

D 38

**Q.P. Code : [07 DSCA 02/
07 DSC 0/07 DIT 02]**

(For the candidates admitted from 2007 onwards)

Reg. No. :

**B.C.A./B.Sc. DEGREE EXAMINATION,
DECEMBER 2010.**

First Year

Part III — Computer Application/Computer Science
Information Technology

DIGITAL FUNDAMENTALS AND ARCHITECTURE

Time : Three hours Maximum : 100 marks

Answer any FIVE questions.

(5 × 20 = 100)

1. (a) Perform the binary addition, multiplication and division : (10)
- (i) $58.75 + 23.5$
 - (ii) 58.75×23.5
 - (iii) $58.75 \div 23.5$
- (b) Explain about BCD adder with neat diagram. (10)

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2. (a) Write about a parallel binary subtractor (9)
- (b) Prove Demorgan's theorem (5)
- (c) Implement the following Boolean Expression using NOR gates only. $Y = AB + BC + \overline{AC}$ (6)
3. (a) Using Karnaugh map simplify the following $f(w, x, y, z) = (0, 2, 4, 8, 9, 10, 11, 12, 13)$. (10)
- (b) Write about decoders. (10)
4. (a) With neat diagram write about RS flip-flop. (10)
- (b) Explain about Multiplexers. (10)
5. (a) Draw and explain the pin out diagram of 8085. (10)
- (b) Write about addressing modes of 8085. (10)
6. (a) Write about asynchronous data transfer : (7)
- (i) Strobe control (7)
 - (ii) Handshaking. (7)
- (b) Explain about DMA transfer. (6)
7. Illustrate the virtual memory concept. (20)
8. Write a note on Associative Memory. (20)

S.C

Reg. No. :

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**Q.P. Code : [07 DSC 02/
07 DIT 03]**

(For the candidates admitted from 2007 onwards)

B.Sc. DEGREE EXAMINATION, DECEMBER 2010.

First Year

Part III — Computer Science/Information Technology

DATA STRUCTURES AND C PROGRAMMING

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions.

All questions carry equal marks.

(5 × 20 = 100)

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1. Discuss about formatted and unformatted I/O functions.
2. Explain different types of operators and string functions.
3. Write about preprocessor directive.
4. Discuss in detail about singly linked list.

5. Write short note on :
 - (a) Enumerated data type
 - (b) Queue.
6. Explain the concept of structure and compare with UNION.
7. How can you sort a set of n numbers using quick sort and find a number from the sorted numbers using binary search?
3. Write a program to display first twenty odd numbers, first ten even numbers and sum of first 30 numbers.

Reg. No. :

D 79 Q.P. Code : [07 DSC 03/07 DIT 01]

(For the candidates admitted from 2007 onwards)
B.Sc. DEGREE EXAMINATION, DECEMBER 2010.

First Year

Part III — Computer Science / Information Technology
Allied — MATHEMATICAL FOUNDATIONS FOR
COMPUTER SCIENCE

Time : Three hours Maximum : 100 marks

Answer any FIVE questions.

1. Find the eigen values and eigen vectors of the matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$. (20)
2. (a) Write the principle of duality. (2)
(b) Prove the following identities :
 - (i) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$
 - (ii) $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.
- (c) Write the dual of the above identities and also prove them. (8)

3. (a) If $A = \{a, b\}$, $B = \{1, 2\}$ and $C = \{2, 3\}$, find

(i) $A \times (B \cup C)$

(ii) $A \times (B \cap C)$

(iii) $(A \times B) \cup (A \times C)$

(iv) $(A \times B) \cap (A \times C), (\bigcap V)(A \times B) \cup C$. (10)

(b) Show that for any two Sets A and B

(i) $A - B = A \cap \sim B$

(ii) $A \subseteq B \Leftrightarrow \sim B \subseteq \sim A$

(iii) $A - (A \cap B) = A - B$. (10)

4. Show that:

(a) $\neg(P \leftrightarrow Q) \Leftrightarrow (P \vee Q) \wedge \neg(P \wedge Q)$

(b) $\neg(P \leftrightarrow Q) \Leftrightarrow (P \wedge \neg Q) \vee (\neg P \wedge Q)$

(c) $\neg(P \wedge Q) \Leftrightarrow \neg P \vee \neg Q$

(d) $(P \rightarrow Q) \wedge (R \rightarrow Q) \Leftrightarrow (P \vee R) \rightarrow Q$. (20)

5. Write in the symbolic form and negate the following statements.

(a) Everyone who is healthy can do all kinds of work (8)

(b) Some people are not admired by everyone. (7)

(c) Everyone should help his neighbors or his neighbors will not help him. (5)

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6. (a) If $f: A \rightarrow B$, $g: B \rightarrow C$ be two functions which are one-to-one and onto prove that $g \circ f$ is also one-to-one and onto. (10)

(b) Let $f: R \rightarrow R$, $g: R \rightarrow R$ where R is the set of real numbers given by $f(x) = x^2 - 4$ and $g(x) = x + 4$. Find $f \circ g$ and $g \circ f$. State whether these functions are injective, surjective and bijective. (3 + 3 + 4)

7. (a) Let R and S be two relations from A to B. Define (i) the complement of R (ii) the intersection of R and S. (4)

(b) Let $R: A \rightarrow B$, $S: B \rightarrow C$ be two relations prove that $(S \circ R)^{-1} = R^{-1} \circ S^{-1}$. (6)

(c) Define:

(i) an equivalence relation and

(ii) a partial order relation. (4)

(d) Prove that the relation R defined on the set of all ordered pairs of positive integers by $(x, y)R(u, v)$ iff $xv = yu$ is an equivalence relation. (6)

8. (a) Write the definitions of
- (i) graph
 - (ii) digraph
 - (iii) isomorphic graphs with examples
 - (iv) complete graph. (2 + 2 + 4 + 2)
- (b) Define a binary tree. (2)
- (c) Write the algorithms of traversing a binary tree. (8)
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