I Semester B.C.A. Degree Examination, November/December 2018  
(CBCS) (F+R) (2014-15 and Onwards)  
COMPUTER SCIENCE  
BCA-104T : Digital Electronics

Time : 3 Hours  Max. Marks : 70

*Instruction : Answer all Sections.*

SECTION – A

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

1) What is Semiconductor? Give an example.
2) What is meant by rectification?
3) State and explain Ohm’s law.
4) Define form factor and peak factor.
5) What is the active element in an electric network? Give an example.
6) Expand ASCII and EBCDIC code.
7) Perform $(11101)_2 - (10101)_2$ using 2’s complement.
8) Convert $(62.501)_10$ to octal and hexadecimal.
9) Convert (i)$10101$ to gray code (ii) $(520)_4$ to hexadecimal.
10) Define a nibble and a byte.
11) What is the logic symbol and truth table for XOR gate.
12) What is a sequential circuit? Explain.

SECTION – B

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

13) a) State and explain Superposition theorem.
    b) Explain half-wave rectifier with a neat diagram.

14) a) List any two properties of semiconductor. Explain PN junction with a neat diagram.
    b) What are extrinsic semiconductors? Explain the doping process.

P.T.O.
15) a) Explain any 5 important characteristics of Digital ICs.
   b) Write a note on TTL and CMOS.

16) a) Convert the following:
   i) Octal to decimal equivalent \((465.44)_8\)
   ii) Binary to decimal \(-110100011\).

   b) Simplify the sop using 4-variable K-maps. \(F(a, b, c, d) = \sum(0, 6, 7, 8, 9, 10, 12) + \Sigma d(2, 4, 5, 13)\).

17) a) State and prove De Morgan's theorem.
   b) With a logic diagram explain 4 to 1 multiplexer.

18) a) Implement a full-adder with two half-adders and explain the full adder.
   b) Explain the working of 4-bit parallel binary adder.

19) a) What is a T flip-flop? How do you convert JK flip-flop to T-flip-flop?
   b) What is a shift register? Explain the types of registers.

20) a) What are semiconductors? Explain different types of semiconductors.
   b) Explain error detection and error correction codes.
I Semester B.C.A. Degree Examination, Nov./Dec. 2017
(CBCS) (F+R)
(2014-15 and Onwards)
BCA 104 : DIGITAL ELECTRONICS

Time : 3 Hours  Max. Marks : 70

Instruction : Answer all the Sections.

SECTION – A

I. Answer any ten of the following questions : (10x2=20)
1) Define electric current and specify the expression for current.
2) What do you mean by active element and passive element ?
3) State Norton’s theorem.
4) Define the terms Time Period and Frequency.
5) What is conduction band and forbidden band ?
6) What is doping ?
7) Find the 2’s complement of 101110011.
8) Convert the binary number 1101011(2) to gray code.
9) Show that $C + \bar{B}C = 1$.
10) Define encoder and decoder.
11) Write any two difference between Latch and flip flop.
12) What are the basic functions of shift register ?

SECTION – B

II. Answer any five of the following questions : (5x10=50)
13) a) Briefly explain the current divider circuit. 5
      b) State and explain Kirchhoff’s voltage law. 5

P.T.O.
14) a) State super position theorem and explain with an example.
   b) Describe Bohr's atomic model.
15) a) Mention the differences between intrinsic and extrinsic semiconductor.
   b) Briefly explain the working of bridge rectifier.
16) a) Convert $(BCA)_{16}$ to $(\_\_\_)_2$, $(\_\_\_)_8$, $(\_\_\_)_10$.
   b) Subtract $29_{(10)} - 7_{(10)}$ using 2's complement method.
17) a) Simplify the given minterm expression using K-map.
       \[ F = \Sigma m(1, 5, 7, 8, 9, 13) + \Sigma d(3, 12) \]
   b) State and prove De-Morgan's theorem.
18) a) What is universal gate? Realize NAND as universal gate.
   b) With a neat circuit diagram explain the working of Full Adder.
19) a) Design a 4 to 1 multiplexer circuit and explain.
       b) Explain the working of clocked RS flip-flop with truth table.
20) a) Explain the working of 4 bit serial-in-parallel-out shift register.
    b) What are the operating characteristics of Flip Flop?
I. Answer any ten questions:

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 a half-adder? Write its truth table.

12) Explain the important characteristics of flip-flops.
2. a) Explain P-N junction with a neat diagram.  
   b) Write a note on extrinsic semiconductors.  
3. a) Explain the characteristics features of IC family gates.  
   b) State and prove De-Morgan’s theorems.  
4. a) Convert the following:  
   i) \((453.26)_{10} = (\quad )_2, (\quad )_8.\)  
   ii) \((1101.110)_2 = (\quad )_8, (\quad )_{16}\)  
   b) Simplify the following into POS using K-Map  
      \(F(A B C D) = \Sigma(0, 2, 3, 5, 11, 13) + \Sigma D(1, 7, 10).\)  
5. a) Prove NAND and NOR gates as universal gates.  
   b) With a logic diagram explain decimal to BCD encoder.  
6. a) Write a note on parity checker and parity generator.  
   b) With a neat diagram explain 4-bit parallel binary adder.  
7. a) Explain the working of J-K flip-flop with a neat diagram.  
   b) Differentiate between a latch and a flip-flop.  
8. a) Explain SISO shift register with a diagram.  
   b) Write a note on applications of shift registers.
I Semester B.C.A. Degree Examination, November/December 2015
(CBCS) (Y2K14 Scheme)
BCA – 104 T: DIGITAL ELECTRONICS

Time: 3 Hours
Max. Marks: 70

Instruction: Answer all Sections.

SECTION – A

Answer any ten questions:

1. Find the equivalent resistance of the combination.

2. What is rms value?


4. What is forbidden energy gap?

5. What is breakdown voltage in PN junction?

6. Write the difference between Analog and Digital technologies.

7. Convert 10011 from Gray to Binary.

8. Simplify the Boolean equation $AB + CD + EF$.

9. What is a combinational circuit?

10. What is magnitude comparator?

11. Write applications of Flip Flop.

12. What is a shift register?

P.T.O.
Answer **any five** questions:

13. a) State and explain the Norton's theorem.

   b) Find delta equivalent of the following circuit.

   ![Circuit Diagram](image)

14. a) Find the current through $R_L$ by Thevenin's theorem.

   ![Circuit Diagram](image)

   b) Draw and explain $V-I$ characteristics of PN-junction.

15. a) Explain the working of center tap full wave rectifier.

   b) Discuss the merits and demerits of full wave and half wave rectifier.

16. a) State and prove DeMorgans theorem.

   b) Express the following Boolean expression in terms of sum of minterms

   $F = \overline{A}B + C$.

17. a) What is K-map and explain various types of grouping.

   b) Simplify K-map

   $F(ABCD) = \sum (7, 9, 10, 11, 12, 13, 14, 15)$.

18. a) Draw the logic circuit whose Boolean equation is $Y = \overline{A} + B + C$.

   b) What are universal gates? Explain universal property of NAND gate.

19. a) Explain Full adder with neat circuit diagram.

   b) With neat circuit diagram explain Master Slave JK flip flop.

20. a) Draw the pin diagram of 7476.

   b) Explain about PISO register.
1. Semester B.C.A. Degree Examination, November/December 2014
(Y2K14 – CBCS Scheme)
Computer Science
BCA 104 T : DIGITAL ELECTRONICS

Time : 3 Hours
Max. Marks : 70

Instruction : Answer all Sections.

SECTION – A

Answer any ten questions.

1. Define the terms short circuit and open circuit.
2. What are the different types of network ports?
3. What is a semiconductor? Give example.
4. How are solids classified?
5. Convert B64.53 to binary.
6. Define minterm and maxterm.
7. Simplify the following Boolean expressions: \((A + B)' + CD\)
8. What is an X-OR gate? Give the truth table and logic symbol of X-OR gate.
9. What is a combinational circuit? Give example.
10. What is an adder? Give the logic diagram of half adder circuit.
11. Mention the two applications of D Flip-flop.
12. Define the terms propagation delay and hold time.

SECTION – B

Answer any 5 questions.

1. a) State and explain Superposition theorem.
   b) What is series parallel circuit? Explain.

(2x10=20)

(10x5=50)

P.T.O.
2. a) Explain P-N junction with a neat diagram.
   b) Write a note on extrinsic semiconductors.
3. a) Explain the characteristics features of IC family gates.
   b) State and prove De-Morgan's theorems.
4. a) Convert the following:
      i) \((453.26)_{10} = (\quad)_{2}, (\quad)_{8}, (\quad)_{16}\)
      ii) \((1101.110)_{2} = (\quad)_{8}, (\quad)_{16}\)
   b) Simplify the following into POS using K-Map
      \(F(A B C D) = \Sigma(0, 2, 3, 5, 11, 13) + \Sigma D(1, 7, 10)\).
5. a) Prove NAND and NOR gates as universal gates.
   b) With a logic diagram explain decimal to BCD encoder.
6. a) Write a note on parity checker and parity generator.
   b) With a neat diagram explain 4-bit parallel binary adder.
7. a) Explain the working of J-K flip-flop with a neat diagram.
   b) Differentiate between a latch and a flip-flop.
8. a) Explain SISO shift register with a diagram.
   b) Write a note on applications of shift registers.