(CBCS)
(F + R) (2014-15 and Onwards)
COMPUTER SCIENCE
BCA 104 : Digital Electronics

Time : 3 Hours
Max. Marks : 70

**Instruction**: Answer all Sections.

**SECTION – A**

I. Answer **any ten** questions : \((10 \times 2 = 20)\)

1) State and explain Ohm's law.

2) List the applications of superposition theorem.

3) Define the terms waveform and time period.

4) What is a semiconductor? Give an example.

5) Differentiate between half-wave and full-wave rectifiers.

6) Find the 2's complement of 00110011.

7) Prove that \(x(x+y) = x\).

8) Write the logic symbol and truth table for X-NOR gate.

9) What is a multiplexer? Write the logic symbol for 4-bit multiplexer.

10) What is a sequential circuit? Explain.

11) What is an half-adder? Write its truth table.

12) Explain the important characteristics of flip-flops.
II. Answer any five questions : (10x5=50)

13) a) Explain Thevenin’s theorem in detail.
   b) Find the currents in various branches of the circuit by nodal voltage analysis.

14) a) Define peak value, rms value, average value, frequency for a time wave.
    b) Explain the energy levels and energy bands of orbits in an atom with a neat diagram.

15) a) Explain p-n junction with a neat diagram.
    b) Write a note on TTL and CMOS.

16) a) Convert $(4096.3125)_{10} = (?)_2$ and $(36F.ABC)_{16} = (?)_{10}$
    b) What is a self-complementing code? Prove how weighted code 2421 is a self-complementing code.

17) a) State and prove Demorgan’s theorem.
    b) Simplify using K-map, $F(A, B, C, D) = \sum (4, 6, 8, 10, 11, 12, 15) + d(3, 5, 7, 9)$.

18) a) Realize the basic gates using NAND gate.
    b) Explain the working of 4-bit binary adder-subtractor with a neat logic diagram.

19) a) Write the logic diagram and truth table for decimal to BCD encoder.
    b) Explain the working of JK flip-flop with logic diagram and truth table.

20) a) Explain SISO and PIPO shift registers.
    b) Write a brief note on applications of shift register.