University of Sri Jayewardenepura
Faculty of Humanities and Social Sciences

Bachelor of Arts Second Year Second Semester Examination – January/February 2018

Economics

ECON 2250.3 – Statistics for Economics

Duration: Three hours (03)

Answer only **five (05)** questions **including the question no 01. Please attach the section I of this paper to your answer script.**

Calculators are allowed to use.

Section I

01. Write short answers for the following questions (use the given space only) (40 marks)

i. What is the difference between descriptive statistics and inferential Statistics?

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ii. How the probability relate with inferential statistics?

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iii. Why we should be cautious when using secondary data?

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iv. What is probability sampling?

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v. When do we use weighted arithmetic mean to calculate the central value?

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vi. What describe from the measures of dispersion?

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vii. How the central tendency measures relate with the skewness of a data distribution?

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viii. What is a random variable and what are the types of random variables?

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ix. Where do we use Binomial distribution in statistics?

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x. How the Standard Normal distribution differ from Standard Normal distribution?

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xi. What is Central Limit Theorem?

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xii. What is a sampling distribution?

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xiii. How the point estimation differ from interval estimation?

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xiv. What is an unbiased estimator?

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xv. What is the meaning of consistency of an estimator?

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xvi. How the probability associated when constructing a confidence interval?

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xvii. What is a hypothesis testing?

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xviii. How do you define the significance level in hypothesis testing?

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xix. What is the use of test statistic in hypothesis testing?

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xx. What is the difference between one tail and two tail tests and how do you identify that in hypothesis testing?

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Section II

02. The following data set shows the number of dengue patients recorded in an area within a week for a period of 50 weeks.

4	9	14	8	15
6	10	14	14	19
13	12	9	17	3
15	9	10	15	8
9	11	13	0	8
8	8	8	5	14
3	17	3	7	17
7	4	9	6	4
17	7	8	9	8
1	17	6	10	9

i. Construct a frequency distribution with class width 3 (4 marks)

ii. Find the mean value for the recorded dengue patients in a week. (3 marks)

iii. Calculate the standard deviation of the data set. (3 marks)

03. Suppose X is a random variable which is normally distributed with mean 75 and variance 30.

i. Find the probabilities of following cases. (6 marks)

a. X is less than 70

b. X is in between 65 to 85

c. X is greater than 82

ii. Find the value of the X for following probabilities (4 marks)

a. $P(Z > a) = 0.0244$

b. $P(Z < b) = 0.7005$

04. i. The mean daily production of a worker in a factory is 50 items. The factory operates six days in a week, while the standard deviation of weekly production of a worker is 75 items. If there are 40 workers in one section of the factory, find the weekly production of a worker in that section is

i. More than 325 (3 marks)

ii. Less than 290 (3 marks)

ii. As a result of increasing worker's benefit, the productivity improved. Therefore, the mean production is increased up to 52 items and variance reduced up to 100 items per day. Now find the probability of the mean daily production of a worker in that section is more than 50. (4 marks)

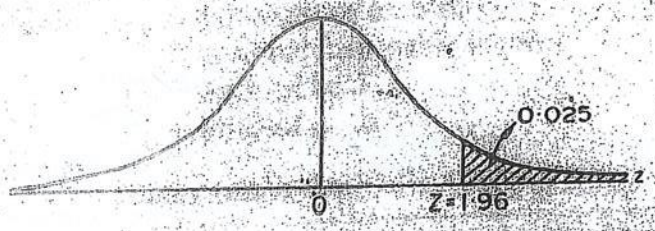
05. i. Show the steps of deriving confidence interval for the population mean if the sample size is large enough. (4 marks)

ii. The standard deviation of the monthly consumption expenditures in urban households is estimated as 10000 rupees. A randomly selected sample of 50 urban households showed that their mean consumption expenditures is 30000 rupees per month. Construct a confidence interval for the urban household's mean consumption expenditures under 95% confidence level. (6 marks)

06. i. What are the steps of testing hypothesis in statistics? (4 marks)

ii. The government says that they are allocating average of 5% of the GDP on education with the variance of 1% . Considering the government expenditures of last 30 years it was observed that the mean expenditures on education is 4.2% of the GDP. Check whether the government's statement is right under 5% significance level. (6 marks)

Table 1. Areas under the Normal Curve



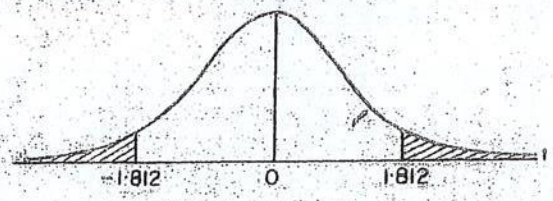
Example

$$Z = \frac{X - \mu}{\sigma}$$

$P(Z > 1{\cdot}96) = {\cdot}0250$

z	·00	·01	·02	·03	·04	·05	·06	·07	·08	·09
0·0	·5000	·4960	·4920	·4880	·4840	·4801	·4761	·4721	·4681	·4641
0·1	·4602	·4562	·4522	·4483	·4443	·4404	·4364	·4325	·4286	·4247
0·2	·4207	·4168	·4129	·4090	·4052	·4013	·3974	·3936	·3897	·3859
0·3	·3821	·3783	·3745	·3707	·3669	·3632	·3594	·3557	·3520	·3483
0·4	·3446	·3409	·3372	·3336	·3300	·3264	·3228	·3192	·3156	·3121
0·5	·3085	·3050	·3015	·2981	·2946	·2912	·2877	·2843	·2810	·2776
0·6	·2743	·2709	·2676	·2643	·2611	·2578	·2546	·2514	·2483	·2451
0·7	·2420	·2389	·2358	·2327	·2296	·2266	·2236	·2206	·2177	·2148
0·8	·2119	·2090	·2061	·2033	·2005	·1977	·1949	·1922	·1894	·1867
0·9	·1841	·1814	·1788	·1762	·1736	·1711	·1685	·1660	·1635	·1611
1·0	·1587	·1562	·1539	·1515	·1492	·1469	·1446	·1423	·1401	·1379
1·1	·1357	·1335	·1314	·1292	·1271	·1251	·1230	·1210	·1190	·1170
1·2	·1151	·1131	·1112	·1093	·1075	·1056	·1038	·1020	·1003	·0985
1·3	·0968	·0951	·0934	·0918	·0901	·0885	·0869	·0853	·0838	·0823
1·4	·0808	·0793	·0778	·0764	·0749	·0735	·0721	·0708	·0694	·0681
1·5	·0668	·0655	·0643	·0630	·0618	·0606	·0594	·0582	·0571	·0559
1·6	·0548	·0537	·0526	·0516	·0505	·0495	·0485	·0475	·0465	·0455
1·7	·0446	·0436	·0427	·0418	·0409	·0401	·0392	·0384	·0375	·0367
1·8	·0359	·0351	·0344	·0336	·0329	·0322	·0314	·0307	·0301	·0294
1·9	·0287	·0281	·0274	·0268	·0262	·0256	·0250	·0244	·0239	·0233
2·0	·0228	·0222	·0217	·0212	·0207	·0202	·0197	·0192	·0188	·0183
2·1	·0179	·0174	·0170	·0166	·0162	·0158	·0154	·0150	·0146	·0143
2·2	·0139	·0136	·0132	·0129	·0125	·0122	·0119	·0116	·0113	·0110
2·3	·0107	·0104	·0102	·0099	·0096	·0094	·0091	·0089	·0087	·0084
2·4	·0082	·0080	·0078	·0075	·0073	·0071	·0069	·0068	·0066	·0064
2·5	·0062	·0060	·0059	·0057	·0055	·0054	·0052	·0051	·0049	·0048
2·6	·0047	·0045	·0044	·0043	·0041	·0040	·0039	·0038	·0037	·0036
[illegible]	[illegible]	[illegible]	[illegible]	0032	0031	0030	0029	0028	0027	0026
2·8	·0026	·0025	·0024	·0023	·0023	·0022	·0022	·0021	·0020	·0019
2·9	·0019	·0018	·0018	·0017	·0016	·0016	·0015	·0015	·0014	·0014
3·0	·0013	·0013	·0013	·0012	·0012	·0011	·0011	·0011	·0010	·0010

Table 2. Percentage Points of the t Distribution



Example
For $\nu = 10$ degrees of freedom:
$P(t > 1{\cdot}812) = 0{\cdot}05$
$P(t < -1{\cdot}812) = 0{\cdot}05$

ν \ α	·25	·20	·15	·10	·05	·025	·01	·005	·0005
1	1·000	1·376	1·963	3·078	6·314	12·706	31·821	63·657	636·619
2	·816	1·061	1·386	1·886	2·920	4·303	6·965	9·925	31·598
3	·765	·978	1·250	1·638	2·353	3·182	4·541	5·841	12·941
4	·741	·941	1·190	1·533	2·132	2·776	3·747	4·604	8·610
5	·727	·920	1·156	1·476	2·015	2·571	3·365	4·032	6·859
6	·718	·906	1·134	1·440	1·943	2·447	3·143	3·707	5·959
7	·711	·896	1·119	1·415	1·895	2·365	2·998	3·499	5·405
8	·706	·889	1·108	1·397	1·860	2·306	2·896	3·355	5·041
9	·703	·883	1·100	1·383	1·833	2·262	2·821	3·250	4·781
10	·700	·879	1·093	1·372	1·812	2·228	2·764	3·169	4·587
11	·697	·876	1·088	1·363	1·796	2·201	2·718	3·106	4·437
12	·695	·873	1·083	1·356	1·782	2·179	2·681	3·055	4·318
13	·694	·870	1·079	1·350	1·771	2·160	2·650	3·012	4·221
14	·692	·868	1·076	1·345	1·761	2·145	2·624	2·977	4·140
15	·691	·866	1·074	1·341	1·753	2·131	2·602	2·947	4·073
16	·690	·865	1·071	1·337	1·746	2·120	2·583	2·921	4·015
17	·689	·863	1·069	1·333	1·740	2·110	2·567	2·898	3·965
18	·688	·862	1·067	1·330	1·734	2·101	2·552	2·878	3·922
19	·688	·861	1·066	1·328	1·729	2·093	2·539	2·861	3·883
20	·687	·860	1·064	1·325	1·725	2·086	2·528	2·845	3·850
21	·686	·859	1·063	1·323	1·721	2·080	2·518	2·831	3·819
22	·686	·858	1·061	1·321	1·717	2·074	2·508	2·819	3·792
23	·685	·858	1·060	1·319	1·714	2·069	2·500	2·807	3·767
24	·685	·857	1·059	1·318	1·711	2·064	2·492	2·797	3·745
25	·684	·856	1·058	1·316	1·708	2·060	2·485	2·787	3·725
26	·684	·856	1·058	1·315	1·706	2·056	2·479	2·779	3·707
27	·684	·855	1·057	1·314	1·703	2·052	2·473	2·771	3·690
28	·683	·855	1·056	1·313	1·701	2·048	2·467	2·763	3·674
29	·683	·854	1·055	1·311	1·699	2·045	2·462	2·756	3·659
30	·683	·854	1·055	1·310	1·697	2·042	2·457	2·750	3·646
40	·681	·851	1·050	1·303	1·684	2·021	2·423	2·704	3·551
60	·679	·848	1·046	1·296	1·671	2·000	2·390	2·660	3·460
120	·677	·845	1·041	1·289	1·658	1·980	2·358	2·617	3·373
∞	·674	·842	1·036	1·282	1·645	1·960	2·326	2·576	3·291

Source: This table is abridged from Table III of Fisher & Yates: *Statistical Tables for Biological, Agricultural and Medical Research* published by Oliver & Boyd Ltd., Edinburgh, and by permission of the authors and publishers.