

GANPAT UNIVERSITY

B. Tech Sem. III (Open Elective) (ALL) CBCS Regular Exam. DEC - 2013

Sub : (20S 301) Probability & Statistics

Time: 3 hrs

Total marks: 70

Instruction: (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

QUE. 1 (A) Explain : scatter diagram in detail. (03)

(B) Calculate the correlation co-efficient from the following data between X and Y. (04)

X	25	28	35	32	31	36	29	38	34	32
Y	43	46	49	41	36	32	31	30	33	39

(C) Calculate Spearman's rank correlation co-efficient between Advertisement costs and Sales from the following data. (04)

Advt. costs	48	33	40	9	16	16	65	24	16	57
Sales	13	13	24	6	15	4	20	9	6	

QUE. 2 (A) From the following data between X and Y; Find two Regression equations between them. (06)

X	80	75	90	74	75	110	70	85	88	78
Y	307	259	341	317	274	416	267	320	274	336

(B) A pair of dice thrown 10 times. If getting a doublet is consider a success, Find the probability of obtaining (06)

(1) Exactly 5 - success (2) No success (3) More than 6 - success

OR

- QUE. 2** (A) Derive the formula for a line of regression of Y on X. (06)
- (B) Assuming that the probability of a child being a boy or a girl is equal. Find the number of family out of 400 consisting 3 children is having (06)
- (1) All girls
 - (2) One boy and Two girls and
 - (3) At most one boy.
- QUE. 3** (A) If the probability that an individual suffers a bad reaction from certain injection is 0.001. Determine the probability that out of 2000 individual (06)
- (1) Exactly 3 and
 - (2) More than 5 individuals will suffer a bad reaction.
- (B) Assume the mean height of soldiers to be 68.22 inches with a variance of 10.8 (06)
- inches. How many soldiers in regiment of 1000 would you expect to be
- (1) Over 72 inches tall and
 - (2) Below 66 inches.

OR

- QUE. 3** (A) A car hire firm has two cars, which it hires out day by day. The number of demand for a car on each day is distributed as a Poisson variate with mean 1.5. Calculate the proportion of days on which (06)
- (1) Neither car is used and
 - (2) Some demand is refused.
- (B) A sample of 100 dry battery cells tested to find the length of life produced the following results $\mu = 12$ hours, $\sigma = 3$ hours. Assuming the data to be normally distributed, what percentage of battery cells are expected to have a life (06)
- (1) More than 12 hours
 - (2) Less than 5 hours and
 - (3) Between 10 and 14 hours.

SECTION – II

- Que. 4** (12)
- (A) Define Frequency distribution and explain Discrete frequency distribution with suitable example.

(B) Prepare a grouped frequency table of wages paid in rupees with class length of Rs. 7

10	17	15	22	11	16	19	24	29	18
25	26	32	14	17	20	23	27	30	12
25	18	24	36	38	15	21	28	33	38
34	13	10	16	20	22	29	19	23	31

(C) Find the Median for the following distribution:

X	5	7	9	11	13	15	17	19
F	2	3	7	10	11	8	5	4

Que - 4

OR

(12)

(A) Define Grouped frequency distribution and explain the Grouped frequency distribution with suitable example.

(B) Classify following data of marks by taking class intervals of size 5. Take the first Class interval as 10 - 15.

14	16	16	14	22	13	15	24	12	23
14	20	17	21	22	18	19	20	17	16
15	11	12	21	20	17	18	19	23	14

(C) Find the Median for the following distribution:

Variable:	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency:	4	6	7	10	14	9	6	4

Que - 5

(A) Derive step deviation method to compute Mean for discrete frequency distribution. Using it compute mean of following data. (04)

Marks below:	10	20	30	40	50	60	70
No. of Students:	5	9	7	9	3	5	2

(B) Using method of grouping, calculate Mode of the following distribution (04)

X	1	2	3	4	5	6	7	8
F	4	7	9	11	13	15	15	16

(C) An incomplete distribution of families according to their expenditure per week is given below. The Median and Mode for distribution are Rs. 25 and Rs. 24 respectively. Find missing frequencies. (03)

Expenditure :	0-10	10-20	20-30	30-40	40-50
No. of families:	14	?	27	?	15

Que - 5

OR

(A) Derive step deviation method to compute Mean for grouped frequency distribution. Using it compute mean of following data. (04)

Marks:	10-20	20-30	30-40	40-50	50-60	60-70
No. of Students:	8	12	20	10	6	4

(B) Calculate Mode of the following distribution

(04)

Marks	No. of Students	Marks	No. of Students
Less than 5	29	Less than 30	644
Less than 10	224	Less than 35	650
Less than 15	465	Less than 40	653
Less than 20	582	Less than 45	655
Less than 25	634		

(03)

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

Que - 6 Attempt Any three.

(12)

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

Marks:	5	7	9	11	13	15	17
No. of students:	2	4	6	8	10	12	8

(B) Define standard deviation and prove that $\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^n f_i x_i^2 - \left(\frac{1}{N} \sum_{i=1}^n f_i x_i \right)^2}$

(C) Explain : (1) Chronological classification and (2) Quantitative classification with suitable example.

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

Variable	Frequency	Variable	Frequency
0 - 4	5	16 - 20	1
4 - 8	7	20 - 24	4
8 - 12	12	24 - 28	4
12 - 16	2	28 - 32	1

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	0.1103	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