



UNIVERSITY OF NORTH BENGAL
BCA Honours 1st Semester Examination, 2020

CC2-COMPUTER APPLICATION
DIGITAL ELECTRONICS

Full Marks: 60

ASSIGNMENT

The figures in the margin indicate full marks.

Answer any *three* questions from the following

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
2. Discuss memory hierarchy with respect to speed, capacity and cost. Describe the various types of ROMs and explain the advantages of one over the other. 8+12
3. 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
4. Explain half-adder and full-adder with the help of truth tables. Design a full-adder using half-adders. Discuss the design of a 4-bit binary adder-cum-subtractor. (2+2)+6+10
5. Explain the functions of multiplexer and decoder. Draw the logic diagrams of an 8×1 Multiplexer and a 3×8 Decoder with Enable input. Discuss the operation of these two circuits with the help of truth tables. (2+2)+(8+8)
6. Discuss the circuit and working of a Master-Slave JK flip-flop with the help of a timing diagram. Discuss the design of a 4-bit controlled shift-left register. 10+10

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