A five-digit numbers divisible by 3 is to be formed using the numerals 0, 1, 2, 3, 4 and 5, without repetition. The total number of ways this can be done is *(1989 - 2 Marks)*

(a) 216 (b) 240 (c) 600 (d) 3125

**(d)** We know that a number is divisible by 3 only when the sum of the digits is divisible by 3. The given digits are 0, 1, 2, 3, 4, 5.

Here the possible number of combinations of 5 digits out of 6 are ${}^5C_4 = 5$, which are as follows–

$1+2+3+4+5 = 15 = 3 \times 5$

$0+2+3+4+5 = 14$ (not divisible by 3)

$0+1+3+4+5 = 13$ (not divisible by 3)

$0+1+2+4+5 = 12 = 3 \times 4$

$0+1+2+3+5 = 11$ (not divisible by 3)

$0+1+2+3+4 = 10$ ( not divisible by 3)

Thus the number should contain the digits 1, 2, 3, 4, 5 or the digits 0, 1, 2, 4, 5.

Taking 1, 2, 3, 4, 5, the 5 digit numbers are $= 5! = 120$

Taking 0, 1, 2, 4, 5, the 5 digit numbers are $= 5! - 4! = 96$

$\therefore$ Total number of numbers $= 120 + 96 = 216$