B.Sc I T Programme
March, 2014

2nd Semester
Title/Course No: Digital Electronics (BIT-201)
Time Allowed: 2 ½ Hours

Maximum Marks: 80
Minimum Marks: 32

Note: - *Attempt All questions from sections A and B and only two questions from section C.*

Section: A (Very short answer type questions to be answered in about 20 words each.)

$8 \times 2 = 16$

1. (i) Convert the BCD codes 001101010001 and 1001010001110000 into decimal.
   (ii) Convert the decimal number 284 and 4019 into the hexadecimal number.
   (iii) What is Gray code, give one example?
   (iv) What is the basic difference between sequential and combinational logic
   (v) What is race around in the Flip-Flops?
   (vi) What is edge triggering?
   (vii) What do you mean by access time of the memory?
   (viii) What is dynamic memory?

Section: B (Short answer type questions to be answered about 250 words each.)

$4 \times 8 = 32$

2. State DeMorgan's theorems and apply them to $\overline{A + B + C} + \overline{\overline{DE}}$.

3. Use Karnaugh map to minimize the following standard POS expression
   $(A + B + C)(A + B + \bar{C})(A + \bar{B} + C)(A + \bar{B} + \bar{C})(\bar{A} + \bar{B} + C)$: Also, derive the equivalent SOP expression.

4. Draw the logic circuit of edge triggered JK-flip-flop, write its truth table and describe its operation.

5. Give the comparison of the Flash memories with the other memories.

Section: C (Long answer type questions to be answered in about 500 words each)

$2 \times 16 = 32$

6. Discuss the TTL in detail, also define active pull-up.
7. Draw the logic circuit of Full adder along with truth table, explain its working.
8. What is ring counter? Draw its circuit, timing diagram and explain its working.
9. Draw bipolar RAM and MOS RAM cells and explain their working.

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B. Sc. IT Programme

2ⁿᵈ Semester

Subject: Mathematics-II (BIT-202)

Time Allowed: 2½ Hours

March, 2014

Maximum Marks: 80

Min Pass Marks: 32

Note: Attempt all questions from Section A & B and only two questions from Section C.

SECTION-A

1. i) Given $A = \{1,2,3,4\}$, $B = \{2,4,6,8\}$, $C = \{3,4,5,6,7\}$. Find $A \cap (B \cup C)$ (02)
    ii) Define equivalence relation and give an example of the equivalence relation (02)
    iii) Find $\lim\limits_{\theta \to 0} \dfrac{\sin 2\theta}{\sin 3\theta}$ (02)
    iv) When a function is said to be continuous at a point? Write down the points
    of discontinuity of the function $\dfrac{x+1}{(x-2)(x-3)}$ (02)
    v) Find $\dfrac{dy}{dx}$ for the function $y = \log(ax+6)^n$ (02)
    vi) Evaluate $\int x^2 e^x \, dx$ (02)
    vii) For each x in a Boolean algebra B, prove that $x+y=1$, $xy=0 \Rightarrow y=x'$. (02)
    viii) Draw the switching circuit representing the Boolean function: $x + x'y$. (02)

SECTION-B

2. If $A = \{1,2,3\}$, $B = \{2,3,4\}$, $S = \{1,3,4\}$, $T = \{2,4,5\}$, verify that:
    a) $(A \times B) \cap (S \times T) = (A \cap S) \times (B \cap T)$ (06)
    b) $(S \cup T)' = S' \cap T'$ (02)

3. Find the value of λ for which the following function is continuous at $x=1$ (08)
    $$f(x) = \frac{x^2-1}{x-1} \qquad x \neq 1$$
    $$= \lambda - 1 \qquad x = 1$$

4. Find from first principle the derivative of $\sin x$ (08)

5. Assuming $a \cdot a' = 0$ and $a + a' = 1$, for any element a in a Boolean algebra, prove that
    i) $a+a=a$ and (ii) $a+1=1$. (08)

SECTION-C

6. a) In a group of 250 persons, 210 can speak Kashmiri and 120 can speak English. Find how many of them can speak both Kashmir and English. Also how many of them can speak Kashmiri only. (10)
    b) If a function $f : R \to R$ be defined by: (06)
    $$f(x) = \begin{cases} 2x-1 & x<0 \\ 2 & x=0 \\ 2x+1 & x>0 \end{cases}$$
    Find $f(-3)$, $f(0)$, $f(2)$.

7. a) Evaluate: $\lim_{x \to 0} \dfrac{(1+x)^n - 1}{x}$. (08)

b) Discuss the continuity of the following function at $x = 0$ (08)

$f(x) = \dfrac{|x|}{x}$ when $x \neq 0$

$\quad\quad = 0$ when $x = 0$.

8. a) If $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$, then find $\dfrac{dy}{dx}$ (06)

b) Evaluate $\int \dfrac{ax^2 + bx + c}{\sqrt{x}} dx$. (05)

c) Evaluate $\int (\tan x + a^x) dx$. (05)

9. a) Prove that for every $a \in B, (a')' = a$. (08)

b) In a town, all cars marked P belong to the police. Unless marked P, the cars are not fitted with wireless. The police has no red car. By using Boolean algebra prove that no red car is fitted with wireless. (08)

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B. Sc. IT Programme

2nd Semester
Subject: Data Structures through C (BIT-203)
Time Allowed: 2½ Hours

March, 2014
Maximum Marks: 80
Min Pass Marks: 32

Note: Attempt all questions from Section A & B and only two questions from Section C.

SECTION-A: Very short answer type questions to be answered in about 20 words

$8\times2=16$

1.
   i) What is a Data Structure?
   ii) What is an array?
   iii) State any three applications of Queue in programming.
   iv) Differentiate between in-fix, pre-fix and post-fix expressions.
   v) What is a Pointer Variable?
   vi) Name various memory allocation, adjustment and deletion C functions.
   vii) What is a Circular List?
   viii) What is a Tree Data Structure?

SECTION-B: Short answer type questions to be answered in about 250 words

$4\times8=32$

2. Write a program to sort an array of strings in ascending order.

3. Implement a Stack of numbers using an array. Write functions namely push and pop to store and retrieve a number from. Write a suitable main to demonstrate the stack.

4. State the different forms of argument passing for functions. Demonstrate the difference between them using a sample program.

5. Code a C function to search a node In a Binary Search Tree.

SECTION-C: Long answer type questions to be answered in about 500 words

$2\times16=32$

6.
   i) State and explain algorithm for sorting using Selection Sort.
   ii) Write a C function to sort an array using Insertion Sort technique.

7. Demonstrate the use of Stack for the conversion of operations from in fix to prefix form.

8.
   i) What is a pointer to pointer? Demonstrate the use of pointer to pointer through a sample program.
   ii) How a pointer to structure can be passed as argument to a function? Demonstrate using a sample program.

9.
   i) What is a Binary Search Tree? Write a C functions to traverse a Binary Search Tree in Pre-order and in-order.
   ii) The pre order and In Order Traversals of a Binary Tree are given hereunder:

   Pre Order: F E D C A B G H I
   In Order: D E A C B F G I H
   Construct the Binary Tree.

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B. Sc. IT Programme

2nd Semester
Subject: Data Base Management System (BIT-204)
Time Allowed: 2½ Hours

March, 2014
Maximum Marks: 80
Min Pass Marks: 32

Note: Attempt all questions from Section A & B and only two questions from Section C.

8×2=16

SECTION-A: Very short answer type questions to be answered in about 20 words

1.
   i) What is schema.
   ii) What is an index.
   iii) What are triggers.
   iv) List any two DOL Commands and their uses. (DDL)
   v) Write general syntax of update command?
   vi) Define normalization.
   vii) What is a cursor? List any three?
   viii) Define Query.

4×8=32

SECTION-B: Short answer type questions to be answered in about 250 words

2. Explain Various users in DBMS.

3. Define following
   a) Network Data Model.
   b) Hierarchical Data Model

4. Explain all CODD rules?

5. Define store Procedures in Pl/SQL with example.

2×16=32

SECTION-C: Long answer type questions to be answered in about 500 words

6.
   a) Differentiate between file processing system and database system.
   b) Give characteristics of database.

7. Explain the following relational algebra with examples Selection, projection, Cartesian product, joins.

8. Explain the three level architecture of DBMS in detail.

9. Create a cursor in PL/SQL which checks if the account of customer is below Rs. 1000 at the end of the month, He will be fined with Rs 100.

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