



বিদ্যাসাগর বিশ্ববিদ্যালয়

VIDYASAGAR UNIVERSITY

B.Sc. Honours Examination 2021

(CBCS)

1st Semester

COMPUTER SCIENCE

PAPER—C2T & C2P

COMPUTER SYSTEM ARCHITECTURE

Full Marks : 60

Time : 3 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

THEORY : C2T

Group - A

Answer any *three* questions.

3×12

1. (a) State and prove distribution theorem of boolean algebra.

(b) Find the complement of the function $F' = \bar{x}y\bar{z} + \bar{x}\bar{y}z$.

- (c) Implement $F = xy + \bar{x}\bar{y} + \bar{y}z$ with only OR and NOT gates. 5+3+4
2. (a) Simplify the boolean function $F(w, x, y, z) = \sum(1, 3, 7, 11, 15)$ with the don't care conditions:
 $d(w, x, y, z) = \sum(0, 2, 5)$ using K-map method.
- (b) Obtain the simplified expression in sum of products and product of sums of $\bar{x}\bar{z} + \bar{y}\bar{z} + y\bar{z} + xyz$. 6+6
3. (a) What is the difference between combination and sequential circuits?
 (b) What is encoder? Design a octal to binary encoder.
 (c) Distinguish between encoder and decoder. 4+6+2
4. (a) Draw and explain Booth algorithm for multiplication of signed 2's complement numbers.
 (b) Show the step-by-step multiplication process of $(+15) \times (+13)$ using Booth algorithm assuming 5 bit register holding signed numbers. 7+5
5. (a) What is addressing mode? What is the necessity of it?
 (b) Explain register direct, implied, and indirect addressing modes.
 (c) What is I/O driver? 4+6+2
6. (a) Compare RISC and CISC.
 (b) Explain a hardware control unit with proper diagram.
 (c) Explain Direct memory access. 3+6+3

Group – BAnswer any *two* questions.

2×2

7. What is instruction format?
8. Draw the circuit diagram of SR flipflop.
9. Distinguish between register and counter.
10. What are fixed and floating point representation?

PRACTICAL : C2PAnswer any *one* question.

1×15

1. Design 3×8 decoder using two 2×4 decoder. Draw the circuit and truth table.
2. Design a full subtractor circuit using NAND gates and NOR gates. Draw the circuit and also truth table. 8+7
3. Design a J-K flip flop using D flip flop. Draw the circuit. Also explain the characteristics table.

Answer any *one* question.

1×5

4. Write an assembly language program to find the 1's complement of a 16 bit number.
5. Write a program to perform addition of two numbers (i.e. 159279H and 05A2CH). Store the 24 bits result in register BCD.
6. Design and implement a 4-bit synchronous down counter. Draw the circuit and truth table.