Instructions

• Use black ink or ball-point pen.
• If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
• Fill in the boxes at the top of this page with your name.
• Answer all questions and ensure that your answers to parts of questions are clearly labelled.
• Answer the questions in the spaces provided – there may be more space than you need.
• You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
• Answers should be given to three significant figures unless otherwise stated.

Information

• The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.

Advice

• Read each question carefully before you start to answer it.
• Try to answer every question.
• Check your answers if you have time at the end.
1 A football coach measured the heights and weights of 12 players. The data is shown below.

<table>
<thead>
<tr>
<th>Height (cm)</th>
<th>188</th>
<th>194</th>
<th>178</th>
<th>175</th>
<th>185</th>
<th>175</th>
<th>188</th>
<th>193</th>
<th>180</th>
<th>190</th>
<th>181</th>
<th>169</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>70</td>
<td>100</td>
<td>83</td>
<td>69</td>
<td>77</td>
<td>58</td>
<td>90</td>
<td>86</td>
<td>71</td>
<td>94</td>
<td>68</td>
<td>61</td>
</tr>
</tbody>
</table>

(a) Draw a scatter graph for this information.  
(b) Give an interpretation of the correlation between the height and weight of the footballers.  

The equation of the regression line is \( w = 1.37h - 173 \)

(c) Give an interpretation of the gradient of this regression line.  

The product moment correlation coefficient is calculated to be 0.81.

(d) Stating your hypotheses clearly, test, at the 5\% significance level, whether there is a positive correlation between temperature and hours of sunshine.

(e) Determine whether you would reach the same conclusion at the 1\% significance level.

(Total for question 1 is 10 marks)

2 The temperature and the rainfall on 15 days is recorded.

(a) Suggest a null and alternative hypothesis for a two-tailed test to investigate whether there is a correlation between temperature and rainfall.  

The product moment correlation coefficient is calculated to be \( r = 0.37 \).

(b) Test your hypotheses at the 10\% significance level.  

(Total for question 2 is 4 marks)

3 The temperature and the number of hours of sunshine on 12 days is recorded. The product moment correlation coefficient is calculated to be \( r = 0.636 \).

Stating your hypotheses clearly, test, at the 1\% significance level, whether there is a positive correlation between temperature and hours of sunshine.  

(Total for question 3 is 4 marks)

4 Amy wants to find out if there is a correlation between daily maximum relative humidity and daily mean pressure.

(a) Suggest a suitable null and alternative hypothesis for a two-tail test.  

Amy takes a sample of 14 days and finds a product moment correlation coefficient of -0.55.

(b) Carry out the hypothesis test at the 5\% significance level.  

(Total for question 4 is 4 marks)