QP – 451

I Semester B.C.A. Examination, April/May 2021
(Y2K14) (CBCS) (F+R)
COMPUTER SCIENCE
BCA – 104T : Digital Electronics

Time : 3 Hours Max. Marks : 70

Instructions : *1) Answer **all** Sections.*
*2) Section – **A** : Answer **any 10** questions.*
*3) Section – **B** : Answer **any 5** questions.*

SECTION – A

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

1) What is the total resistance between A and B ?

2) Draw ac sinewave and denote amplitude and time period.
3) Write any two differences between intrinsic and extrinsic semiconductor.
4) Write any two applications of a diode.
5) What is the value of ripple factor of half-wave rectifier and full-wave rectifier ?
6) What is doping ?
7) What are universal gates ? Name them.
8) Draw the pin diagram of IC 7400.
9) Draw the symbol of EXOR gate and write its truth table.
10) What is a sequential circuit ? Give one example.
11) Draw the block diagram of D flip-flop.
12) Name the four types of shift registers.

SECTION – B

II. Answer **any five** of the following questions : **(5×10=50)**

13) a) State and explain KVL and KCL.
b) State Thevenin's theorem with suitable circuit. Explain the steps to Thevenise the resistive network. **(4+6)**

P.T.O.

14) a) State and prove De-Morgan's Theorem.
b) Define energy band. Explain all three energy bands. **(5+5)**

15) a) Draw the symbol of PN junction diode. Explain its working in forward bias and reverse bias mode.
b) Define rectifier. Explain half-wave rectifier with necessary circuit diagram and input/output waveforms. **(4+6)**

16) a) Convert the binary number $11001110_{(2)}$ to decimal number.
b) Convert the binary code 1111 to Gray code.
c) Subtract $10011_{(2)}$ from $11100_{(2)}$ using 2's complement subtraction method. **(3+2+5)**

17) a) Simplify the Boolean expression $A \cdot \overline{B}C + \overline{A}B(BC + \overline{B})$ using boolean laws. Draw logic circuit for simplified expression.
b) Simplify the Boolean function $f(A, B, C, D) = \Sigma m(1, 3, 5, 8, 9, 11, 15)$ using k-map. Draw the logic circuit for simplified expression. **(5+5)**

18) a) Realize AND , OR and NOT gate using NAND gate.
b) Explain half subtractor with logic circuit. Draw its truth table. **(5+5)**

19) a) With logic circuit and truth table, explain the working of a full-adder.
b) Explain the working of RS flip-flop with a block diagram. Draw its truth table. **(5+5)**

20) a) Differentiate latch and flip-flop.
b) What is a register ? With necessary diagram, explain the working of a 4 bit SISO. **(4+6)**