



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

DSC1-COMPUTER SCIENCE
COMPUTER SYSTEM ARCHITECTURE

Full Marks: 60

ASSIGNMENT

The figures in the margin indicate full marks.

Fulfill any *three* assignments 20×3 = 60

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 = 20

2. Reduce the Boolean expression: 8+8+4 = 20
 $f(A, B, C, D) = \sum(0, 1, 2, 3, 4, 5, 10, 11, 15)$ using
(i) Laws of Boolean algebra
(ii) Karnaugh map
and draw the logic circuits of both the original and reduced expressions.

3. 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 = 20

4. Discuss the design of hardwired control unit assuming your own instruction set. Describe the micro-operations performed during fetch, indirect and executive cycles with the help of a flow diagram. 10+10 = 20

5. Assuming your own instruction set, describe a simple setup for programmed I/O and explain its operation. Discuss interrupt driven I/O with the help of a flow diagram. 10+10 = 20

6. 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 = 20

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