THE OPEN UNIVERSITY OF SRI LANKA
DEPARTMENT OF SOCIAL STUDIES
BA DEGREE PROGRAMME IN SOCIAL SCIENCES - LEVEL IV & V
FINAL EXAMINATION 2023/2024 (SEMESTER II)
DSE5301 – STATISTICS FOR SOCIAL SCIENCES

DURATION: THREE HOURS (3 HOURS)

Date: 17.08.2024 **Time: 09.30 a.m. – 12.30 p.m.**

Instructions:

- **There are nine (09) questions in this paper.**
- **Answer any five (05) questions.**
- **Each question carries equal marks.**
- **Use of non –programmable calculators is allowed.**

1. (a) Define and differentiate the terms population vs. sample, and the terms parameter vs. statistic. Which do scientists almost always use, and why? (10 marks)

   (b) Discuss the importance of identifying variables at the beginning of a research study that examines the impact of one factor on another. Include examples to illustrate your points. (10 marks)

2. (a) The objective of the study is as follows: To describe the association between social class and knowledge of nutrition.
   (i)What are the variables for the above mentioned objective?

   (ii) How would you classify the two variables in question (i)? (05 marks)

   (b) Indicate which scale of measurement is being used.

   (i) The Dialog phone company announces that the Colombo district serves one million customers.
   (ii) The University sports association announces individual names with their order of finish for the first 100 runners to cross the finish line.
   (iii) The University Grants Commission publishes the names and marks of the students selected for the Scholarship Scheme.
   (iv) The age in years of the youngest member of each household.
   (v) Proximity to the Sea (kilometers from the nearest coastline).

   (3×5=15 marks)

3. The body weights (kg) of 20 pregnant mothers attending an antenatal clinic were reported as follows.

55, 60, 62, 65, 70, 85, 60, 70, 56, 63, 65, 60, 60, 59, 72, 80, 62, 70, 82, 62

(i) Arrange the above observations in ascending order
(ii) Construct class interval
(iii) Find the cumulative frequency
(iv) Construct histogram
(v) Construct frequency polygon
(vi) Find the mean and mode (20 marks)

4. (i) Describe three measures of central tendency.

(ii) Discuss the purpose of measure of central tendency.

(iii) Define the mean, median, and mode.

(iv) Identify the distinguishing characteristics of the mean, median, and mode.

(v) Discuss the limitation of the mean, median, and mode. (4×5 = 20 marks)

5. (i) Describe three measures of variability.

(ii) Discuss the purpose of measures of variability.

(iii) Define the Range, Variance, and Standard Deviation.

(iv) Discuss the limitation of the Range, Variance, and Standard Deviation.
(5×4=20 marks)

6. (a) Discuss the characteristics of a normal or bell-shaped curve. (05 marks)

(b) Using the Z table;

i) Find the area under the normal distributing curve between Z = -0.86 and Z = 1.67

ii) Find the area to the left of Z =1.5

iii) Find the area to the right of Z =2.5

iv) Find the area to the left of Z = 2

v) Find the area under the normal distributing curve between Z = -0.81 and Z = 0.56

(3×5=15 marks)

7. An urban council has installed 2000 lamps with mercury bulbs in the streets of the town area. The lifetimes of these bulbs are normally distributed with a mean of 1200 burning hours and having a standard deviation of 200 hours.

(a) How many of these bulbs can be expected to fail,

(i) In the first 800 burning hours?
(ii) Between 900 and 1750 burning hours?

(b) After what number of burning hours would you expect that,

(i) 10 % of the bulbs would fail?
(ii) 150 bulbs are still in good condition? (20 marks)

8. Measurements of the IQ of 202 people selected at random produced the following results.

Mean IQ= 105

standard deviation = 10

(a) Calculate the standard error of the mean. (05 marks)

(b) Estimates the confidence limits of the mean IQ and interpret the results.

(i) With 95 percent confidence
(ii) With 99 percent confidence
(iii) With 90 percent confidence (5×3 = 15 marks)

9. Answer **any four (04)** of the following

(a) Point estimate
(b) Interval estimate
(c) Hypothesis testing
(d) Statistical Significance
(e) Characteristics of a good estimator
(f) The standard normal distribution
(g) Variations in normal distributions (5×4 = 20 marks)

Standard Normal (Z) Table
Area between 0 and 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