

## Random Response Method Mark Scheme

Q1.

| Question number | Answer   | Additional guidance   | Mark |
|-----------------|--|---|------|
| (a)             | B1 for e.g. this is a sensitive question or people may not want to answer it otherwise   | B1 for a correct response referring to the sensitivity of the question  | (1)  |
| (b)             | e.g.<br>M1 for $0.5 \times (743 + 679) (= 711)$<br><br>M1 for $\frac{743 - "711"}{"711"}$<br><br>A1 for 0.045(007...)  | M1 for method to estimate the number of people who answered yes because they got Heads<br><br>M1 for method to estimate the proportion of people who have downloaded illegally<br><br>A1 for a correct proportion, e.g. 0.045 or 4.5% or better | (3)  |
| (c)             | B1 for not appropriate<br><br>B1 for a correct reason, e.g. the town may not be representative of the UK<br><br>B1 for a different correct reason, e.g. the telephone directory may not include everyone in the town | B1 B1 B1 for assessing the appropriateness of the statistical methodology with correct reasons  | (3)  |

Q2.

| Question number | Answer  | Additional guidance   | Mark |
|-----------------|---|---|------|
| (a)             | B2 The method is appropriate as this is <ul style="list-style-type: none"> <li>a sensitive question,</li> <li>people may not answer it honestly otherwise</li> <li>people may not want to answer it otherwise</li> <li>maintains confidentiality</li> </ul> Award maximum 2 marks from any 2 of the above.<br>OR<br>B1 The method is appropriate as this is <ul style="list-style-type: none"> <li>only one of the above reasons</li> </ul> | B2 for a completely correct assessment of the appropriateness of using the random response technique<br><br>They <b>must</b> state that it is appropriate for at least B1 plus one reason.<br><br>OR<br>B1 for appropriate with attempt at reason<br><br>If they state inappropriate B0B0 | (2)  |
| (b)             | $\frac{4}{6} (615 + 102) *$<br>OR<br>$\frac{2}{6} (615 + 102) - 102 *$  | <b>NB</b><br>This is a show question, the <b>full</b> method must be seen for the award of this mark.   | (1)  |

**Q3.**

| Question | Answer  | Additional guidance   | Mark |
|----------|---|---|------|
| (a)      | B1 for reference to respondents are more likely to be honest if answering the question  | B1 for a correct justification of the appropriateness of the method   | (1)  |
| (b)      | <p>M1 for <math>0.5 \times (426 + 354) (= 390)</math></p> <p>M1 for <math>\frac{426 - "390"}{"390"}</math></p> <p>OR for <math>2 \times (426 - "390")</math> AND <math>0.059 \times (426 + 354)</math></p> <p>OR for <math>2 \times ("390" - 354)</math> AND <math>0.059 \times (426 + 354)</math></p> <p>A1 for 0.092(307...)</p> <p>OR for 72 AND 46(.02)</p> <p>A1 for comparison of '0.092(307...)' and 0.059 with appropriate conclusion about effectiveness eg <math>0.092 &gt; 0.059</math> so the random response technique appears to be effective as more people admitted to avoiding tax</p> <p>OR for comparison of '72' AND '46.02' with appropriate conclusion about effectiveness</p> <p>B1 for eg we don't know the population used in the research</p> | <p>M1 for method to estimate the number of people who answered yes because they got 1, 2 or 3</p> <p>M1 for method to estimate the proportion of people who have avoided tax OR for method to find 5.9% of the total number of respondents</p> <p>A1 for a correct proportion OR for comparable values based on the proportions</p> <p>A1 for comparison of values with appropriate conclusion about effectiveness</p> <p>B1 for identifying a limitation of the conclusion</p> | (5)  |

**Q4.**

| Question number | Answer   | Additional guidance   | Mark |
|-----------------|--|---|------|
| (a)             | <p>B1 for e.g.</p> <ul style="list-style-type: none"> <li>Not appropriate, collecting data at the local car park will give a unrepresentative/biased sample</li> </ul> <p>B1 for e.g.</p> <ul style="list-style-type: none"> <li>Appropriate, all ages represented/age groups don't overlap</li> <li>Not appropriate, (Quota sample) may not be proportional to the population</li> <li>Not appropriate, not random</li> </ul> | <p>B1 for a correct comment assessing the appropriateness of the location of the sampling</p> <p>B1 for a correct comment assessing the appropriateness of the method for sampling<br/>Do not allow small sample size</p> | (2)  |
| (b)             | <p>B1 for e.g. roll a dice / spin a spinner</p> <p>B1 for e.g. if the number is odd then answer the question 'do you drive faster than the speed limit on the motorway?'</p> <p>B1 for e.g. if the number is even then tick yes</p>  | <p>B1 for an instruction to generate a random number</p> <p>B1 for indicating to answer the question for <b>some</b> outcomes</p> <p>B1 for indicating to tick yes for other outcomes</p>                                 | (3)  |

**Q5.**

| Question number | Answer  | Additional guidance | Mark |
|-----------------|---|---------------------|------|
| (a)             | <p>M1 <math>\frac{26}{48+26+22} \times 30 (= 8.125)</math></p> <p>A1 8 or 9</p>   |                     | (2)  |
| (b)             | <p>B1 for a suitable question e.g. do you work hard consistently?</p> <p>B1 for an instruction to generate a random outcome e.g. roll a dice / spin a spinner</p> <p>B2 for a complete method to respond to the random response question<br/>e.g. if the dice roll is a 1 or 2 tick yes, if the dice roll is a 3 or 4 tick no, if the dice roll is a 5 or 6 answer the question<br/>OR if B2 is not earned...</p> <p>B1 for indicating to answer the question for <b>some</b> outcomes<br/>e.g. if the number is odd then answer the question</p> |                     | (4)  |