SOMAIYA VIDYAVIHAR UNIVERSITY

Batch: _____ Roll No.: _____
Name: _____
Course: ITC
Experiment / assignment / tutorial No. _____
Grade: _____ Signature of the Faculty with d

Name - Arya Nair
Batch - A2
Roll Number 16010421063
ITC Tut 6

Q2) Cyclic code properties are-
i) They are error ~~detat~~ detecting codes
ii) Linearity - combination of two codewords must be equal to another codeword
iii) Cyclic shifting - If we shift each bit of a cyclic code it would result in another code.
iv) They are used for error correction

Q1) b) Message 1001
$x^3x^2x^1x^0$

$M(x) = x^3+1$

$n=7 \quad k=4$

$q = n-k$
$= 7-4 = 3$

$a(x) = x^3(x^3+1)$
$= x^6+x^3$

$b(x) = \frac{a(x)}{g(x)} = \frac{x^6+x^3}{x^3+x^2+1}$

$b(x) =$

$$
\begin{array}{r|l}
x^3+x^2+1 & x^6+x^3 \\
\hline
 & x^3+x^2+x+1 \\
\ominus & x^6+x^5+x^3 \\
\hline
 & x^5 \\
\ominus & x^5+x^4+x^2 \\
\hline
 & x^4+x^2 \\
\ominus & x^4+x^3+x \\
\hline
 & x^3+x^2+x \\
 & x^3+x^2+1 \\
\hline
 & x+1 \\
 & 0\ 1\ 0
\end{array}
$$

$C(x) =$ 1 0

Codeword = 1 0 0 1 : 0 1 0

1 0 1 1

$M(x) = x^3+x+1$

$n = 7 \quad k = 4$

$q = 3$

$a(x) = x^3(x^3+x+1)$

$= x^6+x^4+x^3$

$b(x) = \dfrac{a(x)}{g(x)} = \dfrac{x^6+x^4+x^3}{x^3+x+1}$

SOMAIYA VIDYAVIHAR UNIVERSITY

Batch: _____ Roll No.: _____
Name : Arya Nair
Course : _____
Experiment / assignment / tutorial No. _____
Grade: _____ Signature of the Faculty with date

$b(x) =$ $x^3 + x^2 + 1 \;\overline{)\; x^6 + x^4 + x^3}$ $\quad x^3 + x^2$

$x^6 + x^5 + x^3$

$x^5 + x^4$

$x^5 + x^4 + x^2$

x^2

$c(x) =$

Remainder $= x^2$

100

Codeword $=$ 1011 : 100

(21) a) $g(x) = 1 + x^2 + x^3$

Generator Matrix $= [I : P]$

$$\begin{array}{l|ccccccc} x^3 g(x) & 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ x^2 g(x) & 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ x\, g(x) & 0 & 0 & 1 & 1 & 0 & 1 & 0 \\ g(x) & 0 & 0 & 0 & 1 & 1 & 0 & 1 \end{array}$$