Part I :- Virtual Memory Questions :-

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(1.) virtual memory size :- 2^{32} bytes

Physical memory size :- 2^{18} bytes

So, Page Bize :- 2^{12} bytes

Page table size :- 2^{20} bytes

$(11123456)_{16}$ = 0001 0001 0001 0010 | 0011 0100 0101 0110

Higher 20 bits | low-order bits

so lower 12 bits are used as displacement into page and upper 20 bits are used for displacement into page table.

(2)

Let X be probability of page fault

200×10^{-9} sec $\geq (1-X) \times 10^{-9}$ sec $+ (0.3 * X) \times 8 \times 10^{-3}$ sec $+ (0.7X) \times 20 \times 10^{-3}$ sec

Taking maximum :-

$200 = (1-X) \times 100 + 24000X + 140000X$

$20 = 1 - X + 24000X + 140000X$

$1 = -X + 24000X + 140000X$

$1 = 163999X$

$X = 0.000006$

Maximum accepted page-fault rate.