1.

B. 1,2,4,9,6,3,8,5,7

2.

a.

compare 15 to 36 => 15 < 36 => move left
compare 15 to 18 => 15 < 18 => move left
18 has no left child, so place 15 there

b.

compare 20 to 36 => 20 < 36 => move left
compare 20 to 18 => 20 > 18 => move right
compare 20 to 25 => 30 < 25 => move left
compare 20 to 23 => 20 < 23 => move left
23 has no left child, so place 20 there

c.

compare 55 to 36 => 55 > 36 => move right
compare 55 to 43 => 55 > 43 => move right
compare 55 to 49 => 55 > 49=> move right
49 has no right child, so place 55 there

3.

No, it's not balanced. From the root, the left subtree height is 4 and the right subtree height is 2. To be balanced, difference between left-subtree height and right subtree height must be less than or equal 1, but in this case our difference is 2 so , it is not balanced.

4.

((x+ y) * z )+ 2

5.

- Breadth: 5, 4, 8, 3, 6, 10, 25
- Pre-order: 5, 4, 3, 8, 6, 10, 25
- In-order: 3, 4, 5, 6, 8, 10, 25
- Post-order: 3, 4, 8, 5, 6, 10, 25

6.

a.

Binary tree: It's a simple unordered representation of non-linear data in tree structure and each node has maximum two child nodes.

BST: It's an ordered binary tree where left child node is always smaller than parent node and right child node is always greater than parent node or root node.

b. Binary trees are useful in constructing Binary Search Tree (BST) and various tree structure with different properties and Since, BST is organized, well-structured and ordered, insertion, deletion, searching of elements is faster.

Question 2:

1. Graph is directed because origin and destination are fixed.
2. Graph is weighted since it has value associated with it.
3. Graph is not connected because there is no path leading to node C and G.
4. Graph is cyclic because to be a cyclic graph at least one graph cycle is needed and A to B goes both ways which completes the cycle.
5. A -> E ->H ->I
6. Interlinked webpages are a good application of this kind of undirected graph.
7. One key difference between graph and tree is that graph doesn't have any rules where edges can be connected to nodes in any way, but tree is more restrictive meaning parent node can only have 2 children node, has exactly one path from root to node.