Bachelor of Science (B.Sc.) Semester—I (C.B.S.) Examination

ELECTRONICS (Fundamentals of Digital Electronics)

Compulsory Paper—2

Time : Three Hours] [Maximum Marks : 50

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Due credit will be given to neatness and adequate dimensions.

(3) Assume suitable data wherever necessary.

(4) Diagrams should be given wherever necessary.

EITHER

1. (A) Define the following :

(i) Base

(ii) Place value of a digit

(iii) Bit

(iv) Byte.

Convert the following :

$(42.15)_{10} = (...)_2$

$(A1.2)_{16} = (...)_{10}$

$(110101101001)_2 = (...)_{16}$

$(673)_8 = (...)_2$

Explain why 8421 is commonly called BCD. 4+4+2

OR

(B) Explain the different ways of representing negative numbers in binary and their relative merits and demerits.

Determine $(10010011)_2 - (11010110)_2$ by is complement method.

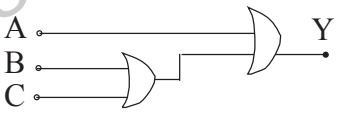
Determine $(010010)_2 + (110011)_2 = ?$ 5+3+2

EITHER

2. (A) Draw the symbol and truth table of AND gate.

IC 7411 is a triple, 3 input AND gate. Draw its truth table.

Find the truth table of the following circuit :

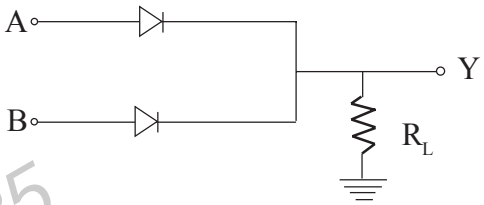


2+3+5

OR

(B) Prove that $A \oplus B = \overline{A} \oplus \overline{B}$.

Find the truth table of the given circuit :



Explain why NOR and NAND gates are called universal building blocks. 3+4+3

EITHER

3. (A) Define fundamental product and fundamental sum.

For the given truth table, determine the SOP and draw its logic diagram :

A	B	C	Y
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1

2+8

OR

(B) Define :

(i) Quad

(ii) Pair

(iii) Octet.

Simplify using K-maps :

f(ABCD) = Σm(0, 3, 5, 6, 9, 10, 12, 15).

Draw the logic circuit of simplified equation. 3+7

EITHER

4. (A) With logic diagram and truth table. Explain the working of :

(i) Full Adder

(ii) Half Subtractor. 5+5

OR

(B) Draw the logic diagram and explain the working of 4 : 1 multiplexer using logic gates.

Draw the circuit diagram and explain the working of Even Parity Generator. 5+5

5. Answer any ***ten*** :

(A) Give the characteristics of XS3 code.

(B) Give truth table of 2-bit gray code.

(C) Write the 2's complement of $(110111)_2$.

(D) State De-Morgan's theorems.

(E) Give the Boolean equation and logic diagram of distributive law (any one).

(F) Prove that $A + \bar{A}B = A + B$.

(G) Give truth table of XNOR gate.

(H) Draw the circuit of a transistor inverter.

(I) Implement NOR as NOT gate.

(J) Give two applications of ENCODER.

(K) Define parity.

(L) Explain the role of SUB control terminal in 2's complement adder/subtractor. 1×10