EASTERN UNIVERSITY, SRI LANKA

FACULTY OF COMMERCE AND MANAGEMENT

DEPARTMENT OF COMMERCE

THIRD YEAR FIRST SEMESTER EXAMINATION IN BACHELOR BUSINESS ADMINISTRATION/

BACHELOR OF COMMERCE 2012 / 2013 (MARCH 2015)

RE-REPEAT

DAF 3134 BUSINESS STATISTICS

Answer all Questions **Time: 03 hours**

1. (i) Discriminate between a pair of terms "Random variable and probability distribution".

(ii) In the following probability distribution, the random variable X represents the number of bad switches found by an inspector

X	0	1	2	3	4
P(X=X)	0.35	0.38	0.2	0.05	0.02

(a) What is the shape of the distribution?
(b) What is the mean of the random variable X?
(c) What is the standard deviation of the random variable X?
(d) What is the probability that the inspector finds 3 or 4 bad switches?

(iii) (a) The number of defective parts produced per day by an automated machine follows a Poisson probability distribution with a mean of 4. What is the probability that on 2 consecutive days at least 2 defective parts are produced?

(b) A student majoring in accounting has been told by a placement counselor that she can expect to receive a job offer from 80% of the firms to which she applies. The student applies to only five firms. What is the probability that the student receives exact five offers?

(20 Marks)

2. (i) Distinguish between a normal distribution and a standard normal distribution.

(ii) An automatic machine in a manufacturing process is operating properly if the lengths of an important subcomponent are normally distributed with mean 117 cm and standard deviation 5.2 cm.

(a) Find the probability that one selected subcomponent is longer than 120cm.
(b) Find the probability that if four subcomponents are randomly selected, their mean length exceeds 120 cm.

(15 Marks)

3. (i) Define the terms given below.

(a) Parameter (b) Statistics (c) Level of significance (d) Level of confidence

(ii) In a time study in the banking industry, 30 randomly selected managers spent a mean hours each day on paper work with a standard deviation of 1.3 hours.

(a) Construct a 95% confidence interval for the mean paperwork time of all the manag
(b) Interpret the confidence interval in the context of the question.
(c) For the result at part (a) to be valid, must the population distribution of hours sp bank managers on paper work be normal? Explain why or why not.

(iii) A company is considering two different television advertisements for promotion of product. Management believes that advertisement A is more effective than advertisem Two test market areas with virtually identical consumers' characteristics are se Advertisement A is used in one area and advertisement B is in the other area. In a r sample of 60 customers who saw advertisement A, 18 tired the product. In a random s of 100 customers who saw advertisement B, 22 tried this product. Test the beli management at 5% level of significance.

(a) State the null and alternative hypothesis.
(b) What is the critical value?
(c) What is the test statistic? What is the value of the test statistic?
(d) Sketch the rejection region and mark in the critical value
(e) Will you accept or reject the null hypothesis?
(f) Interpret your result in the context of the question.

(25 M

4. The following data relate to training and performance of salesmen employed in a company

Salesman	1	2	3	4	5
Hours of training	20	05	10	13	12
Performance(Average weekly sales in '000Rs)	44	22	25	32	27

(a) Fit the least squares linear regression line to the above data.
(b) Interpret the slope of the regression line in the context of the data.
(c) Estimate the weekly sales that are likely to be attained by a salesman who is giv hours of training.
(d) Compute the value of R^2, the coefficient of determination.
(e) Interpret R^2 in the context of the data.
(f) Compute the value of r, the correlation coefficient.
(g) Interpret r in the context of the data.

(20 M

5. (i) Which of the four components of a time series you would use in the following cases and wh

(a) The effect of new year sales of textiles on a large retail outlet of readymade garmen
(b) The effect of war
(c) Increasing house construction activity during the past five years
(d) Recession.

(ii) The revenues (in Rs. millions) of a chain of Ice cream stores are listed for each quarter during the pervious 5 years.

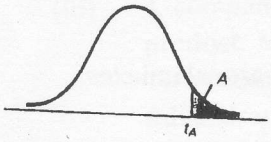
Year

Quarter	2012	2013	2014
1	68	65	68
2	62	58	63
3	61	56	63
4	63	61	67

(a) Calculate the four – quarter centered moving averages.
(b) Using the moving averages computed in part (i) calculate the seasonal indexes.
(c) Interpret the seasonal indexes.

(20 Marks)

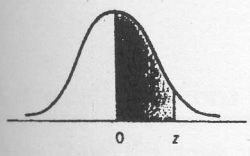
Table 4 Critical Values of t



DEGREES OF FREEDOM	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$	DEGREES OF FREEDOM	$t_{.100}$	$t_{.050}$	$t_{.025}$	$t_{.010}$	$t_{.005}$
1	3.078	6.314	12.706	31.821	63.657	24	1.318	1.711	2.064	2.492	2.79
2	1.886	2.920	4.303	6.965	9.925	25	1.316	1.708	2.060	2.485	2.78
3	1.638	2.353	3.182	4.541	5.841	26	1.315	1.706	2.056	2.479	2.77
4	1.533	2.132	2.776	3.747	4.604	27	1.314	1.703	2.052	2.473	2.77
5	1.476	2.015	2.571	3.365	4.032	28	1.313	1.701	2.048	2.467	2.76
6	1.440	1.943	2.447	3.143	3.707	29	1.311	1.699	2.045	2.462	2.75
7	1.415	1.895	2.365	2.998	3.499	30	1.310	1.697	2.042	2.457	2.75
8	1.397	1.860	2.306	2.896	3.355	35	1.306	1.690	2.030	2.438	2.72
9	1.383	1.833	2.262	2.821	3.250	40	1.303	1.684	2.021	2.423	2.70
10	1.372	1.812	2.228	2.764	3.169	45	1.301	1.679	2.014	2.412	2.69
11	1.363	1.796	2.201	2.718	3.106	50	1.299	1.676	2.009	2.403	2.67
12	1.356	1.782	2.179	2.681	3.055	60	1.296	1.671	2.000	2.390	2.66
13	1.350	1.771	2.160	2.650	3.012	70	1.294	1.667	1.994	2.381	2.64
14	1.345	1.761	2.145	2.624	2.977	80	1.292	1.664	1.990	2.374	2.63
15	1.341	1.753	2.131	2.602	2.947	90	1.291	1.662	1.987	2.369	2.63
16	1.337	1.746	2.120	2.583	2.921	100	1.290	1.660	1.984	2.364	2.62
17	1.333	1.740	2.110	2.567	2.898	120	1.289	1.658	1.980	2.358	2.61
18	1.330	1.734	2.101	2.552	2.878	140	1.288	1.656	1.977	2.353	2.61
19	1.328	1.729	2.093	2.539	2.861	160	1.287	1.654	1.975	2.350	2.60
20	1.325	1.725	2.086	2.528	2.845	180	1.286	1.653	1.973	2.347	2.60
21	1.323	1.721	2.080	2.518	2.831	200	1.286	1.653	1.972	2.345	2.60
22	1.321	1.717	2.074	2.508	2.819	∞	1.282	1.645	1.960	2.326	2.57
23	1.319	1.714	2.069	2.500	2.807						

SOURCE: From M. Merrington, "Table of Percentage Points of the t-Distribution," *Biometrika* 32 (1941): 300. Reproduced by permission of the Biometrika Trustees.

Table 3 Normal Probabilities



z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0478	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4974	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990

SOURCE: Abridged from Table 1 of A. Hald, *Statistical Tables and Formulas* (New York: Wiley & Sons, Inc.), 1952. Reproduced by permission of A. Hald and the publisher, John Wiley & Sons, Inc.