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 : (10 x 2 = 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 + BC = 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 : (5 x 10 = 50)
13) a) Briefly explain the current divider circuit.
    b) State and explain Kirchoff's voltage law.

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 $(\text{BCA})_{16}$ to $(\text{?})_{2}$, $(\text{?})_{8}$, $(\text{?})_{10}$.
   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?
(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 : (10×2=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.

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) \((453.26)_{10} = (\quad)_{2}, (\quad)_{8}\).  
   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.
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 \( A\overline{B} + C\overline{D} + E\).
9. What is a combinational circuit?
10. What is magnitude comparator?
11. Write applications of Flip Flop.
12. What is a shift register?
Answer any five questions:

13. a) State and explain the Norton's theorem.
b) Find delta equivalent of the following circuit.

14. a) Find the current through $R_L$ by Thevenin's theorem.
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
   \[ F = A\overline{B} + C. \]

17. a) What is K-map and explain various types of grouping.
b) Simplify K-map
   \[ F(ABCD) = \sum m(7, 9, 10, 11, 12, 13, 14, 15). \]

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.
I 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.
(2x10=20)
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 \((A + \overline{B}) + CD\).
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.
(10x5=50)
1. a) State and explain Superposition theorem.

b) What is series parallel circuit ? Explain.

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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) \((453.26)_{10} = (\_\_\_\_)_2, (\_\_\_\_)_8.\)
    ii) \((1101.110)_2 = (\_\_\_)_8, (\_\_\_)_{16}.\)
   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. 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.

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BCA – 104 T : DIGITAL ELECTRONICS  

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Answer any ten questions:  

(10×2 = 20)  

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.
SECTION-B

Answer any five questions:

13. a) State and explain the Norton's theorem.
   b) Find delta equivalent of the following circuit.

\[ \begin{array}{c}
Q_a \quad Q_c \\
Q_b \\
R_G \\
\end{array} \]

14. a) Find the current through \( R_L \) by Thevenin's theorem.
   b) Draw and explain V-I characteristics of PN-junction.

\[ 100V \quad R_1 \quad R_2 \quad R_3 \quad R_L \]

15. a) Explain the working of center tap full wave rectifier.
   b) Discuss the merits and demerits of full wave and half wave rectifier.

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SECTION – B

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(10x5=50)

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   b) What is series parallel circuit? Explain.  
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