

COAL
BS DS Fall 2022
Quiz 8

Time allowed: 15 min

Total marks: [5+5+3=13]

Roll Number: _____

Name: _____

Q#1 Design an arithmetic circuit with one selection variable S and two 4-bits data inputs A and B . The circuit generates the following four arithmetic operations in conjunction with input carry Cin . Draw the logic diagram for the first two stages.

S	$Cin = 0$	$Cin = 1$
0	$A+B$	$A-B$
1	$A-1$	$A+1$

Q#2 A computer uses a memory unit with 256K words of 32 bits each. A binary instruction code is stored in one word of memory. The instruction has four parts: an indirect bit, an operation code, a register code part to specify one of 64 registers, and an address part.

a) How many bits are there in the operation code, the register code part, and the address part?

Operation Code: _____ **7** _____ Register code: _____ **6** _____ Address Part: _____ **18** _____

b) How many bits are there in the data and address inputs of the memory?

Data: _____ **32** _____ Address: _____ **18** _____

Q#3 A digital computer has a common bus system with 8 register 64 bit each. Bus is designed using Multiplexers.

- i. How many selections lines are there in multiplexers: _____ **3** _____.
- ii. What is the size of Multiplexers _____ **8x1** _____.
- iii. How many Multiplexers are needed _____ **64** _____.