

"QUESTION PAPER MUST BE ATTACHED ALONGWITH THE ANSWER BOOK."

L - 82

November, 2016

STATISTICS

Reg. No.

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[Time : 3 Hours]

[Total Marks :100]

Answer **ANY FIVE** questions only. All questions carries **20** marks each.

(Candidates are allowed to refer Statistical Tables)

Marks
5 each

Q.1. Write Short-Notes On

- a) The Law of Large Numbers.
- b) Types of Portfolios.
- c) Chi-Square Test of Homogeneity
- d) Purpose and Use of Index-Numbers.

Q.2. Variable 'X' represents the number of motor vehicle policies (in thousands) issued by a branch office of a general insurance company in a year. Data collected for 50 years is tabulated below.

X→	20-25	25-30	30-35	35-40	40-45	45-50	50-55
Years →	2	5	8	12	10	7	6

Calculate:

- i) Both the Quartiles (Q_1 & Q_3) 5
- ii) Seventh decile & 43rd percentile 5
- iii) Mean Deviation from mean 5
- iv) Standard deviation 5

- Q.3. a) Subway trains on a certain railway line run every half hour between mid night and six in the morning. What is the probability that a man entering a station during this period, at a random time, will have to wait at least 20 minutes? 10
- b) A Sample poll of votes for two candidates A & B during an election was taken. Results were tabulated as below. 10

(Total Sample Voters 2000)

Area \ Candidate ↓ →		A	B
Rural →		620	380
Urban →		550	450

Test at 5% level of significance whether type of area is related to voting preference to A & B

- Q.4. a) Steel rods are manufactured to be 3 inches in diameter but they are acceptable if they are inside the limits of 2.99 inches & 3.01 inches. It is observed that 5% are rejected as oversize and 5% are rejected being undersize. Assuming the diameters are distributed normally, find the standard deviation of the distribution. Hence calculate what would be the percentage of rejections if permissible limits were widened to 2.985 inches & 3.015 inches. 10

- b) Following figures give the distribution of digits in numbers chosen at random from a telephone directory :- 10

0	1	2	3	4	5	6	7	8	9	Total
1026	1107	997	966	1075	933	1107	972	964	853	10000

Test whether the digits are occurring equally frequently in the directory.

- Q.5. "Long-Life Life Assurance Company" was established in the Year: 2005-2006. 20

Following data is about 635 Death-Claims, settled by "Long-Life Life Assurance Company", during the Financial Year: 2015-2016.

S	Policy-Duration (Completed Years)	Number of Death-Claims
1	1	14
2	2	24
3	3	39
4	4	42
5	5	60
6	6	64
7	7	73
8	8	87
9	9	95
10	10	137
Total	55	635

Calculate Coefficient of Correlation (r) between the Policy-Duration (Completed Years) and the Number of Settled Death-Claims.

Comment on your answer.

Is there any Linear Correlation, which exists between the Policy-Duration (Completed Years) and the Number of Settled Death-Claims?

What is the Standard Error of your estimate?

Q.6. a) Write a Short-Note on Chain Indices.

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b) Following are the Index-Numbers for successive years; Index for the Year: 2006, is calculated with the Base-Year: 2001.

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S	Year	Successive Index
1	2006	1.23000
2	2007	1.06504
3	2008	1.08137
4	2009	1.10829
5	2010	1.12038
6	2011	1.08869
7	2012	1.09311
8	2013	1.10906
9	2014	1.06349
10	2015	1.05873

Estimate the Indices for the Years: 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, and 2015, with respect to Base-Year: 2001.

c) Write a short-note on 'Time-Reversal Test'.

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Q.7. Mr. Guru, the Chief Training Officer of a Life Assurance Company, wants to test the Examination-Passing-Percentage of the Candidates trained through the Training Centers of the 5 Regions: North, East, West, South, and Central; which are equipped with 5 different Training Methodologies: A, B, C, D, and E.

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Mr. Guru, wants to follow a Latin Square Design in arrangement of 25 Training Center-Heads, with 5 different Training Methodologies. Mr. Guru designs the set in such a way, that, each Training Methodology will be applied to only 1 Training Center in each Region, and the Examination-Passing-Percentage, is given below.

Training Methodology	Training Centre									
	1		2		3		4		5	
A	North	94%	East	88%	West	98%	South	95%	Central	100%
B	East	81%	West	77%	South	84%	Central	81%	North	87%
C	West	100%	South	88%	Central	82%	North	77%	East	86%
D	South	78%	Central	91%	North	82%	East	99%	West	85%
E	Central	80%	North	96%	East	95%	West	86%	South	80%

Test, whether, Mr. Guru infers that, there is a significant difference in the average Examination-Passing-Percentage of the Training-Center Heads of the different Regions, due to the different Training Methodologies.

Q.8. The Quarter-Wise Performance, of a Country's Life Assurance Industry, in terms of the First Premium (Rupees, Crores), procured in the last 5 Financial Years, is as follows:

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S	Financial Year	Quarter				Total
		I	II	III	IV	
1	2011-2012	98	281	379	920	<u>1,678</u>
2	2012-2013	117	296	339	960	<u>1,712</u>
3	2013-2014	99	184	491	504	<u>1,278</u>
4	2014-2015	128	165	430	715	<u>1,438</u>
5	2015-2016	106	185	392	734	<u>1,417</u>
Total		548	1,111	2,031	3,833	7,523

Forecast the First Premium (Rupees, Crores), likely to be procured, by the Life Assurance Industry, in the Financial Year: 2016-2017, with Quarterly Break-Up, since it is required by the Insurance Regulator of the Country.

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