BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: MTECH **SEMESTER : II**
BRANCH: ECE **SESSION : SP/19**

SUBJECT : EC564 CODING THEORY & APPLICATIONS

TIME: 3.00 Hrs. **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a) A DMS X has five symbols x_1, x_2, x_3, x_4 and x_5 with $P(x_1)$ =0.4, $P(x_2)$ =0.17, $P(x_3)$ =0.18, $P(x_4)$ =0.1 and $P(x_5)$ =0.15 respectively. Design a Shanon-Fano code for X. [5]

Q.1(b) Consider a DMS with source probabilities {0.35, 0.25, 0.20, 0.15, 0.05}. Implement the Huffman code for this source. [5]

Q.2(a) Define Hamming weight, Hamming distance, Minimum distance and Minimum weight. [5]

Q.2(b) List the properties of Linear code. What is Singleton Bound and minimum distance code? [5]

Q.3(a) Define Burst error and describe the condition that a code is cyclic. [5]

Q.3(b) Let the polynomial $G(x)=x^{10}+x^8+x^5+x^4+x^2+x+1$ be generator polynomial of a cyclic code GF(2) with block length 15. Compute the generator polynomial G and parity check matrix H. [5]

Q.4(a) Explain the turbo codes. [5]

Q.4(b) Design a rate ½ convolutional encoder with a constraint length v=4 and d*=6. Also construct the state diagram for this encoder. [5]

Q.5(a) Describe RSA algorithm. [5]

Q.5(b) Examine the problems in symmetric-key cryptography. [5]

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