Internal Question EC 801C

Time-60min **Total Marks-20**

1)For (7,3) cyclic code with generator polynomial $g(x)=x^4+x^3+x^2+1$,Design the encoder circuit for $i=(1\ 1\ 0)$ & also find the corresponding codeword. **7+5**

2.i)State the properties of Linear Block code. Determine the non-systematic codeword polynomial for i=(1 1 0 0) of (7,4) code. **5**

ii) Define Hamming weight & Hamming distance with example. **3**

1. i) Given that, $x^{15}+1=(x+1)(x^2+x+1)(x^4+x+1)(x^4+x^3+1)(x^4+x^3+x^2+x+1)$

Determine (a) the number of cyclic codes with block length 15.

(b) the number of (15,11) cyclic codes & what are they.

(c) the generator polynomials for the (15,7) cyclic codes.

7+4+4

2. The (5,3) linear code has Generator Matrix $G=\begin{bmatrix}1&0&1&0&0\\0&1&0&0&1\\0&1&1&1&0\end{bmatrix}$. Prove that $GH^T=0$

5

1) (i)For (7,4) cyclic code received word at decoder stage is $\gamma(x)=x^6+x^4+x^3+x+1$, find Correct Codeword using Shift Register design method.

(ii) Determine Systematic & non-systematic codewords for $i=(0\ 1\ 1\ 1)$ given (7,4) code with $g(x)=x^3+x+1$. **(10+5)**

2. .(i) The (5,3) linear code has generator matrix

$G=\begin{bmatrix}1&0&1&0&0\\0&1&0&0&0\\0&1&1&1&0\end{bmatrix}$

Determine the systematic form of G. **5**

1) Design a Meggitt decoder for a single-error correcting (7,3) code with $g(x)=x^4+x^3+x+1$. Determine the step-by-step operation table when $c(x)=x^6+x^5+x^4+x$ incurs the error $e(x)=x^6$ & find correct codeword. **5+10**

2) For (6,3) Linear Block Code, generator matrix $G=\begin{bmatrix}1&0&0&0&1&1\\0&1&0&1&0&1\\0&0&1&1&1&0\end{bmatrix}$

Determine Parity Check Matrix in systematic form. 5