JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATIONS- September 2022

B. Tech-III Semester (ECE & Minor in ECE)

COURSE CODE (CREDITS): 18B11EC312 (4)   MAX. MARKS: 15

COURSE NAME: Digital Electronics and Logic Design

COURSE INSTRUCTOR: Dr. Naveen Jaglan and Dr. Pardeep Garg   MAX. TIME: 1 Hour

Note: All questions are compulsory. CO indicates course outcomes. Marks are indicated against each question in square brackets.

Q1 (i). 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- 2], [1 mark]

Q1 (ii). Write two advantages of 2's Complement over 1's complement. Perform the arithmetic operation (-27+56) using 2's complement method.   [CO-2],[1+1=2 marks]

Q2. Convert $(A7E)_{16}$ into Gray code, octal equivalent, and 9's complement formats.

[CO- 1], [1+1+1=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], [1 mark]

Q4(i). Solve for the values of two-valued variables A, B, C, and D by solving the set of simultaneous equations: [CO- 1,2], [2 marks]

$$A'+AB = 0$$
$$AB = AC$$
$$AB+ AC'+CD = C'D$$

Q4(ii). Reduce the following Boolean expression using Boolean algebra:

f= AB+BC+A'C   [CO- 2],[1 mark]

Q5(i). Reduce the following expression to the simplest possible POS and SOP forms:

F (A, B, C, D, E) = $\sum m$ (6,9,13,18,19,25,27,29,31) + d (2,3,11,15,17,24,28)

[CO- 1], [2+2=4 marks]

Q5(ii). Implement Ex-OR gate using:

(a) NOR gates only
(b) NAND gates only   [CO-1], [0.5+0.5=1 mark]