L - 82

May, 2016   **STATISTICS**   Reg. No.

[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
Q.1.	a)	Draw a Pie-Chart, to represent the Following Data, in respect of the 5 Different Club-Member Agents of 'Jeevan Beema Company', as on 31st March, 2016.	5

S	Club	Number of Agents
1	Platinum	204
2	Diamond	218
3	Gold	230
4	Silver	169
5	Rising Star	213
	Total	1,034

Sub-Questions: (b), (c), and (d); depends on the Following Data.

Following Data shows the Number of Policies (in Thousands), issued at Different Ages-at-Entry of the Health Insurance Policy-Holders, of 'Niramay Aarogya Beema Company'.

S	Age-at-Entry	Number of Policies
1	0 to 9	17
2	10 to 19	19
3	20 to 29	18
4	30 to 39	24
5	40 to 49	19
6	50 to 59	17
	Total	114

	b)	Draw a Histogram, to represent the Given Data.	5
	c)	Draw Greater Than Cumulative Frequency Curve and Less Than Cumulative Frequency Curve, to represent the Given Data.	5
	d)	Determine, Graphically; the Upper Quartile, Median, and Lower Quartile; based on the Given Data.	5
Q.2.	a)	Explain advantages of sampling	5
	b)	Describe difference between non probability sampling & probability sampling	5
	c)	A Newspaper wants to conduct a survey for estimating the proportion of voters likely to vote for a party-Z	5

1

What should be the minimum sample -size of the sample if the Editor wants to be 90% confident that the error in estimate will not exceed 5%

d What is meant by sampling error? How to minimise the sampling error & explain how it differs from non-sampling error.   5

Q.3. a) Write a Note on Binomial Distribution.   10

b) A Life Assurance Underwriter, underwrites the Life Assurance Proposals as a Bernoulli Process with 0.25 Decline-Rate, that is, the Probability of the Life Assurance Proposal, selected on a Random Basis, being "Declined" is 0.25, and this Proportion remains Constant, for Each of the Further Sample, taken on Random Basis.

5 Life Assurance Proposals are selected on a Random Basis.

(1) What is the Probability of 0 Proposal being "Declined"?   2
(2) What is the Probability of 1 Proposal being "Declined"?   2
(3) What is the Probability of 3 Proposals being "Declined"?   2
(4) What is the Probability of 5 Proposals being "Declined"?   2
(5) What is the Probability of at least 1 Proposal being "Declined"?   2

Q.4. Following are the Vehicle-Expenses (Rupees, Thousands) of a Chief Marketing Officer of a Life Assurance Company, during the Calendar Years: 2011 to 2015.

Year	Quarter				Total
	I	II	III	IV	
2011	33	24	32	35	124
2012	30	36	29	30	125
2013	35	28	29	31	123
2014	31	34	38	22	125
2015	35	28	26	39	128
Total	164	150	154	157	625

a) Calculate Seasonal Indices by the Method of Moving Averages.   10
b) Derive the Equation of Trend-Line.   5
c) Obtain the Trend-Value for Each Quarter of the Year: 2016.   5

Q.5. a) For a normal distribution with mean 1 and standard deviation 3. Find the probability for the intervals   5

i)	$x = 3.43 \text{ to } 6.19$
ii)	$x = -1.43 \text{ to } 6.19$

b) The quarterly figures of Fire Claims in two different companies are recorded as under for 2 years.   15

(Fire Losses in Lakh)

Company A	Company B
60	52

2

45	43
72	60
43	61
52	70
90	81
67	96
87	34
34	40
42	15
69	16
59	92

Test the Hypothesis that company A has more exposure to fire risk than company B.

Q.6. Following is a Data of the Number of Direct Sales Executives, employed in the 26 Direct Marketing Units of a Life Assurance Company vis-à-vis the New Business First Premium Target (Rupees, Crores), allotted to these Direct Marketing Units.

S	Direct Marketing Unit	Direct Sales Executives	New Business First Premium Target (Rupees, Crores)
1	A	11	12
2	B	18	13
3	C	12	15
4	D	12	14
5	E	14	7
6	F	13	13
7	G	13	10
8	H	16	15
9	I	24	6
10	J	24	7
11	K	20	7
12	L	20	6
13	M	19	12
14	N	23	10
15	O	25	7
16	P	15	11
17	Q	25	10
18	R	11	6
19	S	11	8
20	T	24	6
21	U	17	11
22	V	11	11
23	W	19	13

24	X	22	14
25	Y	17	11
26	Z	18	11
Total		**454**	**266**

a) Calculate Coefficient of Correlation (r) between the Number of Direct Sales Executives and the New Business First Premium Target (Rupees, Crores) of these Direct Marketing Units. **15**

b) Comment on the Correlation between the Number of Direct Sales Executives and the New Business First Premium Target (Rupees, Crores) of these Direct Marketing Units. **5**

Q.7. Following is the Data of the Number of Collection-Receipts in the Month of March, at the Cash-Counters of 10 Premium-Collection Centers of a Life Assurance Company, situated in 5 Different Cities. **20**

Premium-Collection Center	City					Total	Squares
	A	B	C	D	E		
1	2,510	2,474	2,969	2,437	3,000	13,390	179,292,100
2	2,493	2,270	2,340	2,034	2,161	11,298	127,644,804
3	2,486	2,876	2,172	2,701	2,873	13,108	171,819,664
4	2,973	2,301	2,021	2,864	2,004	12,163	147,938,569
5	2,182	2,229	2,504	2,348	2,423	11,686	136,562,596
6	2,095	2,218	2,291	2,826	2,001	11,431	130,667,761
7	2,910	2,782	2,175	2,912	2,670	13,449	180,875,601
8	2,628	2,603	2,372	2,092	2,827	12,522	156,800,484
9	2,331	2,039	2,034	2,352	2,666	11,422	130,462,084
10	2,491	2,558	2,959	2,135	2,855	12,998	168,948,004
Total	25,099	24,350	23,837	24,701	25,480	123,467	15,244,100,089
Squares	629,959,801	592,922,500	568,202,569	610,139,401	649,230,400	3,050,454,671	16,775,111,756

Squares of the Above Numbers are as follows:

Premium-Collection Center	City					Total
	A	B	C	D	E	
1	6,300,100	6,120,676	8,814,961	5,938,969	9,000,000	36,174,706
2	6,215,049	5,152,900	5,475,600	4,137,156	4,669,921	25,650,626
3	6,180,196	8,271,376	4,717,584	7,295,401	8,254,129	34,718,686
4	8,838,729	5,294,601	4,084,441	8,202,496	4,016,016	30,436,283
5	4,761,124	4,968,441	6,270,016	5,513,104	5,870,929	27,383,614
6	4,389,025	4,919,524	5,248,681	7,986,276	4,004,001	26,547,507
7	8,468,100	7,739,524	4,730,625	8,479,744	7,128,900	36,546,893
8	6,906,384	6,775,609	5,626,384	4,376,464	7,991,929	31,676,770
9	5,433,561	4,157,521	4,137,156	5,531,904	7,107,556	26,367,698
10	6,205,081	6,543,364	8,755,681	4,558,225	8,151,025	34,213,376
Total	63,697,349	59,943,536	57,861,129	62,019,739	66,194,406	309,716,159

Test, Using the Analysis of Variance, whether the Number of Collection-Receipts in the Month of March, at the Cash-Counters of 10 Premium-Collection Centers of

a Life Assurance Company, varies from City-to-City.

Q.8. The Following Table shows the Quantities-Consumed and Prices-Charged for Five Commodities.

Commodity	Year: 2005.		Year: 2010.		Year: 2015.	
	Quantity	Price	Quantity	Price	Quantity	Price
C-1	11	500	7	1,421	9	1,217
C-2	7	390	12	1,196	11	1,567
C-3	9	402	8	846	10	1,636
C-4	7	364	8	665	6	1,218
C-5	12	1,111	12	814	16	1,064
Total	46	2,767	47	4,942	52	6,702

You are also given, the Following Data:

Commodity	Price (2015) × Quantity (2005)	Price (2015) × Quantity (2010)	Price (2005) × Quantity (2005)	Price (2010) × Quantity (2010)	Price (2015) × Quantity (2015)
C-1	13,387	8,519	5,500	9,947	10,953
C-2	10,969	18,804	2,730	14,352	17,237
C-3	14,724	13,088	3,618	6,768	16,360
C-4	8,526	9,744	2,548	5,320	7,308
C-5	12,768	12,768	13,332	9,768	17,024
Total	60,374	62,923	27,728	46,155	68,882

Calculate:

a) Price Index Number for the Current-Year: 2015, by Simple Aggregate Method, considering the Base-Year: 2005, and also, 2010.   3

b) Quantity Index Number for the Current-Year: 2015, by Simple Aggregate Method, considering the Base-Year: 2005, and also, 2010.   3

c) Value Index Number for the Current-Year: 2015, by Simple Aggregate Method, considering the Base-Year: 2005, and also, 2010.   4

d) Laspeyre's Price Index Number for the Current-Year: 2015, by Weighted Aggregate Method, considering the Base-Year: 2005, and also, 2010.   3

e) Paasche's Price Index Number for the Current-Year: 2015, by Weighted Aggregate Method, considering the Base-Year: 2005, and also, 2010.   3

f) Fisher's Price Index Number for the Current-Year: 2015, by Weighted Aggregate Method, considering the Base-Year: 2005, and also, 2010.   4

END