

Indian Maritime University
 (A Central University, Govt. Of India)
M.Tech (Marine Engineering and Management)
 Semester - I
 End Semester Examination December 2019
Statistics for Business Managers (PG13T1106)

Date: 13.12.2019
Time: 3 Hours

Max Marks: 60
Pass Marks: 30

Note: Answer any five questions. All questions carry equal marks.

[5 X 12 Marks = 60]

- 1 a. Show that
- (I) Sum of deviations about arithmetic mean is zero
 - (II) Sum of absolute deviation about median is least
 - (III) Sum of squares of deviations about arithmetic mean is least.

[6]

1 b. Calculate the value of coefficient of mean deviation (about median) from the following data:

Marks	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90
No. of students	2	6	12	18	25	20	10	7

[6]

2a. Calculate the mean and variance of the Poisson distribution.

[6]

2b. Assuming that the probability of a fatal accident in a factory during the year is $1/1200$, calculate the probability that in a factory employing 300 workers, there will be at least two fatal accident in a year. (Given $e^{-0.25} = .7788$)

[6]

3a. The theory predicts the proportion of beans in the four groups A, B, C and D should be (9 : 3 : 3 : 1). In an experiment among 1600 beans, the numbers in the four groups were 882, 313, 287 and 118. Does the experimental result support the theory? (Given $\chi^2_{0.05}$ for 3 d.f = 7.815). [6]

3b. Two different types of drugs A and B are tried on certain patients for increasing weights. 5 persons were given drug A and 7 persons were given drug B . The increase in weights in lbs is given below-

Drug A	8	12	13	9	3		
Drug B	10	8	12	15	6	8	11

Do the two drugs differ significantly with regard to their effect in increasing weight? (The Table value of t for df 10 at 5% level = 2.23)

[6]

4 .

10 varieties of wheat are given in 3 plots each and following yields in mounds per ace obtained:

Plots/Variety	1	2	3	4	5	6	7	8	9	10	Total
I	7	7	14	11	9	6	9	8	12	9	
II	8	9	13	10	9	7	13	13	11	11	
III	7	6	16	11	12	5	12	11	11	11	
Total	22	22	43	32	30	18	34	32	34	31	298

Test the significance of the differences between variety yields . [12]

5.a

A business unit collected the following data:

Sales Territory	Sales (Lakh Rupees)	Advertising (Thousand Rupees)	No of Selling Agents
1	100	40	10
2	80	30	10
3	60	20	7
4	120	50	15
5	150	60	20
6	90	40	12
7	70	20	8
8	130	60	14

Develop a multiple regression equation to predict sales when advertising expenditure is 18.5 (thousand rupees) and number of selling agents is 15.

[8]

5 b. Obtain the mean and variance of the estimated values from regression equation Y on X. [4]

6.a) Examine whether Fisher's Ideal Index Number satisfies the Time Reversal and Factor Reversal Tests. [4]

6.b) Fit a parabolic trend to the data given below and estimate the value for the year 2000 and comment on it.

YEAR	2014	2015	2016	2017	2018
VOLUME OF CARGO (in million of Rs.)	10	12	13	10	8

[8]

7. Forecast the volume of cargo for 2019 by Holt's Exponential Smoothing model with $\alpha = 0.5$ and $\beta = 0.1$ from the following data:

YEAR	2011	2012	2013	2014	2015	2016	2017	2018
Volume of Cargo ('000 MT)	120	150	205	185	195	212	225	237

[12]

- 8a. The estimated sales of proposed types of perfumes are as under:

Type of Perfumes	ESTIMATED LEVELS OF SALES (UNITS)		
	Rs. 20,000	Rs. 10,000	Rs. 20,000
A	25	15	10
B	40	20	5
C	60	25	3

- (a) For each of the following decisions, state the optimal action and specify the value leading to its selection:

(i) Maximin, (ii) MAXIMAX, (iii) Laplace, (iv) Maximax regret.

- (b) What will be the optimal act if the payoff entries represent the costs instead of sales?

[6]

- 8b. Solve the game whose payoff matrix is given below:

PLAYER A	P L A Y E R B			
	B ₁	B ₂	B ₃	B ₄
A ₁	3	2	4	0
A ₂	3	4	2	4
A ₃	4	2	4	0
A ₄	0	4	0	8

[6]
