① 08/04/2022 , 9:30 AM

② Exam Roll No. 21234757061

③ MCA

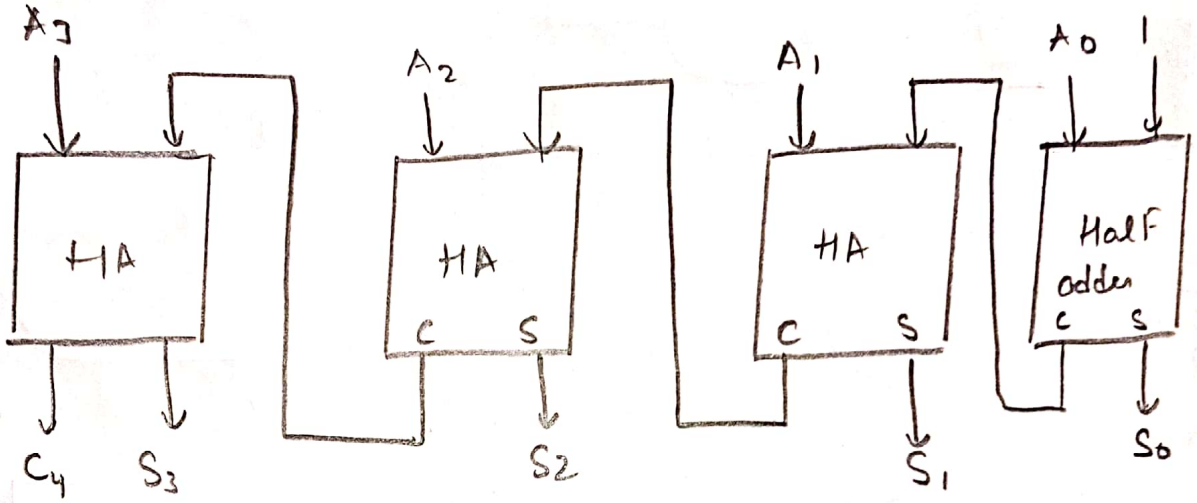
④ Sem-I/ Year-I

⑤ UPC: 223401104

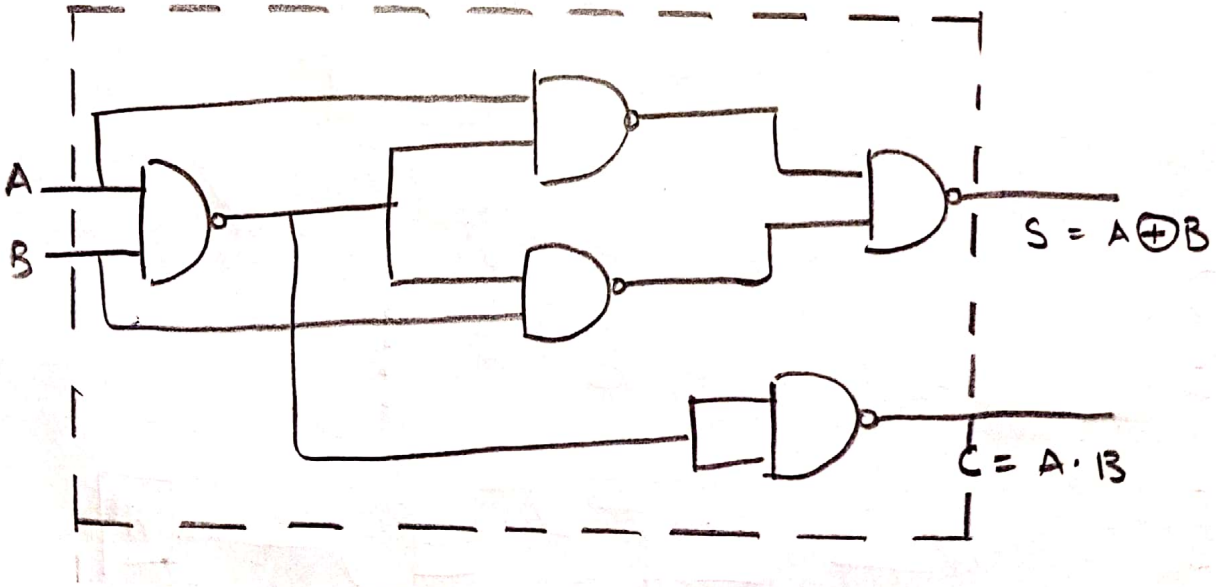
⑥ Computer System Architecture

Ans 5(B) 4-Bit combinational circuit incrementer using NAND gates.

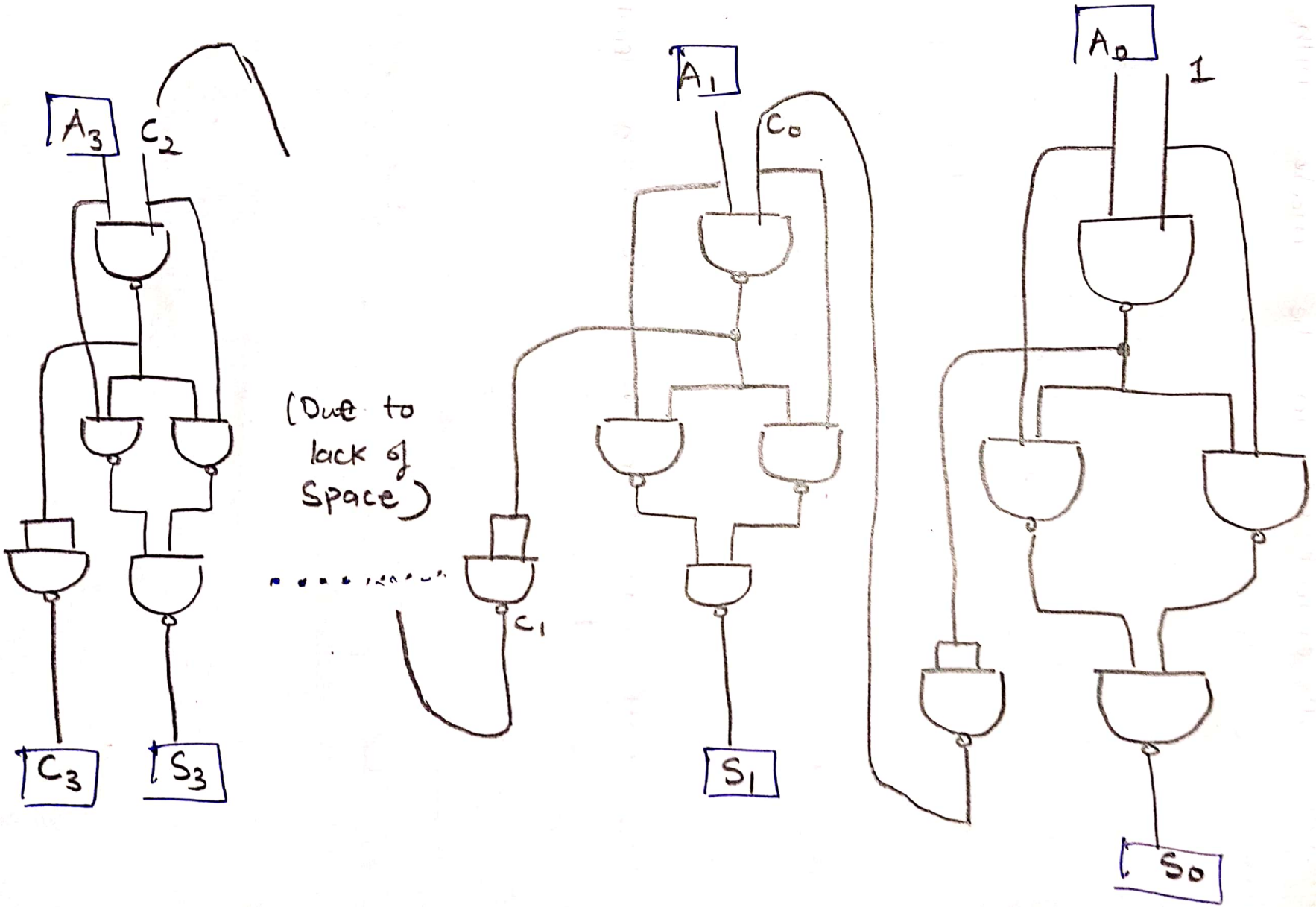
Binary Incrementer can be made with half adder like this



And Half adder can be made with NAND gate



Due to lack of space, I skipped H/A-3 and cont. with (...)



4-bit binary shifter with ripple gate (3).

Ans 5(a)

(i) 0111000111

Worst case: 01 1100 0111

Best case: 01 11 00 01 11

This is the best case of booth' multiplication as the chunk of consecutive 1's & 0's are present in multipliers.

(ii) 0101010101

This the worst case of booth' multiplies as there is consecutive pair of 01 present in multiplier.

Worst case: 01 01 01 01 01

Best case: Not possible.

(iii) 0 11 00 11000

Worst case: 01 10 01 10 00

Best case: 0 11 00 11 00 0

(iv) 1111 00 1111

Worst case: 111 10 01 111

Best case: 1111 00 1111