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BCA (Sem.-2)
COMPUTER SYSTEM ARCHITECTURE

Subject Code : UGCA-1908

M.Code : 77416

Date of Examination : 12-08-21

Time : 2 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE question(s), each question carries 12 marks.

1. Simplify F together with don't care conditions d in (i) SOP (ii) POS for m.

$$F(w, x, y, z) = \sum(1, 2, 8, 9, 12, 13), d(w, x, y, z) = \sum(10, 11, 14, 15)$$

Solve the following Boolean functions :

a) $xy + xy'$

b) $(x + y)(x + y')$

c) $xz + xyz'$

d) $(a + b)'(a' + b')$

2. a) The functionality of a 2 to 4 line decoder is presented in the table below :

Inputs			Outputs			
A1	A0	EN	S3	S2	S1	S0
X	X	0	0	0	0	0
0	0	1	0	0	0	1
0	1	1	0	0	1	0
1	0	1	0	1	0	0
1	1	1	1	0	0	0

b) What are the minimum sum-of-products equations for each output of the 2-to-4 line decoder?

3. a) Represent the decimal number 8620 in

a. BCD

b. Excess-3

c. 8421 code

d. as a binary number.

b) Explain the conversion of an expression from SOP form to POS.

4. Explain the working of full adder with the help of truth-table, logic diagram and addition operation table.
5. A computer uses a memory unit of 256K words of 32-bit each. Binary-instruction code is stored in one word of memory. The instruction has four parts an I bit, an operation code, a register codes part to specify one of the 64 registers and an address part:
 - a) How many bits are there in the operation code, the register code part and the address part?
 - b) Draw the instruction word format and indicate the number of bits in each part.
 - c) How many bits are there in data and address inputs of memory?
6. How will the computer system identify MRI, non-MRI and register reference instructions? What is the difference in the nature of these? Explain.
7. An arithmetic circuit has two selection variables s_1 and s_0 . The arithmetic operations available have been listed below. The circuit must be incorporated with a full-adder in each stage of the arithmetic unit :

S1	S0	C1=0	C1=1
0	0	$F=A+B$	$F=A+B+!$
0	1	$F=A$	$F=A+!$
1	0	$F=B'$	$F=B'+!$
1	1	$F=A+B'$	$F=A+B'+!$

8. Describe the need of a multiplexer in a system. How is a multiplexer different from a decoder? Draw the logic diagram of 8×1 multiplexer and 2×4 decoder.

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