The relevance determined using the random walker model corresponds to

1. The number of steps a random walker needs to reach a page
2. The probability that the random walker visits the page in the long term
3. The number of incoming links a random walker can use to visit the page
4. The probability that the random walker will visit once the page

In the random walker model, the page probability is linked to the probability of visiting that page in the long term, therefore second one is True.

Consider a random jump matrix with entries 1/3 in the first column and 0 otherwise. It means

1. A random walker can always leave node 1 even without outgoing edges
2. A random walker can always reach node 1, even without incoming edges
3. A random walker can always leave node 2, even without outgoing edges
4. none of the above

As only the first column is non-zero and it’s zero everywhere else, it means that we can always leave from the first node (using random jumps), and therefore the first answer is correct.

When computing HITS, the initial values

1. Are set all to 1
2. Are set all to $\frac{1}{n}$
3. Are set all to $\frac{1}{\sqrt{n}}$
4. Are chosen randomly

According to the algorithm, they are initialized by 1/sqrt(n) and therefore the third answer is true.

If the first column of matrix L is (0,1,1,1) and all other entries are 0 then the authority values

1. $(0,1,1,1)$
2. $\left(0, 1/\sqrt{3}, 1/\sqrt{3}, 1/\sqrt{3}\right)$
3. $\left(1, 1/\sqrt{3}, 1/\sqrt{3}, 1/\sqrt{3}\right)$
4. $(1,0,0,0)$

The first node goes to other three nodes (and does it equally), and it’s acting like a hub (without “receiving” any weight as all other values are zero), so to equally distribute it, it must 1/sqrt(3) for nodes 2,3,4. Therefore the second answer is correct.

When compressing the adjacency list of a given URL, a reference list

1. Is chosen from neighboring URLs that can be reached in a small number of hops
2. May contain URLs not occurring in the adjacency list of the given URL
3. Lists all URLs not contained in the adjacency list of given URL
4. All of the above

The first answer is not correct, as reaching a URL with small number of hops in the web graph has nothing to do with the ordering of the URLs that we have in the list. However, the list may contain URLs that are in URL adjacency list and therefore second answer is True.

Which is true?

1. Exploiting locality with gap encoding may increase the size of an adjacency list
2. Exploiting similarity with reference lists may increase the size of an adjacency list
3. Both of the above is true
4. None of the above is true

We can only use a reference list if it compresses and therefore it can' increase size of an adjacency list, so second option is wrong (and therefore the third and fourth option). However, it's possible to increase the size of an adjacency list with some choices for gap encoding, and therefore first answer is true.