



**PAN AFRICA CHRISTIAN UNIVERSITY**

**SCHOOL OF LEADERSHIP, BUSINESS & TECHNOLOGY**

**END OF SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF COMMERCE**

**JANUARY-APRIL 2019 SEMESTER**

**CAMPUS: ROYSAMBU**

**DEPARTMENT: BUSINESS STUDIES**

**COURSE CODE: BCM204**

**COURSE TITLE: BUSINESS STATISTICS II**

**EXAM DATE: MONDAY 15<sup>th</sup> APRIL 2019**

**DURATION: 3 HOURS**

**TIME: 9:00AM-12:00PM**

**INSTRUCTIONS**

- Read the instructions and questions carefully before you write the answers.
- Write your **STUDENT NUMBER** in the Answer Booklet given
- *Write clearly and legibly.*
- This examination script consists of **Six (6)** questions.
- Answer Question **ONE** and any other **FOUR** questions

➤ *ALL PAC University's examination rules and regulations apply*

**QUESTION ONE: COMPULSORY (40 Marks)**

- a. Define the following concepts as they relate to statistics
  - i. Sample (2 Marks)
  - ii. Normal Distribution (2 Marks)
  - iii. Variable (2 Marks)
  - iv. Hypothesis (2 Marks)
  - v. Forecasting (2 Marks)
  
- b. From the following data, compute Pearson's correlation coefficient: (10 Marks)

Age (years):	1	2	3	4	5
Demand (Qty)	3	4	6	7	12

- c. Differentiate between linear regression and multiple regression (2 Marks)
- d. There are three alternative proposals before a business man starts a new project.
  - Proposal 1 – Profit of KES 500,000 with a probability of 0.6 or a loss of KES 80,000 with a probability of 0.4
  - Proposal 2 - Profit of KES 1,000,000 with a probability of 0.4 or a loss of KES 200,000 with a probability of 0.6
  - Proposal 3 – Profit of KES 450,000 with a probability of 0.8 or a loss of KES 50,000 with a probability of 0.2

**Required**

Calculate the proposal he should select if he wants to maximize profit and minimize the loss. (8 Marks)

- e. Distinguish between mutually exclusive events and equally likely events. (2 Marks)
- f. There are four types of appliances in the kitchen denoted by  $A_1, A_2, A_3$  and  $A_4$  and the colours of the appliances are of 3 types  $C_1, C_2, C_3$ . The table below shows the cross-classification of the appliances by both the types and colours.

COLOUR			
TYPES	$C_1$	$C_2$	$C_3$
$A_1$	45	35	70

A <sub>2</sub>	60	15	25
A <sub>3</sub>	40	50	30
A <sub>4</sub>	75	25	30

**Required**

From the table calculate the probability that an appliance picked at random is of:

- i. Type A<sub>4</sub> **(2 marks)**
- ii. Type A<sub>3</sub> given colour C<sub>2</sub> **(3 marks)**
- iii. Colour C<sub>2</sub> given type A<sub>4</sub> **(3 marks)**

**QUESTION TWO (15 Marks)**

- a. Define null hypothesis **(2 Marks)**
- b. Distinguish between type I and type II error. **(4 Marks)**
- c. The mean lifetime of a sample of 100 light tubes produced by a company is found to be 1570 hours with a standard deviation of 80 hours. Test the hypothesis that the mean lifetime of the tubes produced by the company is 1600 hrs. At 95% level of confidence.

**(9 Marks)**

**QUESTION THREE (15 Marks)**

- a. State **two** properties of probabilities. **(2 Marks)**
- b. A pump proprietor sells on average KES 80,000 worth of petrol on rainy days and an average of KES 95,000 on clear days. Statistics from the meteorological department show that the probability is 0.76 for clear weather and 0.24 for rainy weather for the coming Wednesday. Determine the expected value of petrol sale for the coming Wednesday. **(3 Marks)**
- c. Using examples, discuss the **five** degrees of correlation. **(10 Marks)**

**QUESTION FOUR (15 Marks)**

- a. Using diagrams, explain three assumptions of a normal distribution **(6 Marks)**

- b. Ten cartons are taken at random from an automatic filling machine. The mean net weight of the 10 cartons is 11.8kg and standard deviation is 0.15kg. Determine whether the sample mean differ significantly from the intended weight of 12kg, with a significance level of 0.05. **(9 Marks)**

**QUESTION FIVE (15 Marks)**

- a. Discuss the role of statistics in today’s world **(5 Marks)**
- b. The following data represents sales from a particular company as a result of advertising its product.

Sales	Advertising
82	20
70	46
90	24
85	22
73	18

**Required:**

Determine the linear regression equation. **(10 Marks)**

**QUESTION SIX (15 Marks)**

- a. The monthly sales data of a company are given as below:

Sales (N)	Jan.	Feb.	March.	April.	May.	June
Past (Actual)	50	55	70	50	45	90

**Required:**

Using a 3 – period moving average, calculate the forecast values **(7 Marks)**

- b. Describe four basic types of forecasts **(8 Marks)**

**Z Critical values table**

<b>Level of Significance</b>	<b>0.10</b>	<b>0.05</b>	<b>0.01</b>	<b>0.005</b>	<b>0.00022</b>
Critical value of z for one tailed tests	-1.28 1.28	-1.650 1.650	-2.33 2.33	-2.58 2.58	-2.88 2.88
Critical value of z for two tailed tests	-1.645 And 1.645	-1.96 And 1.96	-2.58 And 2.58	-2.81 And 2.81	-3.08 And 3.08

## t Table

cum. prob	$t_{.50}$	$t_{.75}$	$t_{.80}$	$t_{.85}$	$t_{.90}$	$t_{.95}$	$t_{.975}$	$t_{.99}$	$t_{.995}$	$t_{.999}$	$t_{.9995}$
one-tail	<b>0.50</b>	<b>0.25</b>	<b>0.20</b>	<b>0.15</b>	<b>0.10</b>	<b>0.05</b>	<b>0.025</b>	<b>0.01</b>	<b>0.005</b>	<b>0.001</b>	<b>0.0005</b>
two-tails	<b>1.00</b>	<b>0.50</b>	<b>0.40</b>	<b>0.30</b>	<b>0.20</b>	<b>0.10</b>	<b>0.05</b>	<b>0.02</b>	<b>0.01</b>	<b>0.002</b>	<b>0.001</b>
df											
1	0.000	1.000	1.376	1.963	3.078	6.314	12.71	31.82	63.66	318.31	636.62
2	0.000	0.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	22.327	31.599
3	0.000	0.765	0.978	1.250	1.638	2.353	3.182	4.541	5.841	10.215	12.924
4	0.000	0.741	0.941	1.190	1.533	2.132	2.776	3.747	4.604	7.173	8.610
5	0.000	0.727	0.920	1.156	1.476	2.015	2.571	3.365	4.032	5.893	6.869
6	0.000	0.718	0.906	1.134	1.440	1.943	2.447	3.143	3.707	5.208	5.959
7	0.000	0.711	0.896	1.119	1.415	1.895	2.365	2.998	3.499	4.785	5.408
8	0.000	0.706	0.889	1.108	1.397	1.860	2.306	2.896	3.355	4.501	5.041
9	0.000	0.703	0.883	1.100	1.383	1.833	2.262	2.821	3.250	4.297	4.781
10	0.000	0.700	0.879	1.093	1.372	1.812	2.228	2.764	3.169	4.144	4.587
11	0.000	0.697	0.876	1.088	1.363	1.796	2.201	2.718	3.106	4.025	4.437
12	0.000	0.695	0.873	1.083	1.356	1.782	2.179	2.681	3.055	3.930	4.318
13	0.000	0.694	0.870	1.079	1.350	1.771	2.160	2.650	3.012	3.852	4.221
14	0.000	0.692	0.868	1.076	1.345	1.761	2.145	2.624	2.977	3.787	4.140
15	0.000	0.691	0.866	1.074	1.341	1.753	2.131	2.602	2.947	3.733	4.073
16	0.000	0.690	0.865	1.071	1.337	1.746	2.120	2.583	2.921	3.686	4.015
17	0.000	0.689	0.863	1.069	1.333	1.740	2.110	2.567	2.898	3.646	3.965
18	0.000	0.688	0.862	1.067	1.330	1.734	2.101	2.552	2.878	3.610	3.922
19	0.000	0.688	0.861	1.066	1.328	1.729	2.093	2.539	2.861	3.579	3.883
20	0.000	0.687	0.860	1.064	1.325	1.725	2.086	2.528	2.845	3.552	3.850
21	0.000	0.686	0.859	1.063	1.323	1.721	2.080	2.518	2.831	3.527	3.819
22	0.000	0.686	0.858	1.061	1.321	1.717	2.074	2.508	2.819	3.505	3.792
23	0.000	0.685	0.858	1.060	1.319	1.714	2.069	2.500	2.807	3.485	3.768
24	0.000	0.685	0.857	1.059	1.318	1.711	2.064	2.492	2.797	3.467	3.745
25	0.000	0.684	0.856	1.058	1.316	1.708	2.060	2.485	2.787	3.450	3.725
26	0.000	0.684	0.856	1.058	1.315	1.706	2.056	2.479	2.779	3.435	3.707
27	0.000	0.684	0.855	1.057	1.314	1.703	2.052	2.473	2.771	3.421	3.690
28	0.000	0.683	0.855	1.056	1.313	1.701	2.048	2.467	2.763	3.408	3.674
29	0.000	0.683	0.854	1.055	1.311	1.699	2.045	2.462	2.756	3.396	3.659
30	0.000	0.683	0.854	1.055	1.310	1.697	2.042	2.457	2.750	3.385	3.646
40	0.000	0.681	0.851	1.050	1.303	1.684	2.021	2.423	2.704	3.307	3.551
60	0.000	0.679	0.848	1.045	1.296	1.671	2.000	2.390	2.660	3.232	3.460
80	0.000	0.678	0.846	1.043	1.292	1.664	1.990	2.374	2.639	3.195	3.416
100	0.000	0.677	0.845	1.042	1.290	1.660	1.984	2.364	2.626	3.174	3.390
1000	0.000	0.675	0.842	1.037	1.282	1.646	1.962	2.330	2.581	3.098	3.300
<b>Z</b>	0.000	0.674	0.842	1.036	1.282	1.645	1.960	2.326	2.576	3.090	3.291
	0%	50%	60%	70%	80%	90%	95%	98%	99%	99.8%	99.9%
	<b>Confidence Level</b>										