Mid Term Examination, Part-III

1 **[10+10 points]**

  (a) Find multiplicative inverse of x^{15} in the field $Z_2[x]$, $(mod\, x^4 + x + 1)$.

  (b) Find the last 2 digits of 3^{1123}

2 **[10+5+5 points]** Solve the followings:-

  (a) 2^{123} (mod 29)

  (b) Show that 4 is not a primitive root modulo p for any prime p

  (c) Find the value of ϕ for 145 to 150.