



UNIVERSITY OF NORTH BENGAL
B.Sc. Honours 1st Semester Examination, 2020

CC2-COMPUTER SCIENCE (13)

COMPUTER SYSTEM ARCHITECTURE

Full Marks: 40

ASSIGNMENT

The figures in the margin indicate full marks.

Answer any two questions from the following

20×2 = 40

1. Discuss the sign-magnitude, 1's complement and 2's complement methods of representing binary numbers. Discuss the range of all these representations for 4-bit numbers. 10+10
2. Reduce the Boolean expression $f(A, B, C, D) = \sum(0, 1, 2, 3, 4, 5, 10, 11, 15)$ using
(i) laws of Boolean algebra
(ii) Karnaugh map
and draw the logic circuits of both the original and reduced expressions. (8+8)+4
3. Discuss the design of a 4-bit register having both serial and parallel loading facilities. Explain the demerits of a ripple counter and design a 4-bit synchronous counter. 10+10
4. Discuss the design of a bus system to interconnect four 4-bit registers using multiplexers and decoders. Discuss the formats of memory-reference, register-reference and input-output instructions assuming the length to be 16 bit. 10+10
5. Describe the structure of a micro-programmed control unit with the help of a block diagram. Discuss the process of address sequencing (next address generation) in a micro-programmed control unit with the help of flow diagram. 10+10

—x—