JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST-1 EXAMINATION-SEPTEMBER-2024

B.Tech-VII Semester (Open Elective Course)

COURSE CODE (CREDITS): 20B1WEC734 (3) MAX. MARKS: 15

COURSE NAME: Digital Systems

COURSE INSTRUCTOR: Dr. Pardeep Garg MAX. TIME: 1 Hour

Note: (a) All questions are compulsory. (b) Marks are indicated against each question in square brackets. (c) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems.

Q1. Assume an arbitrary number system having a radix of 5 and 0, 1, 2, P, Q as its independent digits. Determine the decimal equivalent of **(20QP.P1)**. **[CO-1, 1.5 marks]**

Q2. Convert $(A7E)_{16}$ into gray code, octal equivalent, and 1's complement formats.

[CO-1, 1*3 = 3 marks]

Q3. The message **(1110110)** coded in the 7-bit Hamming code is transmitted through a noisy channel. Decode the message assuming that at most a single error occurred in the code-word. Compute the error location and find the corrected code-word. **[CO-1, 2.5 marks]**

Q4 (i) Solve for the values of two-valued variables A, B, C, and D by solving the set of simultaneous equations:

$$A'+AB = 0$$
$$AB = AC$$

$$AB+ AC'+CD = C'D$$ **[CO-1, 2 marks]**

Q4 (ii) Reduce the following Boolean expressions using Boolean algebra:

a) f=ABC[AB+C'(BC+AC)]
b) g=B'C'D + (B+C+D)' + B'C'D'E **[CO-1, 1*2=2 marks]**

Q5. Write down the minimized expression by solving the following expression using K-map and implement the minimized expression using AOI logic and universal gates:

$$f=\sum m (5, 6, 7, 9, 10, 11, 13, 14, 15)$$ **[CO-1, 2.5+1.5=4 marks]**