

GANPAT UNIVERSITY

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

April - June 2015

Sub : (20S401) – 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

Question-1

12

- (A) A company keeps accurate records of its monthly expenditure (x) and its total monthly sales (y) for the first 10 months of 2012 ; the records are as under

x	43	44	36	38	47	40	41	54	37	46
y	74	76	60	68	79	70	71	94	65	78

Find Karl Pearson's correlation co-efficient between the two variables under study

- (B) Calculate the Spearman's Rank Correlation co-efficient from the following data

X	50	50	50	60	65	65	65	60	60	50
Y	11	13	14	16	16	15	15	14	13	13

OR

Question-1

12

- (A) Prove that : $b_{xy} = \frac{n \sum xy - (\sum x) \cdot (\sum y)}{n \sum y^2 - (\sum y)^2}$
- (B) Two Regression lines involving variables x and y are : $\begin{cases} y = 5.6 + 1.2x \\ x = 12.5 + 0.6y \end{cases}$
Find the Means of x and y and the correlation coefficient between x & y.

Question-2

- (A) Find two Regression equations from the following data between Sales & Purchase .
Also find the purchase when sales is 95 .

05

Sales	91	97	108	121	67	124	51	73	111	57
Purchase	71	75	69	97	70	91	39	61	80	47

- (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

06

OR

Question-2

- (A) Explain Probable Error and Derive it's formula .
- (B) There are 64 beds in a garden and 5 seeds of a particular variety are sown in each bed. The probability that a seed will germinates is $\frac{3}{4}$. Find the no. of beds in which
(1) All seeds have germinates (2) At least 3 seeds have germinated

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Question-3 Attempt any two .

12

- (A) The no of accidents in a year attributed to taxi drivers in a city follows poisson distribution with mean 3. Out of 1000 taxi drivers find the no of drivers with
- (1) No accidents in a year (2) More than 3 accidents in a year and
(3) More than 6 accidents in a year
- (B) Suppose the waist measurement W of 800 boys are normally distributed with mean 66 cm. and standard deviation 5 cm. Find the number N of boys with waists
- (1) Between 65 and 70 cm. (2) Greater than or equal to 72 cm.
- (C) State the Properties of Binomial Distribution

Section – II

Question-4

12

- (A) An incomplete distribution of families according to their expenditure per week is given below. The median and mode for the distribution are Rs. 25 and Rs. 24 respectively. Calculate the missing frequencies.

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

- (B) The average monthly wage of all workers in a factory is Rs. 444. If the average wages paid to male and female workers are Rs. 480 and Rs. 360 respectively. Find the percentage of male and female workers employed by the factory.
- (C) The following table shows the age distribution of persons in a particular region. Find the Median age

Age (in years)	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	70 and over
No. of persons (in thousands)	2	5	9	12	14	15	15.5	15.6

OR

12

Question-4

- (A) Define Frequency distribution. Explain grouped frequency distribution with suitable example.
- (B) Calculate the missing frequencies from the following table where the mean was found to be 1.46 and the total frequency is 200.

No. of accidents	0	1	2	3	4	5
No. of days	46	?	?	25	10	5

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

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60	Below 70	Below 80
No. of Students	15	35	60	84	94	127	198	249

Question-5

- (A) The frequency distribution of weight in grams of mangoes of a given variety is given below. Calculate Mean and Median for the given distribution. 4

Weight (in grams)	410-419	420-429	430-439	440-449	450-459	460-469	470-479
No. of Mangoes	14	20	42	54	45	18	7

- (B) In usual notation prove that : $s^2 + \sigma^2 = d^2$ 4
- (C) Explain the Partition values : Quartiles ,Deciles and Percentiles. 3

OR**Question-5**

- (A) Find the 7th Decile and 82th Percentile for the following distribution: 4

Wages (in Rs.)	0-10	10-20	20-30	30-40	40-50
No. of workers	22	38	46	35	20

- (B) Prove that The sum of the squares of the deviations of a set of values is minimum when taken about mean. 4
- (C) A box A contain 4 Aspirin ,3 Analgin and another box B contain 3 Aspirin ,7 Analgin . A box is chosen at random and a tablet is drawn from it. If the tablet is an Aspirin ; find the probability that it is from box A . 3

Question-6 Attempt any three.

- (A) A card is drawn from a pack of well-shuffled cards. Find the probability that (1) The card drawn is a spade (2) The card drawn is a face card (3) The card drawn is not a club card and (4) The card drawn is either a heart or a diamond card. 12
- (B) The probability that Dhwanit will solve a problem is $\frac{1}{4}$ and the probability that Aryan will solve it is $\frac{2}{3}$. If Dhwanit and Aryan works independently; What is the probability that (1) The problem will be solved by both of them (2) The problem will be solved by at least one of them and (3) The problem will not be solved by them.
- (C) Define standard deviation and prove that

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

- (D) Find the mean deviation about median for the following data

Class	50-100	100-150	150-200	200-250	250-300	300-350
Frequency	7	18	25	31	15	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	0.1103	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