<table>
<tr><th>Question Number</th><th>Scheme</th><th>Notes</th><th>Marks</th></tr>
<tr><td>5.(a)</td><td>Relief of symptoms is either a “success” or a “failure”.
The probability the medicine being a success is constant.
Samples from different medical practices are independent.</td><td>Any 2. Context required in one assumption.</td><td>B1 B1</td></tr>
<tr><td></td><td></td><td></td><td>(2)</td></tr>
<tr><td>5(b)</td><td>$\text{Mean} = \dfrac{0\times 4+1\times 6+2\times 3+...+8\times 2}{50} = 3.54*$</td><td>At least two correct terms on the numerator and 50 on the denominator,
fully correct expression or $\dfrac{177}{50}$
dep on M1 scored cso.</td><td>M1,
A1cso</td></tr>
<tr><td></td><td></td><td></td><td>(2)</td></tr>
<tr><td>5(c)</td><td>$p = \dfrac{3.54}{8} = 0.4425$</td><td>Can be implied by at least 1 correct value for f or g.</td><td>B1</td></tr>
<tr><td></td><td>$f = 50\times \text{C}_4^8 \times 0.4425^4 \times 0.5575^4 = 12.96$
$g = 50\times 0.4425^8 = 0.07$</td><td>Use of Bin(50, p) for M1,
Allow awrt 12.96, awrt 0.07</td><td>M1A1A1</td></tr>
<tr><td></td><td></td><td></td><td>(4)</td></tr>
<tr><td>5(d)</td><td>H_0 : Binomial distribution is a suitable model
H_1 : Binomial distribution is not a suitable model</td><td>Both hypotheses correct
If parameters used then B0.</td><td>B1</td></tr>
<tr><td></td><td rowspan="2"><table>
<tr><th>No of successes</th><th>O</th><th>E</th><th>$\dfrac{(O-E)^2}{E}$</th><th>$\dfrac{O^2}{E}$</th></tr>
<tr><td>0,1,2</td><td>13</td><td>11.66</td><td>0.154</td><td>14.494</td></tr>
<tr><td>3</td><td>12</td><td>13.07</td><td>0.088</td><td>11.018</td></tr>
<tr><td>4</td><td>10</td><td>12.96</td><td>0.676/7</td><td>7.716</td></tr>
<tr><td>5,6,7,8</td><td>15</td><td>12.31</td><td>0.588/7</td><td>18.278</td></tr>
<tr><td></td><td>50</td><td>50</td><td>1.506</td><td>51.506</td></tr>
</table></td><td>Combining 0,1,2 or 5,6,7,8.</td><td>M1</td></tr>
<tr><td></td><td>M1 for attempting $\dfrac{(O-E)^2}{E}$ or $\dfrac{O^2}{E}$
with at least 2 correct expressions or 2 correct values to 2sf.</td><td>M1</td></tr>
<tr><td></td><td>$\sum \dfrac{(O-E)^2}{E} = \sum \dfrac{O^2}{E} - 50 = 1.50...$</td><td>awrt 1.5 (calculator: 1.50498…)</td><td>A1</td></tr>
<tr><td></td><td>$\nu = 4-2 = 2, \chi^2_2(10\%) = 4.605$</td><td>2 can be implied by 4.605 seen
Only f.t. $\nu = r-2$</td><td>B1
B1f.t.</td></tr>
<tr><td></td><td>Insufficient evidence to reject H_0</td><td>For correct non-contextual statement linking their test statistic and their cv.</td><td>M1</td></tr>
<tr><td></td><td>Data is consistent with a binomial distribution (oe)</td><td>A correct comment suggesting that binomial model is suitable / good fit.
Hypotheses wrong way around scores A0 here. Condone parameters here.</td><td>A1</td></tr>
<tr><td></td><td></td><td></td><td>(8)</td></tr>
<tr><td></td><td></td><td></td><td>Total 16</td></tr>
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