1.

a) A page fault will cause that the state becomes Wait State, because while waiting for I/O operation finish, allocate the CPU to some other processes.

b) The process will be running state if the address reference is resolved in the page table. It won't affect the state of process.

2.

a) 0x2DD

page offset = 0xDD

page number = 2

frame number = 0xA

physical address = 0xDD

b) 0x4E6

page offset = 0xE6

page number = 4

load page 4 in frame 9, then frame number = 0x9

physical address = 0x9E6

c) 0x94A

page offset = 0x4A

page number = 0x9

frame number = 0x1

physical address = 0x14A

d) 0x316

page offset = 0x16

page number = 0x3

load page 3 in frame 15, then frame number = 0xF

physical address = 0xF16

3.

LRU replacement

7	2	3	1	2	1	5	1	6	1	6	0	6	7	6	7	2	7	1
7	7	7	1			1		1			1		7			7		7
	2	2	2			2		6			6		6			6		1
		3	3			5		5			0		0			2		2

Number of page faults: 10

FIFO replacement

7	2	3	1	2	1	5	1	6	1	6	0	6	7	6	7	2	7	1
7	7	7	1			1		1			0		0			0		1
	2	2	2			5		5			5		7			7		7
		3	3			3		6			6		6			2		2

Number of page faults: 10

Optimal replacement

7	2	3	1	2	1	5	1	6	1	6	0	6	7	6	7	2	7	1
7	7	7	7			7		7			7					7		7
	2	2	2			5		6			6					6		1
		3	1			1		1			0					2		6

Number of page faults: 9

4. The page fault rate would be very high if a process does not have "enough" frames, it will cause a process to spend much time on paging than executing. Symptom of thrashing is the low CPU utilization and high page fault rate, then system can detect CPU utilization rate and page fault rate. Decreasing the degree of multiprogramming could eliminate thrashing. For a process we need to allocate enough frames to accommodate the size of its current locality.

5.
Δ with low value will not encompass the entire locality. And it is possible to underestimate for the system, because each process has lower WSSi, resulting in high page fault rate, too many active processes.

Δ with high value will encompass some locality. And it is possible to overestimate for the system, because each process has high WSSi, resulting in low page fault rate, few active processes.