COS 101.1 Reg. No. .....

CREDIT BASED FIRST SEMESTER B.Sc. DEGREE EXAMINATION OCTOBER 2016

COMPUTER SCIENCE

PAPER I – FUNDAMENTALS OF DIGITAL ELECTRONICS

Time: 3 Hrs. **Max. Marks: 80**

PART – A

1. **Answer any TEN questions from the following:** 10×2=20
   a) Define i) Minterm and ii) Maxterm
   b) Prove that $x + x = x$.
   c) Give truth table of NOR and NAND gates.
   d) What is a multiplexer? Give block diagram of 4×1 multiplexer.
   e) Find complement of Boolean functions $F = xy + \bar{x}y$.
   f) What is an encoder? Give one example.
   g) Define register and counter.
   h) Differentiate between combinational and sequential circuits.
   i) What is a ripple counter? Draw the block diagram of 3 bit ripple counter.
   j) What is a shift register?
   k) Write an excitation table of SR and D Flipflop.
   l) Implement OR gate from NAND gates.

PART – B

Answer any TWO questions from each unit.

UNIT – I

2. a) Perform $(25)_{10} - (24)_{10}$ using 1's and 2's complement.
   b) Convert the following:
      i) $(0.513)_{10} \rightarrow (?)_8$
      ii) $(1A.6)_{16} \rightarrow (?)_8$
      iii) $(630.4)_8 \rightarrow (?)_{10}$ **(4+6)**

3. a) Simplify $F(A, B, C, D) = \sum(1, 3, 7, 11, 15)$
   $\sum_d(0, 2, 5)$ using K-map.
   b) Express the Boolean function $F(a, b, c) = a + \bar{b}c$ in standard form. **(6+4)**

4. a) Explain ASCII and EDCDIC coding system.
   b) Simplify $F(x, y, z) = \sum(0, 2, 5, 7)$ using K-map and implement using basic gates. **(4+6)**

UNIT – II

5. a) With a neat diagram explain half adder.
   b) Design a BCD to excess-3 code converter and explain. (3+7)

6. a) What is a magnitude comparator? With a circuit diagram explain the working of a magnitude comparator.
   b) Design 4×1 multiplexer and explain its working. (6+4)

7. a) Implement the Boolean Function $F(A, B, C) = \sum(1, 3, 5, 6)$ using multiplexer.
   b) Design a full adder circuit. (4+6)

UNIT – III

8. a) Design a BCD ripple counter.
   b) Explain the working of serial in, serial out shift register using D Flip Flops. (5+5)

9. a) Design a logic circuit to perform OR, XOR, AND & NOT in ALU.
   b) With a neat diagram explain the working of T Flip Flop. (6+4)

10. a) Write a note on accumulator register.
    b) With a neat diagram, explain the working master slave Flip-flop. (5+5)

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COS 101.1(R)

Reg. No. .....

CREDIT BASED FIRST SEMESTER B.Sc. DEGREE EXAMINATION OCTOBER 2014

COMPUTER SCIENCE

PAPER I – FUNDAMENTALS OF DIGITAL ELECTRONICS

Time: 3 Hrs

Max. Marks: 80

PART – A

1. **Answer any TEN questions from the following:** 2×10=20

   a) Convert $BCD_{(16)}$ into Octal Number.

   b) Why do we use complements in digital computers? Convert $11011011_{(2)}$ into 2's complement.

   c) Define minterm and don't care condition.

   d) Prove that a+ab=a.

   e) Define Half adder and write its touth table.

   f) What is exclusive –OR gate? Write its truth table.

   g) What is a decoder? Write the truth table of 2×4 decoder.

   h) Define quad and Octet in K-Map.

   i) What is a Flip-flop? Write the circuit of a basic RS FF.

   j) What is a state diagram? Give example.

   k) Define Register. Why is it used?

   l) What is a ripple counter?

PART – B

Answer any TWO questions from each unit.

UNIT – I

2. a) Convert
      (i) $4675.213_{(8)}$ into decimal
      (ii) $9876.24_{(10)}$ into binary
   b) Perform $100101_{(2)} - 110110_{(2)}$ using 1's and 2's complement. (3+3) (4)

3. a) Simplify the Boolean function $Y(WZ^1+WZ)+XY$ (3)
   b) Define De Morgans Laws for two variable and prove it using truth table. (3)
   c) Write the basic theorem and postulates of Boolean algebra and prove any two theorems other than De Morgan's theorems. (4)

4. a) Using Karnaugh Maps simplify the following boolean functions.
      i) $f(A,B,C,D) = \sum(1,3,5,8,9,11,15) + \sum_{\emptyset}(2,13)$ where Ø is don't care condition?
      ii) $f(X,Y,Z) = \sum(0,1,2,3,6,7)$ (3+3)

   b. Write the truth table and Logic diagrams of XNOR and NAND gates. (4)

UNIT – II

5. a) What is a full subtractor? Explain the working of a full subtractor.

   b) Implement the Boolean function using multiplexer.
   $F(A, B, C, D) = \sum(0, 3, 4, 8, 9, 15)$

6. a) What is an encoder? With a neat diagram and truth table, explain the working of an octal-to-binary encoder.

   b) Explain the working of a BCD adder with a neat diagram.

7. a) Draw the block diagram of a Binary parallel adder and explain its working.

   b) Explain the working of an BCD to Excess – 3 code converter.

UNIT – III

8. a) Explain the working of JKFF with the neat diagram and truth table.

   b) Design a Mod-16 counter using TFF.

9. a) With a block diagram, explain the serial transfer of data from register A to register B.

   b) With an example, explain the sequential circuit with the state table, state diagram a state equations.

10. a) What is a status register? Explain the steps involved in setting bits in a status register.

    b) Write a note on accumulator. Explain the operations involved in the design of
    i) Increment A ii) Addition with carry, by controlling one set of inputs to a paral adder.

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COS 101.1 Reg. No. .....

CREDIT BASED FIRST SEMESTER B.Sc. DEGREE EXAMINATION OCTOBER 2013

COMPUTER SCEINCE

PAPER I – FUNDAMENTALS OF DIGITAL ELECTRONICS

Time: 3 Hrs **Max. Marks: 80**

PART – A

1. Answer any TEN questions from the following: **2x10=20**

a) Convert $4567_{(8)}$ into Hexadecimal Number.

b) Why do we use complements in digital computers? Convert $10001000_{(2)}$ into 2's complement.

c) What is the difference between canonical form and standard form?

d) Write the complement of the function F=x′z′+x′y′z

e) Define Half subtractor and write its truth table.

f) What is Equivalence function? Write its truth table.

g) What is an encoder?

h) Define K-Map. Why is it used?

i) What is sequential circuit? Write its block diagram.

j) Define excitation table and why is it used.

k) What is a shift register? Draw the basic shift register circuit.

l) Define synchronous counter.

PART – B

Answer any TWO questions from each unit.

UNIT – I

2. a) Convert

(i) $465.513_{(10)}$ into octal.

(ii) $101101.1101_{(2)}$ into decimal **(3+3)**

b) Perform $110101_{(2)} - 111010_{(2)}$ using 1's and 2's complement. **(4)**

3. a) Express the Boolean function F=A+B′C in its sum of minterms. **(3)**

b) Express the Boolean function F=XY+X′Z as a product of maxterms. **(3)**

c) Write the basic theorems and postulates of Boolean algebra and prove any two theorem. **(4)**

4. a) Using Karnaugh Maps simplify the following boolean functions.

i) $f(w,x,y,z) = \sum(0,1,2,3,6,7,13,14) + \sum_Q(8,9,10,12)$ where Q is don't care condition?

ii) $Z(A,B,C) = BC + AB + AC$ **(3+3)**

b. What are universal gates? Write the logic diagram and truth table of universal gates. (4)

UNIT – II

5. a) What is a full adder? Explain the working of a full adder circuit with neat logic diagram and truth table. (5)

   b) Explain the working of 2 bit magnitude comparator with a neat diagram. (5)

6. a) With a neat diagram, explain the working of a BCD adder. (5)

   b) With a neat diagram, explain the working of 3 to 8 line decoder along with its truth table.

7. a) What is multiplexer? Explain the working of 4X1 MUX with a neat diagram. (5)

   b) Explain the working of an BCD to excess 3 code converter. (5)

UNIT – III

8. a) Explain the working of D and T flip-flops with the logic diagram and its truth table. (5)

   b) With an example, explain the sequential circuit with the state table, state diagram and state equations. (5)

9. a) With a block diagram, explain the working of a bidirectional shift register with parallel load. (5)

   b) With a neat diagram explain the working of 4 bit synchronous binary counter using JK flip-flop. (5)

10. a) With a block diagram, explain the working of processor with an accumulator register.(5)

    b) What is a status register? Explain the steps involved in setting bits in a status register.(5)

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COS 101.1 Reg. No. .....

CREDIT BASED FIRST SEMESTER B.Sc. DEGREE EXAMINATION OCTOBER 2012

COMPUTER SCEINCE

PAPER I – FUNDAMENTALS OF DIGITAL ELECTRONICS

Time: 3 Hrs Max. Marks: 80

PART – A

1. Answer any TEN questions from the following: 2x10=20

a) What is the difference between canonical and standard form?

b) How to form 1's complement of a number? Give example.

c) Convert 156 to Hexadicimal.

d) Define minterm and don'tcare term.

e) Write the truth table of Ex-NOR and OR gate.

f) Prove that $x+x'y = x+y$

g) What is a decoder? Write the truth table of 2x4 decoder.

h) Write the characteristic table of D and T Flip Flop.

i) Define synchronous and Asynchronous counter.

j) Write the excitation table of JK and SR flip–flop.

k) What is a state diagram? Give example.

l) Draw the circuit diagram of single bit Magnitude Comparator.

PART – B

Answer any TWO questions from each unit.

UNIT – I

2. a) Perform the following:

(i) $1.1011 \times 2^{-3} - 1.0011 \times 2^{-2}$

(ii) Convert the binary number 110011, 101011 to decimal.

b) Simplify $F(a,b,c,d) = \Sigma(0,1,2,3,6,8,9,10) + \Sigma d(4,11,14)$

and obtain an expression in SOP and POS form.

c) Given the Boolean function $F = xy + x'y' + y'z$

i) implement it with AND, OR and NOT gates.

ii) implement it with only OR and NOT gates. (3+4+3)

3. a) Perform 16-21 using 1's and 2's complement.

   b) Find the value of X and Y.

   $732.35 = (X)_8 = (Y)_{16}$

   c) Reduce the Boolean expression to 3 literals $[(CD)^1 + A]^1 + A + CD + AB$ (4+3+3)

4. a) (i) $x\,(x+y) = x$ ii) $x+x = x$ iii) $xy + x'z + yz = xy + x'z$.
   Prove the above expressions.

   b. Express the following functions in a sum of minterms and a product of maxterms
   $F = D(A^1+B) + B^1D$ (5+5)

UNIT – II

5. a) Explain the working of 2-bit magnitude comparator with a neat diagram.

   b) Implement the Boolean function using multiplexer
   $F(a, b, c, d) = \Sigma(0,3,4,8,9,15)$ (5+5)

6. a) With a neat diagram, explain the working of BCD adder.

   b) What is a Half Subtractor? With a neat diagram explain the working of Half Subtractor. (6+4)

7. a) What is a multiplexer? Explain the working of 4XI MUX with a neat diagram.

   b) Draw the block diagram of a binary parallel adder and explain its working. (5+5)

UNIT – III

8. a) Explain the working of T flip flop with a neat diagram.

   b) What is a status register? Discuss how status bits are set/rest in a typical ALU system. (6+4)

9. a) With the block diagram explain the serial transfer from register A to register B.

   b) Design 4-bit synchronous counter and explain its working. (4+6)

10. a) Write a note on accumulator.

    b) Design an 4bit adder/subtractor circuit and explain its working.

    c) Design a synchronous mod-6 counter using JK flip flop. (2+3+5)

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