Problem-

Consider the following segment table-

Segment No.	Base	Length
0	1219	700
1	2300	14
2	90	100
3	1327	580
4	1952	96

Which of the following logical address will produce trap addressing error?

1. 0, 430
2. 1, 11
3. 2, 100
4. 3, 425
5. 4, 95

Calculate the physical address if no trap is produced.

Solution-

In a segmentation scheme, the generated logical address consists of two parts-

1. Segment Number
2. Segment Offset

We know-

- Segment Offset must always lie in the range [0, limit-1].
- If segment offset becomes greater than or equal to the limit of segment, then trap addressing error is produced.

Option-A: 0, 430-

Here,

- Segment Number = 0
- Segment Offset = 430

We have,

- In the segment table, limit of segment-0 is 700.
- Thus, segment offset must always lie in the range = [0, 700-1] = [0, 699]

Now,

- Since generated segment offset lies in the above range, so request generated is valid.
- Therefore, no trap will be produced.
- Physical Address = 1219 + 430 = 1649

Option-B: 1, 11-

Here,

- Segment Number = 1
- Segment Offset = 11

We have,

- In the segment table, limit of segment-1 is 14.
- Thus, segment offset must always lie in the range = [0, 14-1] = [0, 13]

Now,

- Since generated segment offset lies in the above range, so request generated is valid.
- Therefore, no trap will be produced.
- Physical Address = 2300 + 11 = 2311

Option-C: 2, 100-

Here,

- Segment Number = 2
- Segment Offset = 100

We have,

- In the segment table, limit of segment-2 is 100.
- Thus, segment offset must always lie in the range = [0, 100-1] = [0, 99]

Now,

- Since generated segment offset does not lie in the above range, so request generated is invalid.
- Therefore, trap will be produced.

Option-D: 3, 425-

Here,

- Segment Number = 3
- Segment Offset = 425

We have,

- In the segment table, limit of segment-3 is 580.
- Thus, segment offset must always lie in the range = [0, 580-1] = [0, 579]

Now,

- Since generated segment offset lies in the above range, so request generated is valid.
- Therefore, no trap will be produced.
- Physical Address = 1327 + 425 = 1752

Option-E: 4, 95-

Here,

- Segment Number = 4
- Segment Offset = 95

We have,

- In the segment table, limit of segment-4 is 96.
- Thus, segment offset must always lie in the range = [0, 96-1] = [0, 95]

Now,

- Since generated segment offset lies in the above range, so request generated is valid.
- Therefore, no trap will be produced.
- Physical Address = 1952 + 95 = 2047

Thus, Option-(C) is correct.