KENYATTA UNIVERSITY

UNIVERSITY EXAMINATIONS 2020/2021

FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF COMMERCE

BMS 200: BUSINESS STATISTICS

DATE: Tuesday, 15th June 2021 TIME: 4.30p.m-6.30p.m

INSTRUCTIONS:

QUESTION **ONE** IS COMPULSORY

ANSWER **ANY OTHE TWO** QUESTIONS

NB: Relevant tables are attached at the back of the paper

QUESTION ONE (30 MARKS)

a) Describe the importance of statistics in business, economics and management (5 marks)

b) In a study collecting data about the repair costs of damage to broadcasting equipment in a certain type of malfunctioning tests, a certain model of the equipment had Ksh 1700 in damage and was in the 90th percentile. Should the manufacturer and/or a consumer be pleased or upset by this result? Explain. Write a sentence that interprets the 90th percentile in the context of this problem. (4 marks)

c) Lahore Manufacturers and Distributors monitors the production of each manufacturing department weekly to establish productivity bonuses paid to the member of that department. 250 items have to be produced each week before a bonus is paid. The production in one department over a forty week period is shown below:

382	367	364	365	371	370	372	364	355	347
354	359	359	360	357	362	364	365	371	365
361	380	382	394	396	398	402	406	437	456
469	466	459	454	460	457	452	451	445	446

Required:

i) Form a frequency distribution of eight groups for the number of items produced per week (5 Marks)

ii) Calculate the Quartile Deviation from the frequency distribution (4 Marks)

iii) What is the mean production over the forty weeks? (4 Marks)

iv) Estimate 80th percentile of this distribution (4 marks)

d) Estimate the standard deviation (4 marks)

QUESTION TWO (20 MARKS)

a) Identify and explain the FOUR levels of measurement. (4 marks)

b) Explain the difference between correlation and regression analysis (4 marks)

c) A company dealing with cosmetics wishes to invest in product promotion through door-to-door marketing. In a duration of Seven months, the annual sales and the amount invested in marketing was as shown below

Amount Used in marketing (Ksh "million')	6	8	10	12	15	17	20
Sales (Khs 'millions)	200	190	240	210	270	280	290

By identifying the dependent and the independent variables;

i) Estimate the regression line for the data (7 marks)

ii) Interpret the coefficients in part (i) above (3 marks)

iii) Estimate the volume of sales if the company decided to invest Ksh 25 million in door-to-door marketing (2 marks)

QUESTION THREE (20 MARKS)

a) The director of manufacturing at a clothing factory needs to determine whether a new machine is producing a particular type of clothing according to manufacturer's specifications, which indicate that the clot should have a mean breaking strength of 32kg and standard deviation of 2.72 kg. A sample of 49 pieces of cloth reveals a sample mean breaking strength of 31.3kg.

i) Compute the 99% confidence interval and explain its meaning (4 marks)

ii) Is there evidence that the machine is not meeting the manufacturer's specifications for average breaking strength? Use a 5% level of significance. (6 marks)

b) An inventor has developed a system that allows visitors to museums, zoos and other attractions to get information at the touch of a digital code. For example, zoo patrons can listen to an announcement (recorded on a microchip) about each animal they see. It is anticipated that the device would rent for Ksh3.00 each. The installation cost for the complete system is expected to be about Ksh 400,000. The ABC zoo is interested in having the system installed, but the management is uncertain about whether to take the risk. A financial analysis of the problem indicates that if more than 10% of the zoo visitors rent the system, the zoo will make a profit. To

help make the decision, a random sample of 400 zoo visitors is given details of the systems capabilities and cost. If 48 people say that they would rent the device, can the management of the zoo conclude at the 5% significance level that the investment would result in a profit?

(10 marks)

QUESTION FOUR (20 MARKS)

A researcher in a large organization wishes to study sickness absence amongst its employees. The organization has a large number of branches, each of each keeps full records of sickness leave. A random sample of 10 such branches produced the following data showing the number of sickness per branch in past one year.

18 23 26 30 32 35 39 45 48 54

Required:

a) Using the data

i) Calculate a 95% confidence interval for the mean mount of sickness days per branch.

(6 marks)

ii) Estimate the number of branches that should be included in a simple random sample so that 95% confidence interval for the mean number of days of sickness should not have a width greater than four days. (4 marks)

a) After the sample was collected, it became apparent that the branches fell into three natural groups in terms of sales – small, medium and large. From her data on all the branches, the researcher found that 210 randomly selected staff, 90 worked in small branches, 36 in medium-sized branches and the rest worked in large branches. In total, 96 of the selected staff had no days off for sickness, of which 52 worked in small branches and 29 worked in large-sized branches.

i) Form a table showing this information clearly (4 marks)

ii) Carry out an appropriate statistical test to investigate whether the size branch influences the occurrence of sickness absence and interpreted your results (6 marks)

Z-DISTRIBUTION TABLE
(AREA OF STANDARD NORMAL DISTRIBUTION)

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	.1369	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.0736	.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	.264	.2673	.2703	.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	.49973	.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	.4990	.4990	.4990

STUDENT-T DISTRIBUTION

P/V	.10	.05	.025	.01	.005
1	3.078	6.314	12.706	31.812	63.657
2	1.886	2.920	4.303	6.965	9.925
3	1.638	2.353	3.182	4.541	5.841
4	1.533	2.132	2.776	3.747	4.604
5	1.476	2.015	2.571	3.365	4.032
6	1.440	1.943	2.447	3.143	3.707
7	1.415	1.895	2.365	2.998	3.49
8	1.397	1.860	2.306	2.896	3.355
9	1.383	1.833	2.262	2.821	3.250
10	1.372	1.812	2.228	2.764	3.169
11	1.363	1.796	2.201	2.718	3.106
12	1.356	1.782	2.179	2.681	3.055
13	1.350	1.771	2.160	2.650	3.012
14	1.345	1.761	2.145	2.624	2.977
15	1.341	1.753	2.131	2.602	2.947
16	1.337	1.746	2.120	2.583	2.921
17	1.333	1.740	2.110	2.567	2.898
18	1.330	1.734	2.101	2.552	2.878
19	1.328	1.729	2.093	2.539	2.861
20	1.325	1.725	2.086	2.528	2.845
21	1.323	1.721	2.080	2.518	2.831
22	1.321	1.717	2.074	2.508	2.819
23	1.319	1.714	2.069	2.500	2.807
24	1.318	1.711	2.064	2.592	2.797
25	1.316	1.708	2.060	2.585	2.287
26	1.315	1.706	2.056	2.479	2.779
27	1.314	1.703	2.052	2.473	2.771
28	1.313	1.701	2.048	2.467	2.763
29	1.311	1.699	2.045	2.462	2.756
30	1.310	1.697	2.042	2.457	2.750
40	1.303	1.684	2.021	2.423	2.704
60	1.296	1.671	2.000	2.390	2.660
120	1.289	1.658	1.980	2.358	2.617
	1.282	1.645	1.960	2.326	2.576

CHI-SQUARE DISTRIBUTION

Degree of Freedom	.20	.10	.05	.02	.01	.001
1	1.642	2.706	3.841	5.412	6.635	10.827
2	3.29	4.605	5.991	7.824	9.210	13.815
3	4.642	6.251	7.815	9.837	11.345	16.268
4	4.989	7.779	9.488	11.668	13.277	18.465
5	7.289	9.236	11.070	13.388	15.086	20.517
6	8.558	10.645	12.592	15.033	16.812	22.457
7	9.083	12.017	14.067	16.622	18.475	24.322
8	11.030	13.362	15.507	18.168	20.090	26.125
9	12.242	14.648	16.919	19.679	21.666	27.877
10	13.442	15.987	17.307	21.161	23.209	29.588
11	14.631	17.275	19.675	22.618	24.725	31.264
12	15.812	18.549	21.026	24.054	26.217	32.909
13	16.985	19.812	22.362	25.472	27.688	34.528
14	18.151	21.064	23.685	26.873	29.141	36.123
15	19.311	22.307	24.996	28.259	30.578	37.697
16	20.465	230542	26.296	29.633	32.000	39.252
17	21.615	24.769	27.587	30.995	33.409	40.790
18	22.760	25.989	28.869	32.346	34.805	42.312
19	23.900	27.204	30.144	33.687	36.191	43.820
20	25.038	28.412	31.410	35.020	37.566	45.315
21	26.171	29.615	32.671	36.343	38.932	46.797
22	27.301	30.813	33.924	37.659	40.289	48.268
23	28.429	32.007	35.172	38.968	41.638	49.728
24	29.553	33.196	36.415	40.270	42.980	51.179
25	30.675	34.382	37.652	41.566	44.314	52.620
26	31.795	35.563	38.885	42.856	45.642	54.052
27	32.912	36.741	40.113	44.140	46.963	55.476
28	34.027	37.916	41.337	45.419	48.278	56.893
29	35.139	39.087	42.557	46.693	49.588	58.302
30	36.250	40.256	43.773	47.962	50.892	59.703