

2019

BUSINESS ADMINISTRATION — HONOURS

Paper : A 202/C3

(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.*

Section – A

1. Answer **any five** questions :

2×5

- (a) A.M. of two observations is 25 and their G.M. is 15. Find the two observations.
- (b) Find the standard deviation of the following data :
4, 8, 10, 12, 16
- (c) The mode and mean of an assymetrical distribution are respectively 12 and 18. Find the median of the distribution.
- (d) If $r = 0.4$, $\text{Cov}(x, y) = 10$ and $\sigma_y = 5$, find σ_x (symbols are of usual meaning).
- (e) What is meant by Time series? Mention the chief components of time series.
- (f) What is cost of Living Index? What are its uses?
- (g) If $P(A) = 0.5$, $P(B) = 0.4$ and $P(A \cup B) = 0.7$, find $P(A \cap B)$.
- (h) The three events A , B and C are mutually exclusive and exhaustive; if $P(B) = \frac{3}{2} P(A)$, and $P(C) = \frac{1}{3} P(B)$, find $P(C)$.

2. Answer **any five** questions :

4×5

(a) Calculate Median from the following frequency distribution :

Weight in kg	45-50	50-55	55-60	60-65	65-70	Total
No. of men	15	20	25	30	10	100

(b) Draw the histogram of the following frequency distribution :

Height (cm)	141-150	151-160	161-170	171-180	181-190	Total
Frequency	5	16	56	19	4	100

- (c) Two samples of sizes 60 and 90 have 52 and 48 as the respective arithmetic means, 9 and 12 as the respective standard deviations. Find the arithmetic mean and S.D of the combined sample of size 150.
- (d) Ten students obtained the following marks in Mathematics and Statistics. Calculate the shearman's rank correlation coefficient.

Student (Roll no.) :	1	2	3	4	5	6	7	8	9	10
Marks in Math :	50	70	55	60	80	62	90	65	72	63
Marks in Stat :	25	60	45	50	56	20	55	30	45	30

- (e) Calculate 5-yearly moving averages of the following time series data :

Year :	2010	2011	2012	2013	2014	2015	2016	2017	2018
No. of students	332	317	357	392	402	405	410	427	405

- (f) Find the mode of the following distribution :

Class	130-134	135-139	140-144	145-149	150-154	155-159	160-164
Frequency	5	15	24	28	17	8	3

- (g) Draw Ogives from the following data :

Class Interval	15-21	22-28	29-35	36-42	43-49	50-56	57-63
Frequency	10	15	32	42	26	12	9

Calculate the median form the Ogives.

- (h) The mean of 5 observations is 4.4 and the variance is 8.24. If three of the five observations are 1, 2 and 6, find the other two.

Section - B

3. Answer **any five** questions.

- (a) (i) From the following data using moving average method, Calculate 4-yearly moving average :

Year	2004	2005	2006	2007	2008	2009
Production '000 tons	264	225	227	308	428	352
Year	2010	2011	2012	2013	2014	2015
Production '000 tons	312	320	324	340	302	371

- (ii) Between the hours 10AM and 12 Noon, the average number of phone calls per minute coming into the switchboard of a company is 2.5. Find the probability that during one particular minute, there will be no call at all.

(Given $e^{-2} = 0.13534$, $e^{-0.5} = 0.60650$)

- (b) From the data given below, state which series is more consistent :

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Variable	10-20	20-30	30-40	40-50	50-60	60-70
Series A	10	18	32	40	22	18
Series B	18	22	40	32	18	10

- (c) Calculate Fisher's price index number from the following data. From the data, show that Fisher's index number formula satisfies both time reversal and factor reversal tests.

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Commodity	Base year (2016)		Current Year (2018)	
	Price	Quantity	Price	Quantity
A	3	8	4	6
B	7	14	8	5
C	5	10	7	14
D	4	18	4	13

- (d) Fit a straight line trend to the given time series data and estimate the value for the year 2020.

7+3

Year	2012	2013	2014	2015	2016	2017	2018
Average Production per month ('000 tons)	20	22	21	24	25	23	28

- (e) The weekly wages of 1000 workers are normally distributed around a mean of ₹ 700 and with a standard deviation of ₹ 50. Estimate the number of workers whose weekly ways will be

- (i) between ₹ 700 and ₹ 720
- (ii) between ₹ 690 and ₹ 720
- (iii) more than ₹ 750
- (iv) less than ₹ 630
- (v) estimate the lowest weekly wages of the 100 highest paid workers.

2+2+2+2+2

Given :

z	0.2	0.4	1	1.28	1.4
Area	0.0793	0.1554	0.3413	0.4	0.4192

- (f) A random variable X has the followings probabilitis distribution :

x	0	1	2	3	4	5	6	7
$p(x)$	a	$4a$	$3a$	$7a$	$8a$	$10a$	$6a$	$9a$

- (i) Determine the value of a .
- (ii) Find $p(x < 3)$, $p(x \geq 4)$, $p(0 < x < 5)$
- (iii) Find the minimum value of m for which $p(x \leq m) \geq 0.6$.

2+6+2

(g) For the variables x and y , the equation of regression lines are $4x - 5y + 33 = 0$ and $20x - 9y = 107$.

(i) Identify the regression lines

(ii) Find correlation coefficient

(iii) Find \bar{x} , \bar{y}

(iv) Find s.d. of y when variance of x is 9.

4+2+2+2

(h) Compute an appropriate measure of skewness from the following data :

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% of marks	20-30	30-40	40-50	50-60	60-70	70-80	80-90
No. of students	45	40	24	12	9	3	2