4.10 Fold and Punch: 30-minute Pack

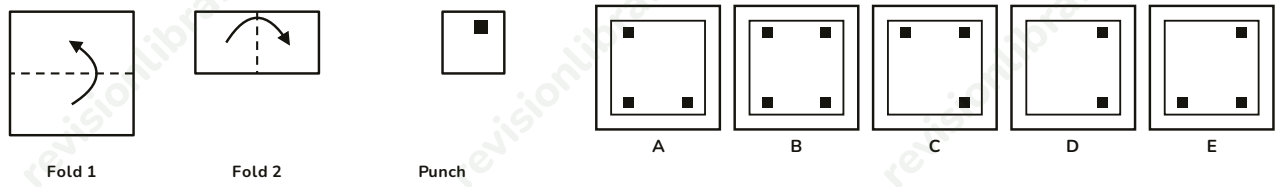
GL ASSESSMENT 11+ NVR · Calculators not allowed · about 30 minutes

Total Marks

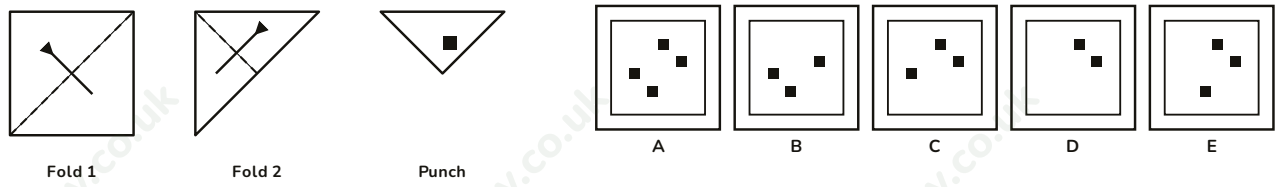
Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

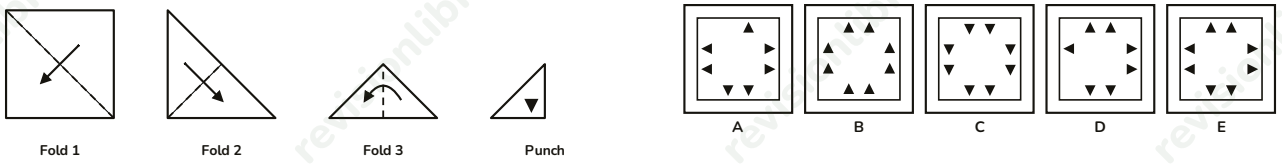
1 A square sheet of paper is folded as shown in the steps, with the dashed line and curved arrow showing each fold. A hole is then punched through all the layers at the place shown. Which of the options A to E shows the sheet opened out flat again, with every hole in its correct position?



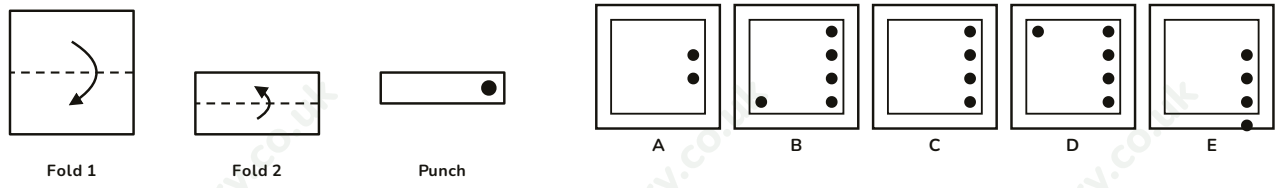
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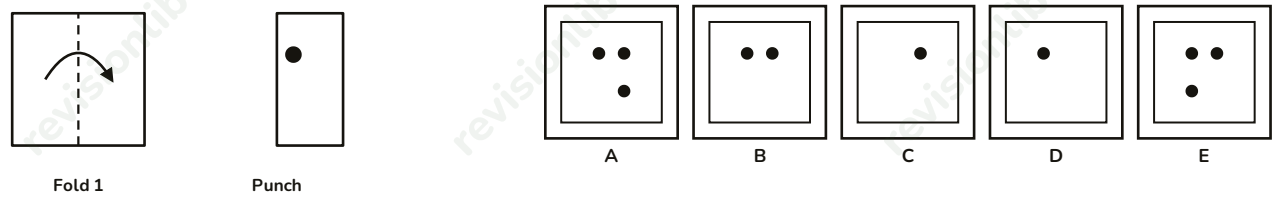
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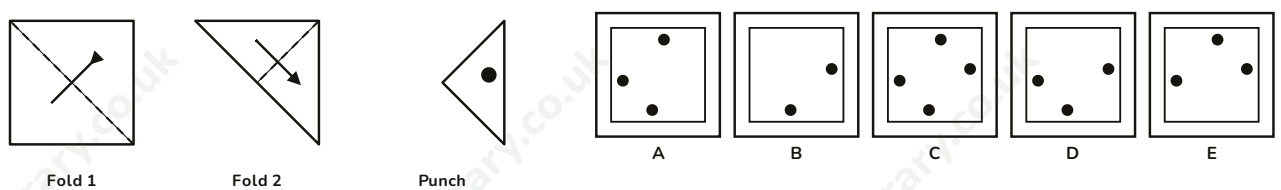
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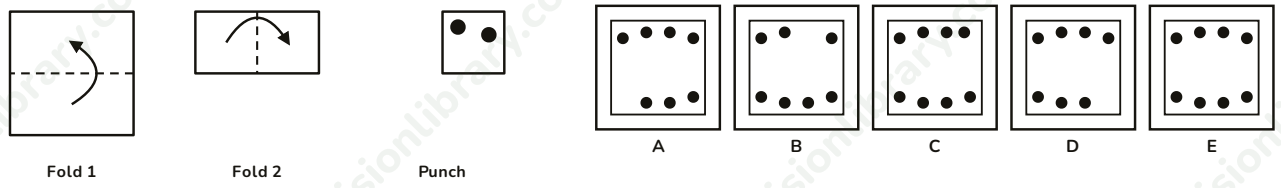


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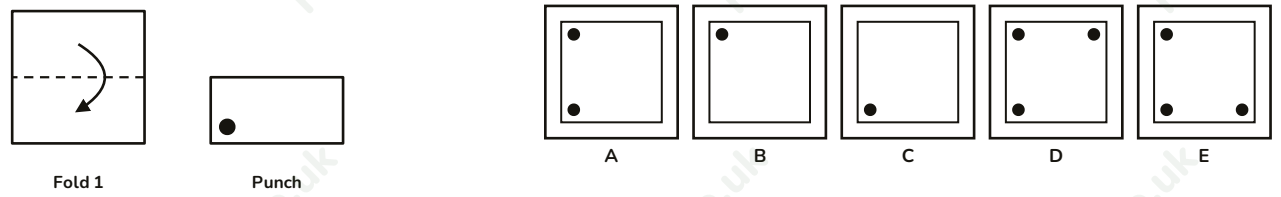


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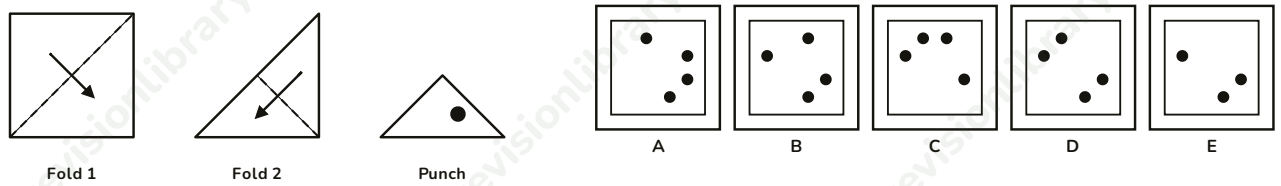
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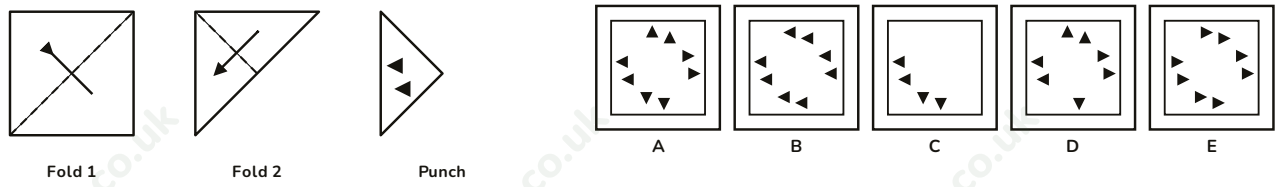
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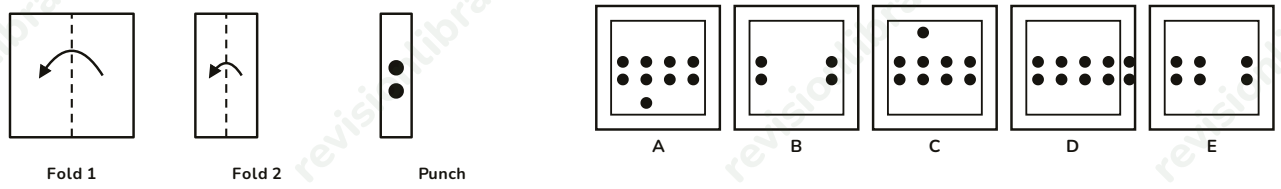
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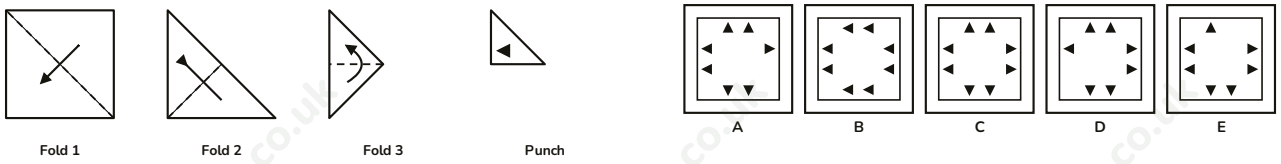
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11

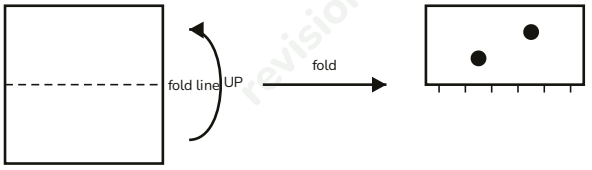


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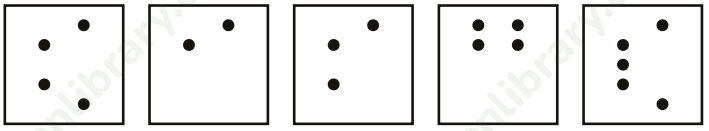
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13 Study the square sheet of paper described below. It is folded as described, in the direction shown by the arrow(s), and a hole (or holes) is punched through all the layers at the point(s) marked. Which of the options A to E shows the sheet of paper fully opened out flat again, with every resulting hole shown in its correct position?

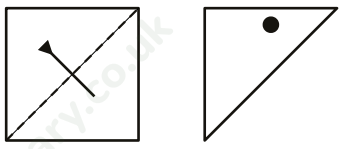


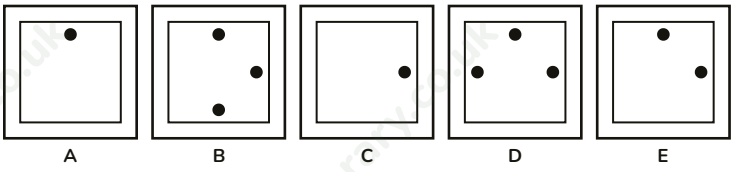
Before folding

After folding - holes punched

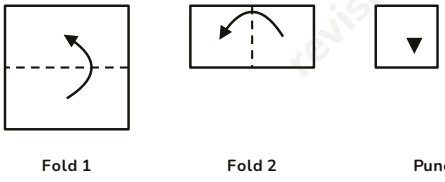


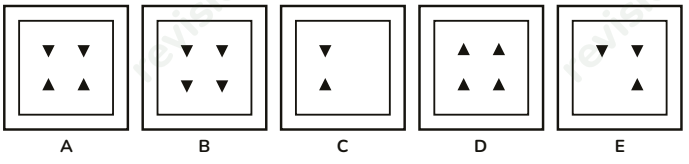
14 A square sheet of paper is folded as shown in the steps, with the dashed line and curved arrow showing each fold. A hole is then punched through all the layers at the place shown. Which of the options A to E shows the sheet opened out flat again, with every hole in its correct position?



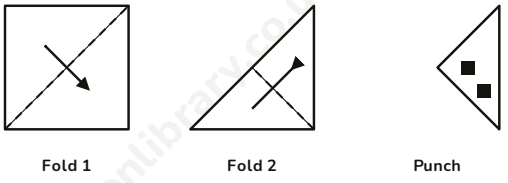


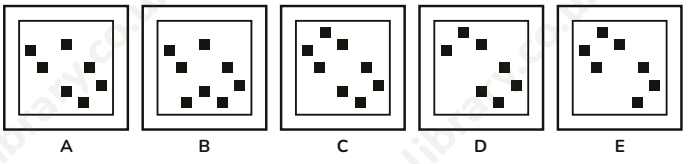
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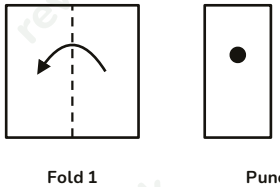


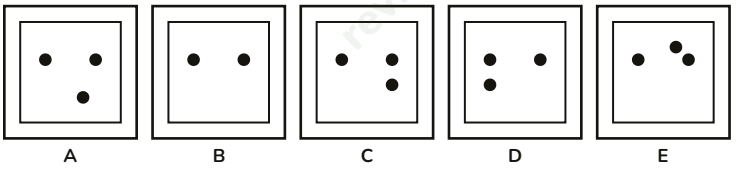
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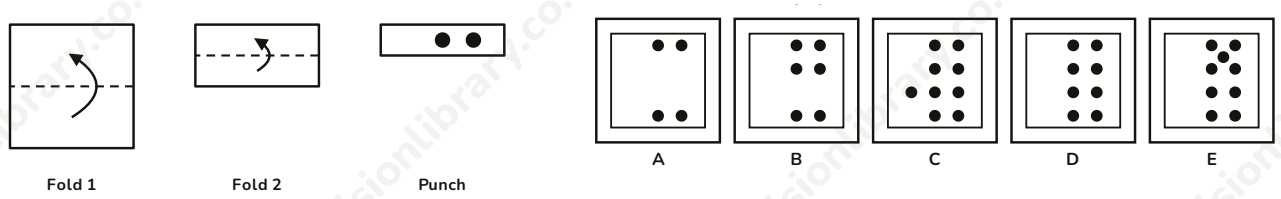
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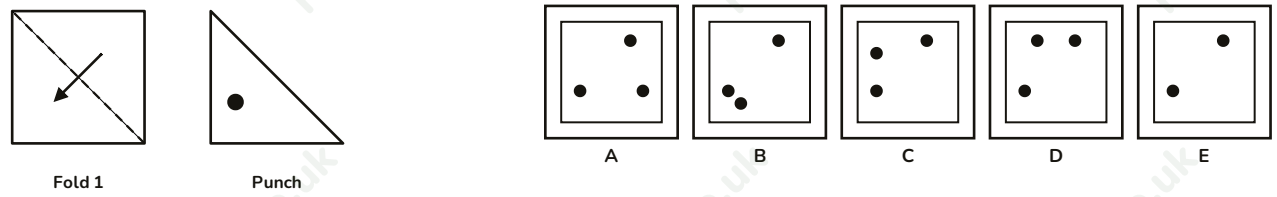


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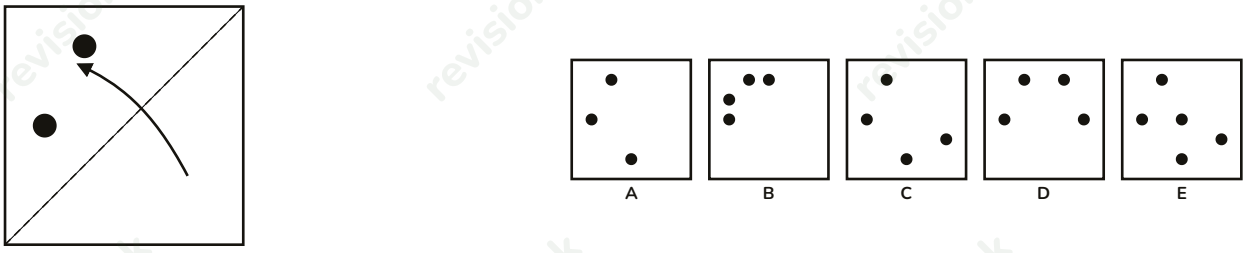
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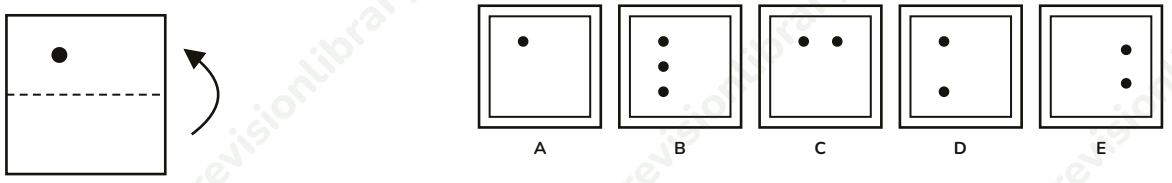
19



20 Study the square sheet of paper described below. It is folded as described, in the direction shown by the arrow(s), and a hole (or holes) is punched through all the layers at the point(s) marked. Which of the options A to E shows the sheet of paper fully opened out flat again, with every resulting hole shown in its correct position?



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Mark scheme · 4.10 Fold and Punch: 30-minute Pack

Question 1

Option B is correct: exactly 4 solid black squares centred at (1.5 cm, 1 cm); (1.5 cm, 7 cm); (6.5 cm, 1 cm); (6.5 cm, 7 cm). Option E is wrong: a hole is missing. Option A is wrong: a hole is missing. Option D is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). Option C is wrong: a hole is missing. **B1**

Answer: B) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 4 solid black squares centred at (1.5 cm, 1 cm); (1.5 cm, 7 cm); (6.5 cm, 1 cm); (6.5 cm, 7 cm).

Question 2

Option A is correct: exactly 4 solid black squares centred at (2 cm, 3.5 cm); (3.5 cm, 2 cm); (4.5 cm, 6 cm); (6 cm, 4.5 cm). Option D is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). Option B is wrong: a hole is missing. Option C is wrong: a hole is missing. Option E is wrong: a hole is missing. **B1**

Answer: A) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 4 solid black squares centred at (2 cm, 3.5 cm); (3.5 cm, 2 cm); (4.5 cm, 6 cm); (6 cm, 4.5 cm).

Question 3

Option E is correct: exactly 8 solid black triangles centred at (1 cm, 3 cm) pointing left; (1 cm, 5 cm) pointing left; (3 cm, 1 cm) pointing down; (3 cm, 7 cm) pointing up; (5 cm, 1 cm) pointing down; (5 cm, 7 cm) pointing up; (7 cm, 3 cm) pointing right; (7 cm, 5 cm) pointing right. Option D is wrong: one hole is in the wrong position. Option B is wrong: the triangles have not been reflected with the paper. Option A is wrong: one hole is in the wrong position. Option C is wrong: the triangles have not been reflected with the paper. **B1**

Answer: E) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 8 solid black triangles centred at (1 cm, 3 cm) pointing left; (1 cm, 5 cm) pointing left; (3 cm, 1 cm) pointing down; (3 cm, 7 cm) pointing up; (5 cm, 1 cm) pointing down; (5 cm, 7 cm) pointing up; (7 cm, 3 cm) pointing right; (7 cm, 5 cm) pointing right.

Question 4

Option C is correct: exactly 4 solid black circles centred at (7 cm, 1 cm); (7 cm, 3 cm); (7 cm, 5 cm); (7 cm, 7 cm). Option D is wrong: there is a hole too many. Option A is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). Option E is wrong: the folds have been unfolded in the wrong order. Option B is wrong: there is a hole too many. **B1**

Answer: C) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 4 solid black circles centred at (7 cm, 1 cm); (7 cm, 3 cm); (7 cm, 5 cm); (7 cm, 7 cm).

Question 5

Option B is correct: exactly 2 solid black circles centred at (3 cm, 5.5 cm); (5 cm, 5.5 cm). Option C is wrong: a hole is missing. Option E is wrong: there is a hole too many. Option D is wrong: a hole is missing. Option A is wrong: there is a hole too many. **B1**

Answer: B) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 2 solid black circles centred at (3 cm, 5.5 cm); (5 cm, 5.5 cm).

Question 6

Option C is correct: exactly 4 solid black circles centred at (1 cm, 3.5 cm); (3.5 cm, 1 cm); (4.5 cm, 7 cm); (7 cm, 4.5 cm). Option A is wrong: a hole is missing. Option B is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). Option D is wrong: a hole is missing. Option E is wrong: a hole is missing. **B1**

Answer: C) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 4 solid black circles centred at (1 cm, 3.5 cm); (3.5 cm, 1 cm); (4.5 cm, 7 cm); (7 cm, 4.5 cm).

Question 7

Option E is correct: exactly 8 solid black circles centred at (1 cm, 1.5 cm); (1 cm, 6.5 cm); (3 cm, 1 cm); (3 cm, 7 cm); (5 cm, 1 cm); (5 cm, 7 cm); (7 cm, 1.5 cm); (7 cm, 6.5 cm). Option B is wrong: one hole is in the wrong position. Option C is wrong: one hole is in the wrong position. Option D is wrong: one hole is in the wrong position. Option A is wrong: one hole is in the wrong position. **B1**

Answer: E) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 8 solid black circles centred at (1 cm, 1.5 cm); (1 cm, 6.5 cm); (3 cm, 1 cm); (3 cm, 7 cm); (5 cm, 1 cm); (5 cm, 7 cm); (7 cm, 1.5 cm); (7 cm, 6.5 cm).

Question 8

Option A is correct: exactly 2 solid black circles centred at (1 cm, 1 cm); (1 cm, 7 cm). Option E is wrong: there is a hole too many. Option C is wrong: a hole is missing. Option D is wrong: there is a hole too many. Option B is wrong: a hole is missing. **B1**

Answer: A) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 2 solid black circles centred at (1 cm, 1 cm); (1 cm, 7 cm).

Question 9

Option D is correct: exactly 4 solid black circles centred at (1.5 cm, 5 cm); (3 cm, 6.5 cm); (5 cm, 1.5 cm); (6.5 cm, 3 cm). Option B is wrong: one hole is in the wrong position. Option C is wrong: one hole is in the wrong position. Option A is wrong: one hole is in the wrong position. Option E is wrong: one hole is in the wrong position. **B1**

Answer: D) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 4 solid black circles centred at (1.5 cm, 5 cm); (3 cm, 6.5 cm); (5 cm, 1.5 cm); (6.5 cm, 3 cm).

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Question 10

Option A is correct: exactly 8 solid black triangles centred at (1 cm, 4.5 cm) pointing left; (1.5 cm, 3 cm) pointing left; (3 cm, 1.5 cm) pointing down; (3.5 cm, 7 cm) pointing up; (4.5 cm, 1 cm) pointing down; (5 cm, 6.5 cm) pointing up; (6.5 cm, 5 cm) pointing right; (7 cm, 3.5 cm) pointing right. Option D is wrong: a hole is missing. Option C is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). Option B is wrong: the triangles have not been reflected with the paper. Option E is wrong: the triangles have not been reflected with the paper. **B1**

Answer: A) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 8 solid black triangles centred at (1 cm, 4.5 cm) pointing left; (1.5 cm, 3 cm) pointing left; (3 cm, 1.5 cm) pointing down; (3.5 cm, 7 cm) pointing up; (4.5 cm, 1 cm) pointing down; (5 cm, 6.5 cm) pointing up; (6.5 cm, 5 cm) pointing right; (7 cm, 3.5 cm) pointing right.

Question 11

Option D is correct: exactly 8 solid black circles centred at (1 cm, 3 cm); (1 cm, 4.5 cm); (3 cm, 3 cm); (3 cm, 4.5 cm); (5 cm, 3 cm); (5 cm, 4.5 cm); (7 cm, 3 cm); (7 cm, 4.5 cm). Option A is wrong: there is a hole too many. Option C is wrong: there is a hole too many. Option E is wrong: the folds have been unfolded in the wrong order. Option B is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). **B1**

Answer: D) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 8 solid black circles centred at (1 cm, 3 cm); (1 cm, 4.5 cm); (3 cm, 3 cm); (3 cm, 4.5 cm); (5 cm, 3 cm); (5 cm, 4.5 cm); (7 cm, 3 cm); (7 cm, 4.5 cm).

Question 12

Option C is correct: exactly 8 solid black triangles centred at (1 cm, 3 cm) pointing left; (1 cm, 5 cm) pointing left; (3 cm, 1 cm) pointing down; (3 cm, 7 cm) pointing up; (5 cm, 1 cm) pointing down; (5 cm, 7 cm) pointing up; (7 cm, 3 cm) pointing right; (7 cm, 5 cm) pointing right. Option A is wrong: one hole is in the wrong position. Option D is wrong: one hole is in the wrong position. Option B is wrong: the triangles have not been reflected with the paper. Option E is wrong: one hole is in the wrong position. **B1**

Answer: C) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 8 solid black triangles centred at (1 cm, 3 cm) pointing left; (1 cm, 5 cm) pointing left; (3 cm, 1 cm) pointing down; (3 cm, 7 cm) pointing up; (5 cm, 1 cm) pointing down; (5 cm, 7 cm) pointing up; (7 cm, 3 cm) pointing right; (7 cm, 5 cm) pointing right.

Question 13

Option A is correct: exactly 4 solid black holes (each 0.6cm diameter): one centred 2cm from the left edge and 4cm from the bottom edge; one centred 2cm from the left edge and 2cm from the bottom edge; one centred 4cm from the left edge and 5cm from the bottom edge; one centred 4cm from the left edge and 1cm from the bottom edge. Option B is wrong: it shows only the two original punched holes, with neither one reflected across the fold line. Option C is wrong: it reflects only one of the two punched holes across the fold line, and omits the mirror image of the other. Option D is wrong: it reflects both holes, but across the wrong axis of the square. Option E is wrong: it shows all four correctly mirrored holes plus an extra phantom hole added on the fold line. **B1**

Answer: Option A

Question 14

Option E is correct: exactly 2 solid black circles centred at (4 cm, 7 cm); (7 cm, 4 cm). Option D is wrong: there is a hole too many. Option C is wrong: a hole is missing. Option B is wrong: there is a hole too many. Option A is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). **B1**

Answer: E) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 2 solid black circles centred at (4 cm, 7 cm); (7 cm, 4 cm).

Question 15

Option A is correct: exactly 4 solid black triangles centred at (2.5 cm, 2.5 cm) pointing up; (2.5 cm, 5.5 cm) pointing down; (5.5 cm, 2.5 cm) pointing up; (5.5 cm, 5.5 cm) pointing down. Option B is wrong: the triangles have not been reflected with the paper. Option C is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). Option D is wrong: the triangles have not been reflected with the paper. Option E is wrong: a hole is missing. **B1**

Answer: A) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 4 solid black triangles centred at (2.5 cm, 2.5 cm) pointing up; (2.5 cm, 5.5 cm) pointing down; (5.5 cm, 2.5 cm) pointing up; (5.5 cm, 5.5 cm) pointing down.

Question 16

Option C is correct: exactly 8 solid black squares centred at (1 cm, 5.5 cm); (2 cm, 4 cm); (2.5 cm, 7 cm); (4 cm, 2 cm); (4 cm, 6 cm); (5.5 cm, 1 cm); (6 cm, 4 cm); (7 cm, 2.5 cm). Option A is wrong: one hole is in the wrong position. Option B is wrong: one hole is in the wrong position. Option D is wrong: one hole is in the wrong position. Option E is wrong: one hole is in the wrong position. **B1**

Answer: C) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 8 solid black squares centred at (1 cm, 5.5 cm); (2 cm, 4 cm); (2.5 cm, 7 cm); (4 cm, 2 cm); (4 cm, 6 cm); (5.5 cm, 1 cm); (6 cm, 4 cm); (7 cm, 2.5 cm).

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Question 17

Option B is correct: exactly 2 solid black circles centred at (2 cm, 5 cm); (6 cm, 5 cm). Option D is wrong: there is a hole too many. Option C is wrong: there is a hole too many. Option E is wrong: there is a hole too many. Option A is wrong: there is a hole too many. **B1**

Answer: B) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 2 solid black circles centred at (2 cm, 5 cm); (6 cm, 5 cm).

Question 18

Option D is correct: exactly 8 solid black circles centred at (4 cm, 1 cm); (4 cm, 3 cm); (4 cm, 5 cm); (4 cm, 7 cm); (6 cm, 1 cm); (6 cm, 3 cm); (6 cm, 5 cm); (6 cm, 7 cm). Option B is wrong: the folds have been unfolded in the wrong order. Option E is wrong: there is a hole too many. Option C is wrong: there is a hole too many. Option A is wrong: the last fold has not been unfolded (the holes from the final reflection are missing). **B1**

Answer: D) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 8 solid black circles centred at (4 cm, 1 cm); (4 cm, 3 cm); (4 cm, 5 cm); (4 cm, 7 cm); (6 cm, 1 cm); (6 cm, 3 cm); (6 cm, 5 cm); (6 cm, 7 cm).

Question 19

Option E is correct: exactly 2 solid black circles centred at (1.5 cm, 2.5 cm); (5.5 cm, 6.5 cm). Option D is wrong: there is a hole too many. Option C is wrong: there is a hole too many. Option B is wrong: there is a hole too many. Option A is wrong: there is a hole too many. **B1**

Answer: E) A 8 cm by 8 cm square, fully unfolded and flattened out, showing exactly 2 solid black circles centred at (1.5 cm, 2.5 cm); (5.5 cm, 6.5 cm).

Question 20

Option A is wrong: it reflects only one of the two punched holes across the diagonal, and omits the mirror image of the other. Option B is wrong: it reflects both holes across the OTHER diagonal of the square instead of the actual fold line. Option C is correct: exactly 4 solid black holes (each 0.6cm diameter): one centred 1cm from the left edge and 3cm from the bottom edge; one centred 3cm from the left edge and 1cm from the bottom edge; one centred 2cm from the left edge and 5cm from the bottom edge; one centred 5cm from the left edge and 2cm from the bottom edge. Option D is wrong: it reflects both holes using a straight (vertical) mirror line instead of the diagonal fold line. Option E is wrong: it shows all four correctly mirrored holes plus an extra phantom hole added on the diagonal fold line. **B1**

Answer: Option C

Question 21

Option A is wrong: it shows only the single punched hole, with no mirror-image hole added when the paper is unfolded. Option B is wrong: it shows the two correctly mirrored holes but with an extra phantom hole added exactly on the fold line. Option C is wrong: it mirrors the wrong measurement (the distance that should stay fixed has been flipped, and the distance that should be flipped has been kept fixed). Option D is correct: exactly 2 solid black holes (each 0.6cm diameter): one centred 2cm from the left edge and 4.5cm from the bottom edge; one centred 2cm from the left edge and 1.5cm from the bottom edge. Option E is wrong: it swaps the two measurements (distance from the left edge and distance from the bottom edge) before mirroring, so the whole hole pattern is in the wrong orientation. **B1**

Answer: Option D

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