00125

The Open University of Sri Lanka
Department of Textile and Apparel Technology
Bachelor of Industrial Studies
Final Examination-2014/2015
TTZ4241-Statistics for Industrial Studies
Duration- 3 Hours

Date: 13th September 2015 **Time: 0930-1230hrs**

Answer Question 01, which is compulsory and additional five (05) questions.

Question 1 carries twenty-five marks and Questions 2 to 8 carry fifteen (15) marks each.

You should clearly show the steps involved in solving problems.

No marks are awarded for the mere answers without writing the necessary steps.

(01). **Compulsory Question**

(A) Briefly describe the following terms used in statistics.

(i) Descriptive Statistics

(ii) Random Variable

(III) Probability of an event

(06 Marks)

(B) ABC Bank selected 10 of their current account holders for a study. Following are the ages (in years) of these account holders.

54 48 58 50 25 47 75 46 60 70

(i) Calculate the mean and the median of the ages. (02 Marks)

(ii) Calculate the standard deviation of the ages.
(Show your calculations) (04 Marks)

(C)It is is known that 2% of the items from a production line are defective. If two items are selected from random, what is the probability that both are **non-defective**? (03 Marks)

(D) Determine the area under the standard Normal curve for following situations.

- Area to the left of Z=1.34
- Area between Z= – 1.34 and 1.56 (02 Marks)

(E) Briefly explain what you understand by "Null hypothesis" and "Alternate hypothesis". (04 Marks)

(F) What do you mean by " One tailed test " and "Two tailed test" ? (04 Marks)

Select any five (05) from questions 02 to 08.

(02) The ABC Company has a sales outlet in university premises. The number of sales in 20 sessions are given below.

65	98	55	62	79
59	51	90	72	56
70	62	66	80	94
79	63	73	71	85

(i) How many classes would you recommend? (03 Marks)

(i) Arrange them in a frequency table. (04 Marks)

(ii) Calculate mean, and median of the data. (04 Marks)

(iii) Calculate the variance, standard deviation and coefficient of variation (04 Marks)

(03) (a) Write the general rule of multiplication and general rule of addition in probability. (03 Marks)

(b) A survey of senior citizens reveals that 35 percent of them regularly read "Sunday Times",20 percent read " Observer" and 40 percent read "The Nation". Also 10 percent read both "Sunday Times" and " The Nation".

(i) What is the probability that a particular citizen reads either "Sunday Times" or " The Nation" ? (05 Marks)

(ii) Are the events mutually exclusive? Explain the answer (03 Marks)

(c)There are 500 garments in a box and 36 of which are defective. Three garments are to be selected, one after the other.

What is the probability that

(i) All three will be defective ? (02 Marks)

(ii)The first one is defective and the other two are non-defective ? (02 Marks)

(04) (a) Write the mathematical formula of the binomial probability distribution. (03 Marks)

(b)A recent survey conducted by the Quality Assurance Unit of the OUSL revealed that 70% of the registered students get eligibility for the course TTZ4241.Sample of 10 students are selected for a study.

(i)What is the probability that all 10 students were eligible? (04 Marks)

(ii) What is the probability that exactly 08 students were eligible? (04 Marks)

(iii) What is the probability that more than 08 students were eligible? (04 Marks)

(05) (a) Write two applications of "Poisson probability distribution". (03 Marks)

(b)A study of the customer care unit of the ABC Bank revealed that ,during a certain period at the rush hours the number of customers waiting is averaged **three (03).** The distribution of the number of customers waiting approximated Poisson Distribution.

What is the probability that during that period,

(i) No customers were waiting?

(ii) Three customers were waiting?

(iii) Three of fewer were waiting?

(iv) Three or more were waiting? (12 Marks)

(06)(a) The lengths of service of the five executives employed in ABC Apparel company is as follows.

20, 22, 26, 24, 28

(i) How many samples of 2 are possible? (01 Marks)

(ii). List all possible samples of size 2, and compute the mean of each sample. (05 Marks)

(iii).Compute the mean of the sample means and the population mean. Comment on your answer. (05 Marks)

(b) State the "Central Limit Theorem" and describe its importance in statistics. (04 Marks)

(07) (a) Describe what do you understand by "Hypothesis Testing"? (02 Marks)

(b) In a hypothesis testing, The null hypothesis and alternate hypothesis are as follows

H_0: $\mu = 50$

H_1: $\mu \neq 50$

The sample of size 36 is taken and the sample mean is 49 and standard deviation is 5.significance level is taken as0.05

(i)Is this a one-tailed or a two-tailed test? (02 Marks)

(ii)Compute the value of the test statistics (04 Marks)

(iii)State the decision rule (04 Marks)

(iv)What is your decision regarding H_0? (03 Marks)

(08) (a) What are the properties of the standard normal probability distribution.

(03 Marks)

(b)The mean score of a University entrance exam is 50 and the standard deviation is 7.5.The scores are normally distributed.

(i) What is the percentage of students who scored more than 50?

(ii)What is the percentage of students scored 32 and below?

(iii) Weak 20% of the students are considered as not eligible. Find out the cut off mark to obtain the eligibility to enter the University.

(iv)Top 10% of the students are to be considered for scholarship Scheme. Find out the minimum mark to get a scholarship

(12 Marks)

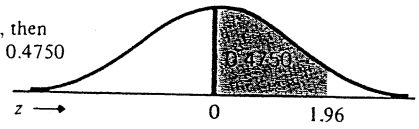
Poisson Distribution: Probability of Exactly X Occurrences

	μ								
X	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0	0.9048	0.8187	0.7408	0.6703	0.6065	0.5488	0.4966	0.4493	0.4066
1	0.0905	0.1637	0.2222	0.2681	0.3033	0.3293	0.3476	0.3595	0.3659
2	0.0045	0.0164	0.0333	0.0536	0.0758	0.0988	0.1217	0.1438	0.1647
3	0.0002	0.0011	0.0033	0.0072	0.0126	0.0198	0.0284	0.0383	0.0494
4	0.0000	0.0001	0.0003	0.0007	0.0016	0.0030	0.0050	0.0077	0.0111
5	0.0000	0.0000	0.0000	0.0001	0.0002	0.0004	0.0007	0.0012	0.0020
6	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0002	0.0003
7	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

	μ								
X	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0
0	0.3679	0.1353	0.0498	0.0183	0.0067	0.0025	0.0009	0.0003	0.0001
1	0.3679	0.2707	0.1494	0.0733	0.0337	0.0149	0.0064	0.0027	0.0011
2	0.1839	0.2707	0.2240	0.1465	0.0842	0.0446	0.0223	0.0107	0.0050
3	0.0613	0.1804	0.2240	0.1954	0.1404	0.0892	0.0521	0.0286	0.0150
4	0.0153	0.0902	0.1680	0.1954	0.1755	0.1339	0.0912	0.0573	0.0337
5	0.0031	0.0361	0.1008	0.1563	0.1755	0.1606	0.1277	0.0916	0.0607
6	0.0005	0.0120	0.0504	0.1042	0.1462	0.1606	0.1490	0.1221	0.0911
7	0.0001	0.0034	0.0216	0.0595	0.1044	0.1377	0.1490	0.1396	0.1171
8	0.0000	0.0009	0.0081	0.0298	0.0653	0.1033	0.1304	0.1396	0.1318
9	0.0000	0.0002	0.0027	0.0132	0.0363	0.0688	0.1014	0.1241	0.1318
10	0.0000	0.0000	0.0008	0.0053	0.0181	0.0413	0.0710	0.0993	0.1186
11	0.0000	0.0000	0.0002	0.0019	0.0082	0.0225	0.0452	0.0722	0.0970
12	0.0000	0.0000	0.0001	0.0006	0.0034	0.0113	0.0263	0.0481	0.0728
13	0.0000	0.0000	0.0000	0.0002	0.0013	0.0052	0.0142	0.0296	0.0504
14	0.0000	0.0000	0.0000	0.0001	0.0005	0.0022	0.0071	0.0169	0.0324
15	0.0000	0.0000	0.0000	0.0000	0.0002	0.0009	0.0033	0.0090	0.0194
16	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0014	0.0045	0.0109
17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0006	0.0021	0.0058
18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0009	0.0029
19	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0004	0.0014
20	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0006
21	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0003
22	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001

AREAS UNDER THE NORMAL CURVE

Example:
If $z = 1.96$, then
$P(0 \text{ to } z) = 0.4750$



z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
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	0.0753
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	0.2257	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2517	0.2549
0.7	0.2580	0.2611	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	0.2995	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	0.4817
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