Time Duration:1 hour   **Max. Marks:20**

Each question carry equal marks.
1. What is universal gate? Define NAND gate is a universal gate.
2. Design full adder using half adder.
3. Minimise the following logic function using K-map.
   f(A, B, C, D) = Σm(1, 3, 7, 8, 10, 11, 12, 15) + d(0, 2, 5)
4. Design 3 bit binary-to-gray code converter.