Seat No. _____

GANPAT UNIVERSITY

B. Tech. Sem. IV (Open Elective)(ALL) CBCS Regular Exam. May – 2014

Sub : (2OS401) – Probability & Statistics

me : 3 hrs Total marks : 70

struction: (1) All questions are compulsory.
(2) Write answer of each section in separate answer books
(3) Figures to the right indicate marks of questions

Section – I

12

uestion-1

(a) Calculate the correlation co – efficient from the following data bet^n Income(x) and Expenditure(y).

x	80	75	90	74	110	70	85	88	78
y	307	259	341	274	416	267	320	274	336

(b) Calculate the Spearman's Rank Correlation co – efficient between marks assigned to 10 students by Judge X and Judge Y in a certain competitive test as given below.

Judge X	52	53	42	60	45	41	37	38	25	27
Judge Y	65	68	43	38	77	48	35	30	25	50

OR

12

Question-1

(a) Prove that : $b_{xy} = \dfrac{n\sum xy - (\sum x)\cdot(\sum y)}{n\sum y^2 - (\sum y)^2}$

(b) The two Regression equations of the variables x and y are :

$x = 19.13 - 0.87y$ and $y = 11.64 - 0.50x$

Find (i) Mean of x's (ii) Mean of y's (iii) The correlation coefficient between x & y.

Question-2

05

(a) Find two Regression equations from the following data between Age in years (x) & Blood pressure (y). Also estimate the blood pressure when the age is 45 years.

x	56	42	72	36	63	47	55	49	38	42	68	60
y	147	125	160	118	149	128	150	145	115	140	152	155

06

(b) Assuming that the probability of being a boy or a girl is equal. Find the no. of families out of 400 consisting 3 children each having (i) One boy (ii) Two boys and one girl (iii) At most one boy

OR

Question-2

05

(a) Explain Probable error and Prove that Probable Error $(r) = 0.6745 \times \left(1 - \dfrac{r^2}{\sqrt{n}}\right)$

06

(b) A sortie of 20 aeroplanes is sent on an operational flight. The chance that an aeroplane fails to return is 5 %. Find the probability that :
(i) One plane doesn't return and (ii) At the most 5 plane do not return .

Question-3 12

(a) A car hire firm has two cars which it hires out day by day . The no. of demand for a car each day is distributed as a poisson variant with mean 1.5 . Calculate the proportion of days on which : (i) Neither car is used and (ii) Some demand is refused .

(b) The weekly wages of 1000 workmen are normally distributed around a mean of Rs. 70 and with a standard deviation of Rs. 5. Estimate the number of workers whose weekly wages will be : (i) Between Rs. 70 & 72 (ii) Between Rs. 69 & 72 (iii) More than Rs. 75 (iv) Less than Rs. 63 (v) More than Rs. 80.

Section – II

uestion-4 **Attempt the following.** 12

(a) Define Frequency distribution. Explain grouped frequency distribution with suitable example.

(b) Define classification of data. Explain (1) Geographical classification and (2) Quantitative classification with appropriate example.

(c) The minimum temperature (in degree centigrade) for Mehsana for the month of April 2014 as reported by the Meteorological department is the given below. Construct a grouped frequency distribution table for it.

30.3	30.0	25.8	26.5	24.2	25.2	28.0	28.0	29.5	27.8
30.0	31.1	27.2	25.9	27.6	24.5	24.4	27.0	28.1	26.0
25.4	28.0	26.9	25.7	27.2	25.5	26.6	28.5	28.0	27.7
24.0									

OR

uestion-4 12

(a) Define Variable in frequency distribution and explain: (1) Continuous variable (2) Discrete variable.

(b) Describe the Exclusive and Inclusive types of classification.

(c) Explain (1) Chronological classification and (2) Qualitative classification with appropriate example.

estion-5 **Attempt the following.**

(a) Derive step deviation method to compute Mean for grouped frequency distribution. Using it compute mean of following data of marks of students in a class. 4

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	6	5	8	15	7	6	3

(b) Calculate the missing frequencies from the following data if median and mode are Rs. 25 and Rs.24 respectively. 4

Expenditure	10-20	20-30	30-40	40-50	20-40
No. of persons (in Rs.)	12	?	25	?	13

) Calculate the mode from the following data. 3

Marks	No. of Students	Marks	No. of Students
Less than 5	29	Less than 25	634
Less than 10	224	Less than 30	644
Less than 15	465	Less than 35	650
Less than 20	582	Less than 40	653

OR

Question-5

(a) Find the Median for the following distribution of wages paid weekly in Rs.: 4

X :	20-30	30-40	40-50	50-60	60-70	70-80	80-90
F :	5	22	26	57	36	18	10

(b) Compute Mean for the following un grouped data. 4

11	14	13	12	18	15	15	21	9	21
13	18	17	19	20	17	16	17	20	15
14	14	9	11	20	18	19	20	22	12

(c) In usual notation prove that : $s^2 + \sigma^2 = d^2$ 3

Question-6 Attempt any three. 12

(a) Using method of grouping , calculate Mode of the following distribution

Variable (X):	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency (F):	15	38	37	18	8	6	2

(b) Find the mean deviation about median for the following data

X	5	7	9	11	13	15	17
F	2	4	6	8	10	12	8

(c) Define standard deviation and prove that

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{n} fi.xi^2 - \left(\frac{1}{N}\sum_{i=1}^{n} fi.xi\right)^2}$$

(d) Define quartiles. Calculate lower and upper quartile for the following distribution

Marks	No. of students	Marks	No. of students
0-5	7	20-25	5
5-10	11	25-30	9
10-15	18	30-35	3
15-20	9	35-40	4

END OF PAPER

Areas under standard normal curve.

Z	0	1	2	3	4	5	6	7	8	9
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0754
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1130	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2258	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
0.7	0.2580	0.2612	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2996	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0.3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4818
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998
3.6	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.7	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.8	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.9	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000