Name:.....
Roll No:.....

MAR ATHANASIUS COLLEGE OF ENGINEERING
KOTHAMANGALAM – 686666
(Govt. Aided Autonomous Institution)
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

B. TECH FIRST SERIES EXAMINATION, AUGUST 2026

(S7 ECE A &B) ECT 453 ERROR CONTROL CODES

Max. Marks: 40 Duration: 1.5 Hours

PART A

Answer all questions. Each question carries 3 marks.

1. Define Hamming Weight, Hamming Distance, and Minimum Hamming Distance of an LBC with suitable examples. (CO1)
2. Write a short note about Hamming Bound and Gilbert Varshamov Bound (CO1)
3. Explain the properties of cyclic codes (CO2)
4. With neat block diagram explain the working of cyclic code decoder. (CO2)

PART B

Answer all questions. Each question carries 14 marks.

5. The parity check bits of a (8, 4) block code are generated by $c_{5=}d_{2+}d_{3+}d_4$ $c_{6=}d_{1+}d_{3+}d_4$, $c_{7=}d_{1+}d_{2+}d_3$, $c_{8=}d_{1+}d_{2+}d_4$. (CO1)
   I. Find the Generator Matrix and Parity check matrix
   II. Find the minimum Hamming weight of the code
   III. Find the error correcting and detecting capabilities of the code

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IV. Draw the encoding and syndrome calculation circuits.

V. Show through an example that it can correct single error.

6. a. Design an Encoder for (7, 4) binary cyclic code generated by g(x) = 1+x+x^3 . And verify its operation using message vector 1010. (CO2)

b. The generator polynomial for a (7, 4) cyclic code is 1+x+x^3 . Determine the code vector in systematic form for the message sequence 1011. (CO2)

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