

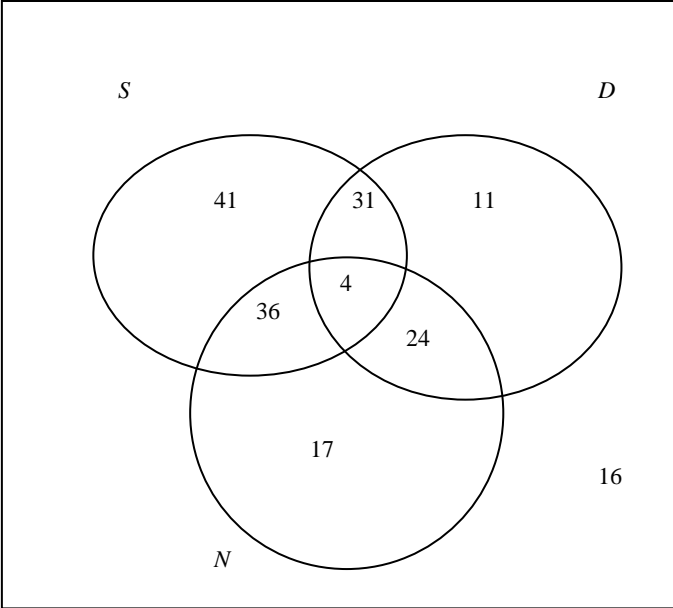
**Edexcel GCE**  
**Statistics S1**  
**Bronze Level B3**  
**(Mark Scheme)**

**All exam papers are issued free to students for education purpose only.  
Mr.S.V.Swarnaraja (Marking Examiner, Team Leader & Author)  
[www.swanash.com](http://www.swanash.com), Mobile: +94777304755 , email: [swa@swanash.com](mailto:swa@swanash.com)**

Question Number	Scheme	Marks
<p>1. (a)</p> <p>(b)</p> <p>(c)</p>	$(S_{pp} =) 38125 - \frac{445^2}{10}$ $= 18322.5$ <p style="text-align: right;">awrt 1830</p> $(S_{pt} =) 26830 - \frac{445 \times 240}{10}$ $= 16150$ <p style="text-align: right;">awrt 16200</p> $r = \frac{"16150"}{\sqrt{"18322.5" \times 21760}}$ $= 0.8088\dots$ <p style="text-align: right;">awrt 0.809</p> <p>As the temperature increases the pressure increases.</p>	<p>M1</p> <p>A1</p> <p>A1</p> <p>(3)</p> <p>M1</p> <p>A1</p> <p>(2)</p> <p>B1</p> <p>(1)</p> <p><b>[6]</b></p>
<p>2. (a)</p> <p>(b)</p>	$2.8 + 5.6 + 2.3 + 9.4 + 0.5 + 1.8 + 84.6 = 107$ <p>mean = <math>107 / 28 (= 3.821\dots)</math> (<b>awrt 3.8</b>)</p> <p>It will have no effect since one is 4.5 under what it should be and the other is 4.5 above what it should be.</p>	<p>M1</p> <p>A1</p> <p>(2)</p> <p>B1</p> <p>dB1</p> <p>(2)</p> <p><b>[4]</b></p>

Question Number	Scheme	Marks
3. (a)	50	B1 (1)
(b)	$Q_1 = 45$	B1
	$Q_2 = 50.5$	B1
	$Q_3 = 63$	B1 (3)
(c)	Mean = $\frac{1469}{28} = 52.464286..$	awrt 52.5 M1 A1
	Sd = $\sqrt{\frac{81213}{28} - \left(\frac{1469}{28}\right)^2}$	M1
	= 12.164.... or 12.387216... for divisor $n-1$	awrt 12.2 or 12.4 A1 (4)
(d)	$\frac{52.46.. - 50}{sd} = \text{awrt } 0.20 \text{ or } 0.21$	M1 A1 (2)
(e)	<p>1. mode/median/mean Balmoral &gt; mode/median/mean Abbey</p> <p>2. Balmoral sd &lt; Abbey sd or similar sd or correct comment from their values, Balmoral range &lt; Abbey range, Balmoral IQR &gt; Abbey IQR or similar IQR</p> <p>3. Balmoral positive skew or almost symmetrical AND Abbey negative skew, Balmoral is less skew than Abbey or correct comment from their value in (d)</p> <p>4. Balmoral residents generally older than Abbey residents or equivalent.</p> <p style="text-align: center;">Only one comment of each type max 3 marks</p>	B1 B1 B1 (3) <b>[13]</b>

Question Number	Scheme	Marks	
4. (a)	$S_{tt} = 10922.81 - \frac{401.3^2}{15} = 186.6973$	awrt 187	M1A1
	$S_{vv} = 42.3356 - \frac{25.08^2}{15} = 0.40184$	awrt 0.402	A1
	$S_{tv} = 677.971 - \frac{401.3 \times 25.08}{15} = 6.9974$	awrt 7.00	A1
			(4)
(b)	$r = \frac{6.9974}{\sqrt{186.6973 \times 0.40184}}$ $= 0.807869$	awrt 0.808	M1A1ft A1
			(3)
(c)	$t$ is the explanatory variable as we can control temperature but not frequency of noise or equivalent comment		B1 B1
			(2)
(d)	High value of $r$ or $r$ close to 1 or strong correlation		B1
			(1)
(e)	$b = \frac{6.9974}{186.6973} = 0.03748$	awrt 0.0375	M1 A1
	$a = \frac{25.08}{15} - b \times \frac{401.3}{15} = 0.6692874$	awrt 0.669	M1 A1
			(4)
(f)	$t = 19, v = 0.6692874 + 0.03748 \times 19 = 1.381406$	awrt 1.4	B1
			(1)
			[15]

Question Number	Scheme	Marks
5. (a)	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 10px; margin-right: 20px;">  </div> <div> <p>3 closed curves and 4 in centre M1</p> <p>Evidence of subtraction M1</p> <p>31,36,24 A1</p> <p>41,17,11 A1</p> <p>Labels on loops, 16 and box B1</p> </div> </div>	<p>(5)</p> <p>B1ft</p> <p>(1)</p> <p>B1ft</p> <p>(1)</p> <p>M1 A1</p> <p>(2)</p> <p><b>[9]</b></p>
	<p>(b) <math>P(\text{None of the 3 options}) = \frac{16}{180} = \frac{4}{45}</math></p> <p>(c) <math>P(\text{Networking only}) = \frac{17}{180}</math></p> <p>(d) <math>P(\text{All 3 options/technician}) = \frac{4}{40} = \frac{1}{10}</math></p>	

Question Number	Scheme	Marks
<p>6. (a)</p>	<p>Diagram may be drawn with <math>B \subset (A \cup C)</math> or with the 0 for <math>B \cap (A \cup C)'</math> simply left blank</p> <div style="text-align: center;"> </div> <p>Accept decimals or probs. in Venn diagram</p>	<p>3cc 90,3,2,1 1,(0),2 1 outside Box</p> <p>M1 A1 M1A1 A1 B1</p> <p>(6)</p> <p>B1ft (1)</p> <p>M1 A1ft (2)</p> <p>M1A1ft (2)</p> <p>M1A1ft (2)</p> <p>M1A1ft, A1 (3)</p> <p><b>[16]</b></p>
(b)	<p><math>P(\text{none})=0.01</math></p>	
(c)	<p><math>P(A \text{ but not } B)=0.04</math></p>	
(d)	<p><math>P(\text{any wine but } C)=0.03</math></p>	
(e)	<p><math>P(\text{exactly two})=0.06</math></p>	
(f)	<p><math>P(C A) = \frac{P(C \cap A)}{P(A)} = \frac{93}{96}</math> or <math>\frac{31}{32}</math> or awrt 0.969</p>	

Question Number	Scheme	Marks
7. (a)		Shape B1 Labels & 0.03 B1 Labels & 0.7,0.02 B1
	(b) $P(\text{Exactly one defect}) = 0.03 \times 0.3 + 0.97 \times 0.02$ <u>or</u> $P(PS \cup Split) - 2P(PS \cap Split)$ $= [0.009 + 0.0194 = ]$	(3) M1A1ft A1 cao (3)
	(c) $P(\text{No defects}) = (1 - 0.03) \times (1 - 0.02) \times (1 - 0.05)$ (or better) $= 0.90307$	M1 A1 cao (2)
	(d) $P(\text{Exactly one defect}) = (b) \times (1 - 0.05) + (1 - 0.03) \times (1 - 0.02) \times 0.05$ $= "0.0284" \times 0.95 + 0.97 \times 0.98 \times 0.05$ $= [0.02698 + 0.04753] = 0.07451$	M1 M1 A1ft A1 cao (4) <b>[12]</b>
		<b>awrt 0.0284</b> <b>awrt 0.903</b> <b>awrt 0.0745</b>

### Statistics for S1 Practice Paper Bronze Level B3

Qu	Max Score	Modal score	Mean %	Mean score for students achieving grade:							
				ALL	A*	A	B	C	D	E	U
1	6		82	4.91		5.46	5.18	4.99	4.80	4.62	3.68
2	4		79	3.17	3.59	3.53	3.17	2.93	2.80	2.65	2.09
3	13		75	9.78		11.69	10.60	9.77	8.91	7.91	6.02
4	15		74	11.14		13.18	11.96	11.25	10.44	9.49	6.87
5	9		74	6.66		7.78	6.83	6.23	5.39	4.78	3.41
6	16		71	11.37		14.39	11.97	9.84	8.39	6.87	4.54
7	12		68	8.11	10.89	10.52	9.14	8.14	7.26	6.50	4.69
	<b>75</b>		<b>74</b>	<b>55.14</b>		<b>66.55</b>	<b>58.85</b>	<b>53.15</b>	<b>47.99</b>	<b>42.82</b>	<b>31.30</b>