

**GANPAT UNIVERSITY**  
**B. Tech. Semester-III CBCS Regular Examination Nov-2014**  
**Subject: (2OS301): Probability & Statistics(Open Elective)**

**Time: 03 hours**

**Marks: 70**

**Instruction:**

1. All questions are compulsory.
2. Write answer of each section in separate answer books.
3. Figure to the right indicate marks of questions.

**SECTION - I**

**Question: 1**

- (A) Derive only the equation of a regression line of  $x$  on  $y$ . [5]
- (B) Obtain two regression lines from following data. [6]

$x$	23	27	28	29	30	31	33	35	36	39
$y$	18	22	23	24	25	26	28	29	30	32

OR

**Question: 1**

- (A) Prove that  $b_{yx}$  and  $b_{xy}$  are dependent of change of scale. [6]
- (B) The equations of two regression lines are as follows. [5]

$$8x - 10y = -66 \quad 40x - 18y = 214$$

Obtain

- (1) the value of correlation co-efficient.
- (2) the mean values of  $x$  and  $y$ .

**Question: 2**

- (A) Derive the formula for finding correlation co-efficient [6]
- (B) Derive Spearman's formula for rank correlation coefficient. [6]

OR

**Question: 2**

- (A) Calculate correlation co-efficient and probable error from following data. [6]

$x$	1	2	3	4	5	6	7	8	9	10
$y$	9	8	10	12	11	13	14	16	15	16

- (B) Calculate rank correlation co-efficient from following data. [6]

$x$	50	50	50	60	65	65	65	60	60	50
$y$	11	13	14	16	16	15	15	14	13	13

[12]

Question: 3 Attempt any two (each carry 6 marks)

(A) 10 MCQ each with 3 alternatives inclusive correct answer. Find the probability that a student gets 8 or more correct answers. Use Binomial Distribution.

(B) Define Poisson distribution and derive the following result.

$$P(X = x) = \frac{e^{-\lambda} \cdot \lambda^x}{x!}$$

(C) If  $X \sim N(\mu = 468, \sigma^2 = 256)$  then evaluate following.

(i)  $P(x > 480)$  (ii)  $P(450 < x < 475)$  (iii)  $P(x > 452)$

### SECTION - II

Question: 4

(A) Calculate Geometric mean and Harmonic mean for following data.

class	2-4	4-6	6-8	8-10	10-12
frequency	20	40	30	10	10

(B) Calculate mean by using step deviation method for following data.

class	0-10	10-20	20-30	30-40	40-50
frequency	3	19	32	17	4

(C) Define types of class intervals.

OR

Question: 4

(A) Obtain Median and Quartiles for the given data.

weight in kg.	6.5-7.5	7.5-8.5	8.5-9.5	9.5-10.5	10.5-11.5	11.5-12.5	12.5-13.5
items	5	12	25	48	32	6	1

(B) Obtain mode for the given data.

Income	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45
Persons	7	10	16	32	24	18	10	5	1

(C) Define Quartiles, Deciles and Percentiles

Question: 5

(A) Find mean deviation about median for following data.

class	0-5	5-10	10-15	15-20	20-25
frequency	3	4	8	16	6

(B) Obtain quartile deviation and its co-efficient for following data.

Marks	0-5	5-10	10-15	15-20	20-25	25-30
No. of students	4	6	8	12	7	2

(C) Derive the formula of Standard deviation by step deviation method.

OR

Question: 5

(A) Find Karl Pearson's co-efficient of skewness from given data. [5]

3, 8, 7, 5, 8, 10, 11, 9, 7, 12

(B) Calculate co-efficient variation from following data. [6]

class	15-25	25-35	35-45	45-55	55-65	65-75	75-85
frequency	30	40	100	110	80	30	10

Question: 6 Attempt any two (each carry 6 marks) [12]

(A) Find 4<sup>th</sup> decile and 50<sup>th</sup> percentile and 77<sup>th</sup> percentile from given data.

class	10-19	20-29	30-39	40-49	50-59
frequency	2	9	15	14	10

(B) Find mode using method of grouping then calculate mean deviation about mode.

$x_i$	2	3	4	5	6	7	8	9	10	11	12	13
$f_i$	3	8	10	12	16	14	10	8	17	5	4	1

(C) The sum of the squares of the deviations of a set of values is minimum when taken about mean.

End of Paper

Areas under standard normal curve From 0 to z

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	0.1103	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
1.2	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
2.6	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