

**2021**

**BUSINESS ADMINISTRATION — HONOURS**

**Paper : A202-C-3**

**(Statistics for Business Decisions)**

**Full Marks : 80**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

Answer **any five** questions from the following.

1. (a) Distinguish between Primary data and Secondary data.
- (b) Distinguish between Population and Sample.
- (c) Construct the Grouped Frequency Distribution from the following data and hence find the value of Median.

Marks	No. of Students
Less than 10	175
Less than 20	360
Less than 30	680
Less than 40	790
Less than 50	900
Less than 60	1000

3+3+(3+7)

2. (a) Draw both the ogives for the following frequency distribution on the same graph:

Class-interval	Frequency
100-110	4
110-120	8
120-130	11
130-140	15

**Please Turn Over**

140-150	12
150-160	6
160-170	3

(b) Age at death of 30 persons of a town are given below:

47	39	45	43	47	38	39	37	40	32
54	36	51	46	41	55	58	31	42	53
36	60	59	41	52	32	44	56	53	31

Arrange the data in a frequency distribution of 10 class intervals and hence obtain the percentage frequency in each class interval and class mark. 8+8

3. (a) The median and mode of the following frequency distribution are known to be 27 and 26 respectively. Find the values of missing frequencies.

<b>Values</b>	0-10	10-20	20-30	30-40	40-50
<b>No. of families</b>	3	?	20	12	?

(b) The runs of two batsmen A and B scored in 8 consecutive innings are as follows:

<b>A</b>	32	28	47	63	71	39	60	96
<b>B</b>	19	31	48	53	90	67	62	40

Find which of the two batsmen is more consistent in scoring. 8+8

4. (a) The sectional distribution of World Bank Project lending in South Asia up to 2020 is given below:

<b>Sectors</b>	<b>Number of Projects</b>
Transportation	80
Telecommunication	21
Industry	108
Agriculture and Rural Development	259
Social Sectors	94

Represent the above data by Pie Diagram.

(b) The mean and standard deviation of one sample are respectively 54.4 and 8; the mean and standard deviation of another sample are 50.3 and 7 respectively. The size of the first sample is 50 and that of second is 100. Find the mean and standard deviation of the composite sample combining the aforesaid two samples.

(c) If  $y = 10 - 7x$  and quartile deviation of  $x$  is 2, then find the quartile deviation of  $y$ . 6+(2+6)+2

5. (a) Find the Mean deviation of the following frequency distribution:

<b>Marks</b>	0-10	10-20	20-30	30-40	40-50	50-60	60-70
<b>No. of students</b>	3	12	25	30	15	10	5

- (b) Find the first, second, third and fourth central moments for the set of numbers 2, 4, 6, 8. Hence find the measures of skewness.
- (c) Calculate the rank correlation coefficient for the following data:

<b>X</b>	92	89	87	86	83	77	71	63	53	50
<b>Y</b>	86	83	91	77	68	85	52	82	37	57

6+5+5

6. (a) Using the following data (given in suitable units) calculate Fisher's Ideal Index Number for 2014 with respect to the base 2013 and hence check whether it satisfies the 'Time Reversal Test'.

<b>Commodity</b>	<b>2013</b>		<b>2014</b>	
	<b>Quantity</b>	<b>Price</b>	<b>Quantity</b>	<b>Price</b>
<b>A</b>	40	25	50	30
<b>B</b>	60	20	55	26
<b>C</b>	25	16	30	15
<b>D</b>	56	24	45	18

- (b) Find the correlation coefficient between the two series:

<b>Series A</b>	29	32	45	67	56	36	45	50	53	48
<b>Series B</b>	56	40	52	68	40	72	40	57	37	52

(4+4)+8

7. (a) Fit a straight line trend to the following data. Hence find the sale in the year 2021.

<b>Year</b>	2014	2015	2016	2017	2018	2019	2020
<b>Sale (tons)</b>	110	121	116	136	140	157	170

- (b) Name the four components of time series.
- (c) If the ratio between Laspeyres' and Paasche's index number is 28 : 27, find the missing figure in the following table:

<b>Commodity</b>	<b>Base year</b>		<b>Current year</b>	
	<b>Price</b>	<b>Quantity</b>	<b>Price</b>	<b>Quantity</b>
<b>X</b>	1	10	2	5
<b>Y</b>	1	5	?	2

6+2+8

8. (a) The regression equations calculated from a given set of observations are  $4x - 5y + 33 = 0$  and  $20x - 9y = 107$ .

Find:

- (i) Average Values of  $x$  and  $y$ .
- (ii) Correlation coefficient between  $x$  and  $y$ .
- (iii) If variance of  $x$  is 9; find the standard deviation of  $y$ .

- (b) Calculate Karl Pearson's measure of skewness for the following distribution.

Class Interval	10-20	20-30	30-40	40-50
Frequency	8	14	16	12

8+8

9. (a) In a bolt factory, machines  $M_1, M_2, M_3$  manufacture 25, 35 and 40 per cent of the total output respectively. Of their output 5, 4 and 2 per cent respectively are defective bolts. One bolt is drawn at random from the product and is found to be defective. What is the probability that it is manufactured in the machine  $M_2$ ?

- (b) Five men in a company of 20 are graduates. If 3 men are picked out of the 20 men at random, find the probability that

- (i) they are all graduates.
- (ii) at least one of them is a graduate.
- (iii) exactly one of them is a graduate.

8+8

10. (a) The group indices and the corresponding weights for the cost of living index number of the working class in an industrial city for the years 2017 and 2019 are given below.

Group	Weight	Group Index	
		2017	2019
Food	60	120	150
Clothing	5	150	190
Fuel	10	130	160
House Rent	15	110	130
Miscellaneous	10	120	140

Compare the cost of living indices for the two years 2017 and 2019. If a worker getting Rs.2000 in 2017 and Rs.2300 in 2019, state how much extra allowance should be given to him to maintain his standard of living at 2017 level.

- (b) Find the mean and standard deviation of binomial distribution with parameters  $n$  and  $p$ . (3+3)+(4+6)