



**PAMIBIA UNIVERSITY  
OF SCIENCE AND TECHNOLOGY**

**FACULTY OF HEALTH AND APPLIED SCIENCES**

**DEPARTMENT OF MATHEMATICS AND STATISTICS**

<b>QUALIFICATION:</b> Bachelor of science ; Bachelor of science in Applied Mathematics and Statistics	
<b>QUALIFICATION CODE:</b> 07BOSC	<b>LEVEL:</b> 5
<b>COURSE CODE:</b> IAS501S	<b>COURSE NAME:</b> INTRODUCTION TO APPLIED STATISTICS
<b>SESSION:</b> JUNE 2019	<b>PAPER:</b> THEORY
<b>DURATION:</b> 3 HOURS	<b>MARKS:</b> 100

<b>FIRST OPPORTUNITY EXAMINATION QUESTION PAPER</b>	
<b>EXAMINER</b>	Mr ROUX, A.J
<b>MODERATOR:</b>	Dr Ntirampeba, D

<b>INSTRUCTIONS</b>
<ol style="list-style-type: none"><li>1. Answer ALL the questions in the booklet provided.</li><li>2. Show clearly all the steps used in the calculations.</li><li>3. All written work must be done in blue or black ink and sketches must be done in pencil.</li></ol>

**PERMISSIBLE MATERIALS**

Non-programmable calculator without a cover.

**ATTACHMENTS**

The Standard Normal Probability Distribution Table

**THIS QUESTION PAPER CONSISTS OF 5 PAGES** (Including this front page)

QUESTION 1 [20]

- 1.1 The type of graph most appropriate to represent categorical data which indicates proportions that make up a given total:
- a. Line graph                      b. Pie chart  
c. Bar chart                        d. Histogram                      [2]
- 1.2 Another term for the median is:
- a. Range                      b. Average                      c. Second Quartile                      d. Quartile deviation                      [2]
- 1.3 A data set consists of 125 observations that range between 38 and 138. When using the Sturge's Rule, the appropriate width of the class is equal to:
- a. 20.00                      b. 21.50                      c. 8.80                      d. 8.85                      [2]
- 1.4 Data collected on the "Eye colour" of students enrolled in a statistics class are called:
- a. qualitative data                      b. quantitative data                      c. interval data                      d. class data                      [2]
- 1.5 1.7) Length is a \_\_\_\_\_ measurement scale variable                      [2]
- a. Ordinal                      b. Interval                      c. Ratio                      d. Nominal                      [2]
- 1.6 The 50th percentile is the
- a. mode                      b. median                      c. mean                      d. third quartile                      [2]
- 1.7 The interquartile range is
- a. the 50th percentile  
b. another name for the variance  
c. the range for the middle 50% of the data values  
d. the difference between the largest and smallest values                      [2]
- 1.8 The weight of an object is an example of
- a. a continuous random variable  
b. a discrete random variable  
c. either a continuous or a discrete random variable, depending on the weight of the object  
d. either a continuous or a discrete random variable depending on the units of measurement

- 1.9 In a frequency distribution, the sum of frequencies for all classes will always equal
- a. 1
  - b. the number of elements in a data set
  - c. the number of classes
  - d. a value between 0 and 1
- [2]

- 1.10 The term test scores of 15 students enrolled in a Business Statistics class were recorded in ascending order as follows:

4 , 7 , 7 , 9 , 10 , 11 , 13 , 15 , 15 , 15 , 17 , 17 , 19 , 19 , 20

After calculating the mean, median, and mode, an error is discovered: one of the 15's should be a 17. The measures of central tendency which will change are:

- a. the mean only
  - b. the mode only
  - c. the median only
  - d. the mean and mode
- [2]

QUESTION 2 [15]

The data below shows the number of hours a group of students spent to prepare for their IAS501S examination.

13	14	9	17	21	10	15	22	19	13
22	13	19	23	17	21	10	9	20	18

For the data set provided above, calculate the following:

- 2.1 Range (2)
- 2.2 Mode (1)
- 2.3 Median (4)
- 2.4 Arithmetic mean (2)
- 2.5 Standard deviation (6)

QUESTION 3 [15]

Consider the contingency table below.

	Production	Sales	Management	Others	Total
Undergraduate	92	76	24	65	<b>257</b>
Graduate	19	15	62	41	<b>137</b>
Postgraduate	15	26	37	28	<b>106</b>
Total	<b>126</b>	<b>117</b>	<b>123</b>	<b>134</b>	<b>500</b>

If one employee is randomly selected, what is the probability that he or she:

- 3.1 is either a postgraduate or belongs to sales department? (3)
- 3.2 is an undergraduate given that belongs to production department? (3)
- 3.3 is neither a postgraduate nor belongs to management department? (4)
- 3.4 does not belong to sales department given that is not a graduate? (5)

QUESTION 4 [26]

4.1 Research has shown that 12 patients visit a certain clinic in every 30 minutes. What is the probability that:

- 4.1.1 exactly 15 patients will visit the clinic in the next 30 minutes time? (3)
- 4.1.2 at most 5 patients will visit the clinic in the next 10 minutes time? (5)
- 4.1.3 at least 10 patients will visit the clinic in the next 1 hour time? (5)

4.2 The diameters of washers are normally distributed with mean 50mm and variance 4mm. A washer is considered non-defective if its diameter lies between 46mm and 53mm. If one washer is randomly selected, what is the probability that:

- 4.2.1 its diameter less than 45mm? (6)
- 4.2.2 it is defective? (7)

QUESTION 5 [24]

The production manager of a cement production company has accumulated the following information on quarterly production (in millions of Namibian Dollars):

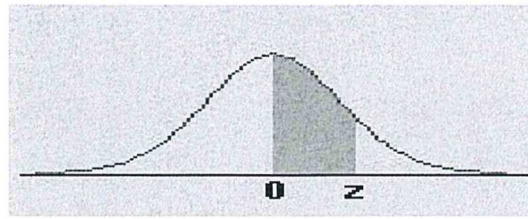
YEAR	Winter	Spring	Summer	Autumn
2015	2.6	4.1	4.8	3.2
2016	2.9	4.5	5.0	3.4
2017	2.8	4.9	5.5	3.3
2018	3.1	5.1	5.6	3.6

Find the quarterly seasonal ratios

(12 x 2 = 24)

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX END OF EXAMINATIONS XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

# APPENDIX A: The Standard Normal Distribution



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