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
- $= 2^{26} B$

Thus, Number of bits in physical address = 26 bits

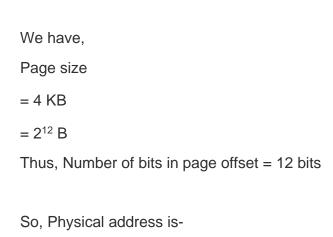
#### **Number of Frames in Main Memory-**

Number of frames in main memory

- = Size of main memory / Frame size
- = 64 MB / 4 KB
- $= 2^{26} B / 2^{12} B$
- $=2^{14}$

Thus, Number of bits in frame number = 14 bits

## **Number of Bits in Page Offset-**



## **Process Size-**

Number of bits in virtual address space = 32 bits

Thus,

Process size

 $= 2^{32} B$ 

= 4 GB

## **Number of Entries in Page Table-**

Number of pages the process is divided

- = Process size / Page size
- = 4 GB / 4 KB
- = 2<sup>20</sup> pages

Thus, Number of entries in page table =  $2^{20}$  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
- $= 2^{20} \times 14 \text{ bits}$
- =  $2^{20}$  x 16 bits (Approximating 14 bits  $\approx$  16 bits)
- $= 2^{20} \times 2 \text{ bytes}$
- = 2 MB

Thus, Option (C) is correct.