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## 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+1

30258(M.Tech)

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

- 2. a) Define block code.
  - b)  $H = [ 1 \ 1 \ 1 \ 0 \ 1 \ 0 \ 0; \ 1 \ 1 \ 0 \ 1 \ 0; \ 10 \ 1 \ 1 \ 0 \ 0 \ 1 \ ].$  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  $\land$  4) incur 2 and error so giving  $v_1(x)=$

$$v_2(x) =$$

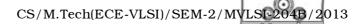
Find 
$$c_1(x)$$
,  $c_2(x)$ .

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 :



- a) Viterbi Decoding
- b) Turbo Code
- c) LDPC code
- d) Berlekamp Algorithm.

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