)**

13. a) The following table gives the biological values of a protein from cow's milk and buffalo's milk at a certain level. Examine if the average values of protein in the two samples significantly differ. **(13)**

Cow's milk	1.82	2.02	1.88	1.61	1.81	1.54
Buffalo's milk	2.00	1.83	1.86	2.03	2.19	1.88

(OR)

b1) Two independent samples of eight and seven items respectively had the following values of the variable.

Sample I	9	11	13	11	15	9	12	14
Sample II	10	12	10	14	9	8	10	

Do the two estimates of population variance differ significantly at 5% level of significance. **(6)**