Consider a machine with 64 MB physical memory and a 32 bit virtual address space. If the page size is 4 KB, what is the approximate size of the page table?

1. 16 MB
2. 8 MB
3. 2 MB
4. 24 MB

**Solution-**

Given-

* Size of main memory = 64 MB
* Number of bits in virtual address space = 32 bits
* Page size = 4 KB

We will consider that the memory is byte addressable.

**Number of Bits in Physical Address-**

Size of main memory

= 64 MB

= 226 B

Thus, Number of bits in physical address = 26 bits

**Number of Frames in Main Memory-**

Number of frames in main memory

= Size of main memory / Frame size

= 64 MB / 4 KB

= 226 B / 212 B

= 214

Thus, Number of bits in frame number = 14 bits

**Number of Bits in Page Offset-**

We have,

Page size

= 4 KB

= 212 B

Thus, Number of bits in page offset = 12 bits

So, Physical address is-

**Process Size-**

Number of bits in virtual address space = 32 bits

Thus,

Process size

= 232 B

= 4 GB

**Number of Entries in Page Table-**

Number of pages the process is divided

= Process size / Page size

= 4 GB / 4 KB

= 220 pages

Thus, Number of entries in page table = 220 entries

**Page Table Size-**

Page table size

= Number of entries in page table x Page table entry size

= Number of entries in page table x Number of bits in frame number

= 220 x 14 bits

= 220 x 16 bits      (Approximating 14 bits ≈ 16 bits)

= 220 x 2 bytes

= 2 MB

Thus, Option (C) is correct.