

**Test 3: Number Patterns****Time: 1 hour****Marks: 50****Question 1**

1.1 Write down the next three terms and the general (or  $n$ th term) of each pattern:

1.1.1 2; 4; 6; 8; ...

1.1.2 1; 7; 13; 19; ...

1.1.3 1; 4; 9; 16; ...

1.1.4 25; 21; 17; 13; ...

1.1.5  $x - 1$ ;  $2x - 2$ ;  $3x - 3$ ;  $4x - 4$ ; ...

1.1.6  $\frac{1}{2}$ ;  $\frac{1}{3}$ ;  $\frac{1}{4}$ ;  $\frac{1}{5}$ ; ...

1.1.7  $\frac{1}{2}$ ; 1;  $\frac{3}{2}$ ; 2; ...

1.1.8  $3\frac{3}{4}$ ;  $3\frac{1}{2}$ ;  $3\frac{1}{4}$ ; 3; ...

**(24)****Question 2**

2.1 Consider the following pattern.

**Arrangement 1   Arrangement 2   Arrangement 3**

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⊗⊗⊗⊗

⊗⊗⊗⊗⊗

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⊗⊗⊗⊗⊗

2.1.1 How many flowers will be used in the 4<sup>th</sup> arrangement? (1)

2.1.2 How many flowers will be used in the  $n$ <sup>th</sup> arrangement (2)

2.1.3 Which arrangement will have 99 flowers (3)

2.2 The height of water in a tank is recorded whilst the tank is being filled. The results have been recorded at five minute intervals:

	<b>First reading</b>	<b>After 5 minutes</b>	<b>After 10 minutes</b>	<b>After 15 minutes</b>	<b>After 20 minutes</b>
<b>Level in <math>cm</math></b>	3	11	19	27	35

2.2.1 What will be the height of the water after 25 minutes? (1)

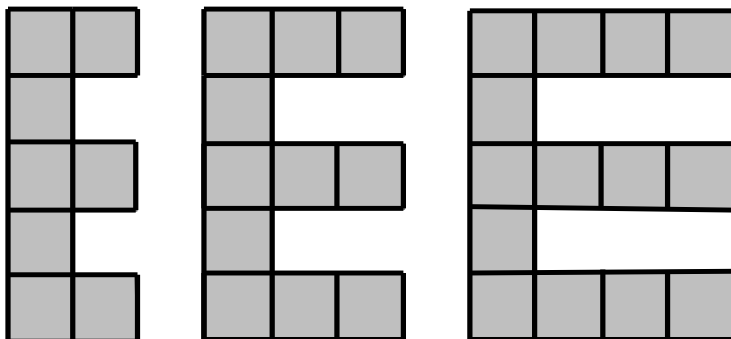
2.2.2 What will be the height after an hour? (2)

2.2.3 At what rate is the level rising? Give your answer in  $cm/minute$ . (2)

2.2.4 What will be the water level after  $5n$  minutes? (3)

2.2.5 After how many minutes will the water level be 403  $cm$  ? (3)

2.3 Consider the following sequence of Es:



- 2.3.1 How many blocks will be needed to build the 10<sup>th</sup> E? (3)  
2.3.2 How many blocks will be needed for the  $n$ th E? (3)  
2.3.3 116 blocks are needed for the  $k$ th E. Calculate the value of  $k$ . (3)  
2.3.4 Can the total number of blocks ever be a multiple of 10? Explain. (3)

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