SVKM's NMIMS

NMIMS – GLOBAL ACCESS SCHOOL FOR CONTINUING EDUCATION

Programme: PGDBM/PGDITM/PGDSCM

Examination: December 2016
Subject: Business Statistics

Date: 10.12.2016

Semester: III
Course : New
Marks : 70
Time: 3.00 p.m. to 6.00 p.m.

Instructions : 1) Candidates should read carefully the instructions printed on the questions paper and on the Cover of the answer-book which is provided for their use.
2) Answer to each new question to be stared on a fresh page.
3) Figures in brackets indicate full marks.
4) Required Statistical Tables attached.
5) Only simple, ordinary calculators to be used. No other electronic devices, such as cell-phones, laptops, i-pads, etc., to be used.

Q.1] **Attempt any 2(two) out of 4 (four) :** **(Marks : 2 X 5 = 10)**

a) The following data represents marks obtained by 120 students :

Marks Obtain	:	1-5	6-10	11-15	16-20	21-25	26-30
Number of Students	:	6	10	16	32	24	16
Marks Obtain	:	31-35	36-40	41-45			
Number of Students	:	10	5	1			

Draw a histogram for this data and hence determine the value of mode for the distribution.

b) The mean wage of 100 workers in a factory is Rs.38/-. The factory has two shifts. The mean wage of 60 workers in the morning shift is Rs.40/-. Find the mean wage of the 40 workers working in the evening shift.

c) Find arithmetic mean for the following data, representing marks of 80 students :

Marks	:	0-10	10-20	20-30	30-40	40-50
No. of Students	:	12	13	21	19	15

d) A box contains 10 electric bulbs out of which 3 are defective, 4 bulbs are selected at random. Find the probability that they contain
(i) exactly one defective bulb,
(ii) atleast one defective bulb.

Q.2] **Write short notes on (any 2 (two) out of 5 (five)) (Marks : 2 X 5 = 10)**

a) Merits and demerits of Arithmetic mean as a measure of central tendency.

b) Scatter diagram with respect to Correlation analysis.

c) Skewness, its types and measures.

d) Absolute and Relative Measures of Dispersion.

e) Properties of Normal Distribution.

Q.3] **Attempt any 3 (three) out of 5 (five) (Marks 3 X 10 = 30)**

a) An export agency exports tennis balls which are supplied by 3 manufacturers A, B and C. The balls manufactured by them contain 3%, 4% and 1% defective balls respectively. The demand is large and the manufacturers can supply the tennis balls within their limitations. Because of these limitations the agencies total export contains 50% balls manufactured by A, 30% by B and 20% by C. To test the quality of tennis balls, one ball is selected at random. Find the probability that

i) ball is defective and manufactured by A.

ii) ball is defective.

iii) ball is manufactured by A given that the ball is defective.

b) X is a discrete random variable with the following p.m.f. :

X	-1	0	1	2
P(x)	$\frac{K+1}{13}$	$\frac{1}{13}$	$\frac{K}{13}$	$\frac{K-4}{13}$

Obtain (i) Value of K, (ii) Expectation of X, (iii) Variance of X.

c) An automobile insurance company has found from past records that the chance of paying off on a policy during a year is just 0.1%. Five hundred new policies are issued in the last month. What is the chance that during the next year there will be (i) no claim, (ii) exactly one claim, (iii) at least one claim from amongst one of these five hundred clients ?
(You are given that $e^{-0.1} = 0.9048$, $e^{-0.5} = 0.6065$, $e^{-5}=0.0067$)

d) The data given below is distribution of monthly wages of 160 workers :

Monthly Wages (in `00Rs.)	Number of Workers
40 – 50	8
50 – 60	10
60 – 70	16
70 – 80	25
80 – 90	32
90 – 100	45
100 – 110	14
110 - 120	10

Draw a less than type ogive for this data and hence determine.

i) the value of first quartile for the distribution,

ii) the percentage of workers who earned less than Rs.8500/- per month.

e) Calculate 1st quartile, 4th decile and 76th percentile for the following data :

Age (below)	:	10	20	30	40	50	60
No. of Persons	:	11	35	50	79	89	100

Q.4] **Attempt <u>both</u> the questions :** **(Marks 2 X 10 = 20)**

a) A wholesale distributor of a product finds that the annual demand for the product is normally distributed with a mean of 1200 and standard deviation of 160. If he orders only once a year, what quantity should be ordered to ensure that there is only 10% chance of running short ? Also, obtain the probability that (i) demand is less than 1360, (ii) demand exceeds 1040.
(Given $P(Z > 1.28) = 0.10$, $P(Z > 1) = 0.15866$)

b) The mean and variance of a binomial variate are 6 and 2 respectively. Find

i) $P(x \geq 2)$

ii) $P(X = 5)$

—x—

APPENDIX

I. Binomial Coefficients

n	$({}^{n}C_{0})$	$({}^{n}C_{1})$	$({}^{n}C_{2})$	$({}^{n}C_{3})$	$({}^{n}C_{4})$	$({}^{n}C_{5})$	$({}^{n}C_{6})$	$({}^{n}C_{7})$	$({}^{n}C_{8})$	$({}^{n}C_{9})$	$({}^{n}C_{10})$
0	1										
1	1	1									
2	1	2	1								
3	1	3	3	1							
4	1	4	6	4	1						
5	1	5	10	10	5	1					
6	1	6	15	20	15	6	1				
7	1	7	21	35	35	21	7	1			
8	1	8	28	56	70	56	28	8	1		
9	1	9	36	84	126	126	84	36	9	1	
10	1	10	45	120	210	252	210	120	45	10	1
11	1	11	55	165	330	462	462	330	165	55	11
12	1	12	66	220	495	792	924	792	495	220	66
13	1	13	78	286	715	1287	1716	1716	1287	715	286
14	1	14	91	364	1001	2002	3003	3432	3005	2002	1001
15	1	15	105	455	1365	3003	5005	6435	6435	5005	3003
16	1	16	120	560	1820	4368	8008	11440	12870	11440	8008
17	1	17	136	680	2380	6188	12376	19448	24310	24310	19448
18	1	18	153	816	3060	8568	18564	31824	43758	48620	43758
19	1	19	171	969	3876	11628	27132	50388	75582	92378	92378
20	1	20	190	1140	4845	15504	38760	77520	125970	167960	1184759

III. Areas under the Normal Curve

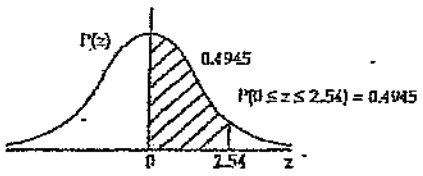

Table of Area

↓z→	0	1	2	3	4	5	6	7	8	9
.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2223
.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2518	.2549
.7	.2580	.2612	.2642	.2673	.2703	.2734	.2764	.2794	.2823	.2852
.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4849	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.49.64
2.7	.4965	.4965	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4390	.4990
3.1	.4990	.4991	.4991	.4991	.4992	.4992	.4992	.4992	.4993	.4993
3.2	.4993	.4993	.4994	.4994	.4994	.4994	.4994	.4995	.4995	.4995
3.3	.4995	.4995	.4995	.4996	.4996	.4996	.4996	.4996	.4996	.4997
3.4	.4997	.4997	4997	.4997	.4997	.4997	.4997	.4947	.4997	.4998
3.5	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4998	.4898	.4898
3.6	.4998	.4998	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.7	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.8	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999	.4999
3.9	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000	.5000

TABLE OF VALUES OF e^{-m}

m	e^{-m}	m	e^{-m}	m	e^{-m}
0.1	0.90484	1.1	0.33287	2.5	0.08208
0.2	0.81873	1.2	0.30119	3.0	0.04979
0.3	0.74082	1.3	0.27253	3.5	0.03020
0.4	0.67032	1.4	0.24660	4.0	0.01832
0.5	0.60653	1.5	0.22313	5.0	0.00674
0.6	0.54881	1.6	0.20190	6.0	0.00248
0.7	0.49659	1.7	0.18268	7.0	0.00091
0.8	0.44932	1.8	0.16530	8.0	0.00034
0.9	0.40657	1.9	0.14957	9.0	0.00012
1.0	0.36788	2.0	0.13534	10.0	0.000045