INSTRUCTIONS TO CANDIDATES

1. Answer Question **ONE** and any other **TWO** questions
2. Show all your working and be neat
3. Do not write on the question paper

This paper consists of **FOUR** printed pages. Please turn over.
QUESTION ONE (30 MARKS)

a) Briefly explain the following terms
   
   i). Hypothesis
   
   ii). Test statistic
   
   iii). Sampling
   
   iv). Random Variable

b) Find the quartile deviation and the mean absolute deviation for the following data.
   
   3, 6, 9, 10, 7, 12, 13, 15, 6, 5, 13

   (3marks)

c) Briefly explain the Arithmetic Mean and its properties

   (4marks)

d) Below are the scores of two cricketers in 10 Minutes. Find the most consistent scorer by indirect
   method and draw a appropriate conclusion.

   A  204  68  150  30  70  95  60  76  24  19
   B  99  190  130  94  80  89  69  85  65  40

   (3marks)

e) Estimate the mean, median, mode and standard deviation for the following frequency distribution:

<table>
<thead>
<tr>
<th>Class</th>
<th>5-9</th>
<th>10-14</th>
<th>15-19</th>
<th>20-24</th>
<th>25-29</th>
<th>30-34</th>
<th>34-39</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freq</td>
<td>5</td>
<td>12</td>
<td>32</td>
<td>40</td>
<td>16</td>
<td>9</td>
<td>6</td>
</tr>
</tbody>
</table>

   (8marks)

f) Given a probability distribution of X as below, find the mean and standard deviation of X.

<table>
<thead>
<tr>
<th>x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>P(X=x)</td>
<td>1/8</td>
<td>1/4</td>
<td>3/8</td>
<td>1/4</td>
</tr>
</tbody>
</table>

   (4marks)

g) Calculate the coefficient of Skewness $\alpha_3$ and the coefficient of kurtosis $\alpha_4$ for the data
   5, 6, 7, 6, 9, 4, 5

   (4 marks)
QUESTION TWO (20 MARKS)

a) Briefly explain the following terms as used in statistics
   
i). Type I and Type II error
   
   ii). Sample and Population
   
   iii). Descriptive and Inferential Statistics

b) The claim that the true mean of TV sets in Kenya homes is equal to 3. Suppose the sample results are \( n = 100, \bar{x} = 2.84 \) (\( \sigma = 0.8 \) is assumed known). Test the claim at 5% significance level and draw an appropriate conclusion.

(8 marks)

c) The following data in the table below relate to the size of capital and number of companies. Compute the Bowley's coefficients of skewness and interpret the results.

<table>
<thead>
<tr>
<th>Capital (Kshs)</th>
<th>1-5</th>
<th>6-10</th>
<th>11-15</th>
<th>16-20</th>
<th>21-25</th>
<th>26-30</th>
<th>31-35</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of companies</td>
<td>20</td>
<td>27</td>
<td>29</td>
<td>38</td>
<td>48</td>
<td>53</td>
<td>70</td>
</tr>
</tbody>
</table>

(6 marks)

QUESTION THREE (20 MARKS)

a) Define the following terms
   
i). Frequency Distribution
   
   ii). Raw Data
   
   iii). Kurtosis

b) Obtain the correlation coefficient of the following data and draw an appropriate conclusion

<table>
<thead>
<tr>
<th>Mean Temp. (x)</th>
<th>14.2</th>
<th>14.3</th>
<th>14.6</th>
<th>14.9</th>
<th>15.2</th>
<th>15.6</th>
<th>15.9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pirates (y)</td>
<td>35000</td>
<td>45000</td>
<td>20000</td>
<td>15000</td>
<td>5000</td>
<td>400</td>
<td>17</td>
</tr>
</tbody>
</table>

(8 marks)

c) Scores made by students in a statistics class in the mid-term and final examination are given here. Develop a regression equation which may be used to predict final examination scores from the mid-term score.

<table>
<thead>
<tr>
<th>Student</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid term</td>
<td>98</td>
<td>66</td>
<td>100</td>
<td>96</td>
<td>88</td>
<td>45</td>
<td>76</td>
<td>60</td>
<td>74</td>
<td>82</td>
</tr>
<tr>
<td>Final</td>
<td>90</td>
<td>74</td>
<td>98</td>
<td>88</td>
<td>80</td>
<td>62</td>
<td>78</td>
<td>74</td>
<td>86</td>
<td>80</td>
</tr>
</tbody>
</table>
QUESTION FOUR (20 MARKS)

a) Define the following terms
   i). Skewness (1 mark)
   ii). Probability Value (1 mark)

b) Briefly explain the steps to performing hypothesis testing (5 marks)

c) The table below contains the data of ten competitors in a beauty contest as ranked by three judges in the following order. Use the rank correlation to discuss which pair of judges has the nearest approach to common tastes in beauty?

<table>
<thead>
<tr>
<th></th>
<th>1st Judge</th>
<th>2nd Judge</th>
<th>3rd Judge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rank</td>
<td>1 6 5 10 3 2 4 9 7 8</td>
<td>3 5 8 4 7 10 2 1 6 9</td>
<td>6 4 9 8 1 2 3 10 5 7</td>
</tr>
</tbody>
</table>

(8 marks)

d) The following table below gives the number of aircraft accident that occurred during various day of the week. Find whether the number of accidents is uniformly distributed over the week.

\( \chi^2_{6.0.05} = 12.59 \)

<table>
<thead>
<tr>
<th>Day</th>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Accident</td>
<td>14</td>
<td>15</td>
<td>7</td>
<td>20</td>
<td>11</td>
<td>9</td>
<td>14</td>
</tr>
</tbody>
</table>

(5 marks)