*Name :* .....

*Roll No. :* .....

*Invigilator's Signature :* .....

**CS/M.Tech(ECE-VLSI)/SEM-2/MVLSI-204B/2013**

# 2013

# ERROR CONTROL AND CODING

*Time Allotted :* 3 Hours *Full Marks :* 70

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words as far as practicable.*

Question No. 1 is compulsory and answer any *four* from the rest.

1. a) What is source coding ?

   b) What do you mean by Entropy ?

   c) What is Channel Capacity ?

   d) Define sub group.

   e) What is the utility of coding in digital communication ?

   f) Define Conjugate.

   g) What is the difference between systematic and non systematic cyclic code ? 2 + 3 + 2 + 2 + 2 + 2 + 1

2. a) Define block code.

   b) $H$ = [ 1 1 1 0 1 0 0; 1 1 0 1 0 1 0; 10 1 1 0 0 1 ]. Find all codeword of the above code

   c) Explain the properties of Syndrome. 2 + 8 + 4

3. a) Explain systematic and non systematic cyclic code with suitable example.

   b) Explain Hamming code with suitable example. 9 + 5

4. a) Define Group, Ring and Field with example

   b) Given that the codeword $c_1(x)$ and $c_2(x)$, belonging to the double error correcting ( 15, 7 ) BCH code constructed over GF ( 2 ∧ 4) incur 2 and error so giving $v_1(x)$ =

   $v_2(x)$ =

   Find $c_1(x)$, $c_2(x)$. 4 + 10

5. a) Explain Reed Solomon Code with suitable example.

   b) Give example of finite group. 10 + 4

6. a) Explain convolution Encoder.

   b) Explain Peterson-Gorenstein-Zierler Decoder. 7 + 7

7. Write short notes any *three* of the following : 14

a) Viterbi Decoding

b) Turbo Code

c) LDPC code

d) Berlekamp Algorithm.