(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-JUNE 2017

Paper Code: BCA-102 ***Subject: Mathematics-II***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each Unit.

Q1 (a) Let A = {1, 2, 3} and B = {a, b, c}. Let $R = \{(1,b)(1,c)(3,b)\}$. Find the domain and range of the relation. Determine R^{-1}. **(3)**

(b) Let D denote the set of all positive divisors of the positive integer n. Determine D_{16}, and represent it by Hasse Diagram. **(2)**

(c) Define isomorphic and Hamilton Graphs with example. **(3)**

(d) Let f, g, be functions from N to N (set of natural numbers) for $N \in N$ such that $f(n) = n + 1$, $g(n) = 2n$. Find fog and gof. **(3)**

(e) Define Tautology and contradictions. **(2)**

(f) Show that the relation of parallel lines in the set of lines on a plane is an equivalence relation. **(2)**

(g) Choose any two statements p and q as you like. Draw the truth table for $p \wedge q$, and $p \vee q$. **(2)**

(h) Consider the graph G (V, E) where v consists of Four vertices A, B, C, D and E of five edges where $e_1 = \{A,B\}$, $e_2 = \{B,C\}$, $e_3 = \{C,D\}$, $e_4 = \{A,C\}$ and $e_5 = \{B,D\}$, represent this undirected graph diagrammatically. Determine the degree of each vertex. **(3)**

(i) Let f be a mapping from R to R such that $f(x) = 2x + 3$. Show that f is invertible and find its inverse. **(3)**

(j) If $n(A) = 40, n(B) = 30, n(A \cap B) = 20$. Then find $n(A \cup B)$. **(2)**

Unit-I

Q2 (a) Let $A = \{1,2,5,6\}$, $B = \{2,5,7\}$, $C = \{1,3,5,7,9\}$.
Verify $(A \times B) \cap \{A \times C\} = A \times \{B \times C\}$. **(6)**

(b) Let $N = \{1,2,3,\ldots\ldots\}$, denote the set of all positive integers and $A = \{x : x \in N, 3 < x < 12\}$, $B = \{x : x \in N, x \text{ is even}, x < 15\}$. Find $A \cap B$, $A \cup B$, A^c and B^c. **(6.5)**

Q3 (a) If R is an equivalence relation in a set A. Then prove that R^{-1} is also equivalence relation. **(6)**

(b) For the sets A, B, C prove the following results.
(i) $A - (B \cap C) = (A - B) \cup (A - C)$, (ii) $A \times (B \cup C) = (A \times B) \cup (A \times C)$. **(6.5)**

Unit-II

Q4 (a) In a lattice $(L, \leq)$, prove that
(i) $a \wedge (b \vee c) \geq (a \wedge b) \vee (a \wedge c)$. (ii) $a \vee (b \wedge c) \leq (a \vee b) \wedge (a \vee c)$. **(6)**

(b) Define Bounded lattice and prove that every lattice L is bounded. **(6.5)**

Q5 (a) Define complemented lattice, also find the complement (if exists) of all elements of (D_{30}, I). **(6.5)**

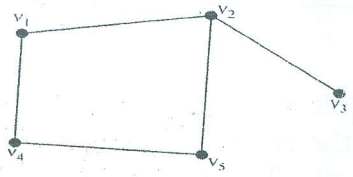
(b) Let $A = \{1,2,3,4,6,8,9,12,18,24\}$ be equipped with relation x divides y. Draw the Hasse diagram. **(6)**

P.T.O.

BCA-102
P.1/2

Unit-III

Q6 (a) Let G be an undirected graph with m vertices, say $v_1, v_2, v_3, \ldots\ldots v_m$. Define the adjacent matrix A of G. Consider the undirected graph G with 5 vertices v_1, v_2, v_3, v_4, v_5 shown in the following diagram. Find the adjacent matrix of this graph. **(6.5)**

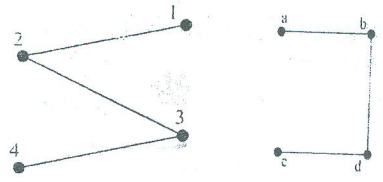


(b) Draw the directed graph for the following incident matrix. Also find the degree of all vertex.

	e_1	e_2	e_3	e_4	e_5	e_6	e_7	e_8
v_1	−1	0	0	0	−1	−1	1	0
v_2	1	1	0	0	0	0	0	1
v_3	0	−1	−1	0	0	1	0	0
v_4	0	0	1	1	0	0	−1	0
v_5	0	0	0	−1	1	0	0	−1

. **(6)**

Q7 (a) Show that the two graphs shown in the figure are Isomorphic. **(6.5)**



(b) Prove that the union of two graphs G_1 and G_2 will be a graph such that.
$V(G_1 \cup G_2) = V(G_1) \cup V(G_2)$ and $E(G_1 \cup G_2) = E(G_1) \cup E(G_2)$. **(6)**

Unit-IV

Q8 (a) By means of truth tables, justify that the conditional statement "If p then q" is logically equivalent to the statement "Not p or q". **(6.5)**

(b) Define a proposition. Let p and q be propositions and p → q denote compound proposition, "if p then q". Draw the truth table for the compound proposition p→q. Let p: you try, and q: you will succeed. Justify the truth table for p →q. **(6)**

Q9 (a) Verify De-morgan's laws for propositions. And also prove that.
$P \wedge (q \vee r) = (p \wedge q) \vee (p \wedge r)$. **(6.5)**

(b) Consider the following: **(6)**
P: Today is Tuesday, Q: It is raining, R: It is cold.

Write in simple sentence the meaning of the following:
(i) $\sim q \rightarrow (r \wedge q)$
(ii) $(p \vee q) \leftrightarrow r$

****

BCA-102
P2/2

(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-2017

Paper Code: BCA104 ***Subject: Principles of Management***

Time : 3 Hours ***Maximum Marks :75***

Note: Attempt all questions as directed. Internal choice is indicated.

Q1 Answer the following questions:- **(5x5=25)**

(a) Taylorism and Theory X are consistent with each other. Comment.

(b) Real life decision making process is "satisfying" rather than "economizing". Analyze the statement.

(c) Management is about doing things right and leadership is about doing right things. Elucidate.

(d) Discuss A-B-C Model of Behaviour modification with examples.

(e) Briefly analyze Elton Mayo's contribution to management theory.

UNIT-I

Q2 Explain Systems Theory of Management and discuss the context under which it emerged. **(12.5)**

OR

State Mintzberg's Classification of managerial roles and mention atleast one activity/task performed by a typical manager that corresponds with each role. **(12.5)**

UNIT-II

Q3 Define Organization Structure and briefly discuss the features of bureaucratic and matrix type organization structures. **(12.5)**

OR

What do you understand by Staffing function? Discuss its significance for success of organizations. **(12.5)**

UNIT-III

Q4 (a) Explain the process of motivation.

(b) According to Herzberg, Hygiene factors are extrinsic where as motivators are intrinsic. What does it imply for motivation of employees? **(12.5)**

OR

Briefly discuss Situational leadership model and its limitations. **(12.5)**

UNIT-IV

Q5 Referring to Holland's Six types of personality and congruent work environments suggest atleast two suitable occupations for each personality type. **(12.5)**

OR

How we perceive the world depends on how we define ourselves in terms of our membership in various social groups. Analyze the statement in the context of the concepts of social identity and stereotyping referring to our personal experiences. **(12.5)**

****

P

(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY JUNE 2017

Paper Code: BCA-106 ***Subject: Digital Electronics (Batch 2011 onwards)***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one question from each unit.

Q1 Attempt **any five** from the following:- **(5x5=25)**

(a) Design full subtractor circuit using NAND gate only.
(b) Explain how transistor as a switch works? Give its use in logic circuits.
(c) Define fan-in, fan-out, propagation delay, noise margin and voltage parameters.
(d) Explain decoder and demultiplexer. Give their applications.
(e) State the De Morgan's theorem and prove them with an example.
(f) Define synchronous and asynchronous counters with their merit and demerits.

UNIT-I

Q2 Simply the expressions:-

(a) $AB + \overline{AC} + A\bar{B}C(AB + C)$ **(3)**
(b) Explain the operation and advantages of CMOS. **(6.5)**
(c) Prove $A + \bar{A}B = A + B$ **(3)**

Q3 (a) Design a combinational circuit whose input is three bit number and whose output is equal to square of input and implement it using basic gates. **(6.5)**
(b) Explain briefly the BCD to seven segment decoder. **(6)**

UNIT-II

Q4 (a) Design a full adder circuit using Multiplexer. **(6.5)**
(b) Implement the Ex-OR gate equation with NAND gates only. **(6)**

Q5 (a) Draw the logic diagram of parity checker and generator/checker. Explain its operation with the help of truth table. **(6.5)**
(b) Design a binary multiplier for following: A=1011, B=111 **(6)**

UNIT-III

Q6 (a) Define edge triggering in flip-flops. Explain Master slave JK flip-flop that solves the problem of Race-around condition, with diagram. **(7)**
(b) Design JK flip-flop using SR flip-flop. **(5.5)**

Q7 (a) Explain the bidirectional shift register with diagram, truth table and clock pulse. Give their applications. **(7.5)**
(b) Differentiate Static RAM and Dynamic RAM. **(5)**

UNIT-IV

Q8 (a) Design Modulo 7 counters with truth table and logic diagram. **(7.5)**
(b) Give the application of PLA and PLD. **(5)**

Q9 (a) Design a combinational circuit with PLA, having three inputs, four product terms and two outputs: **(7.5)**
$F1(A,B,C)=\Sigma(3,5,6,7)$, $F2(A,B,C)=\Sigma(0,2,4,7)$
(b) Explain Johnson's counter with truth table and clock pulses. **(5)**

****

P

(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-JUNE 2017

Paper Code: BCA-108 ***Subject: Data Structure using C***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q no.1 which is compulsory. Select one question from each unit.

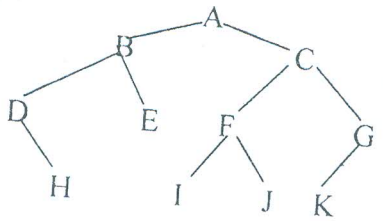
Q1 (a) Add and subtract the following two sparse matrices. **(5)**

0	0	0	0	0		0	0	0	0	0
0	0	0	0	0		0	2	0	0	0
2	0	0	0	0		0	0	0	0	0
0	0	0	0	0		0	0	0	0	0
0	0	0	9	0		0	0	0	0	0

(b) Perform insertion sort on the following values. **(5)**
6, 55, 11, 10, 18

(c) Convert the following infix expression into postfix expression. **(5)**
$(A+B-C*D)/H$

(d) Write the preorder traversal of the following tree. **(5)**



(e) Write a Recursive function to count number of nodes in Tree. **(5)**

UNIT-I

Q2 (a) Classify primitive and non-primitive data structures. Discuss the operations performed on data structures. **(6)**

(b) Evaluate the following postfix expression using stacks **(6.5)**
320, 10, *, 10, 60, 100, *, /

Q3 (a) Explain why circular queue is better than linear queue? **(6)**

(b) Discuss D-queues and priority queues. What are the applications of stacks and queues? **(6.5)**

UNIT-II

Q4 (a) Write a function to insert a node at the end of single linked list. **(6)**

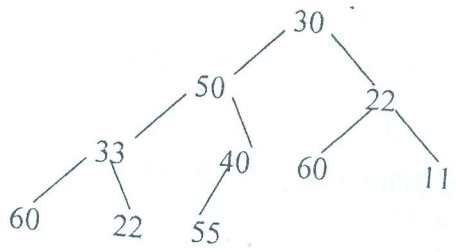
(b) Write a function to delete a node from beginning of double linked list. **(6.5)**

Q5 (a) A binary tree T has 09 nodes. The inorder and preorder traversals of T yield the following sequences of nodes. **(6)**
Inorder: D G B A H E I C F
Preorder: A B D G C E H I F
Draw the tree T

P.T.O.

BCA-108
P1/2

(b) Consider the following binary tree T with N=10 nodes. What is the inorder traversal of the tree? **(6.5)**



UNIT-III

Q6 (a) Construct B-tree of order 3 by inserting the following keys in the order shown. **(6.5)**

18 19, 6, 10, 40

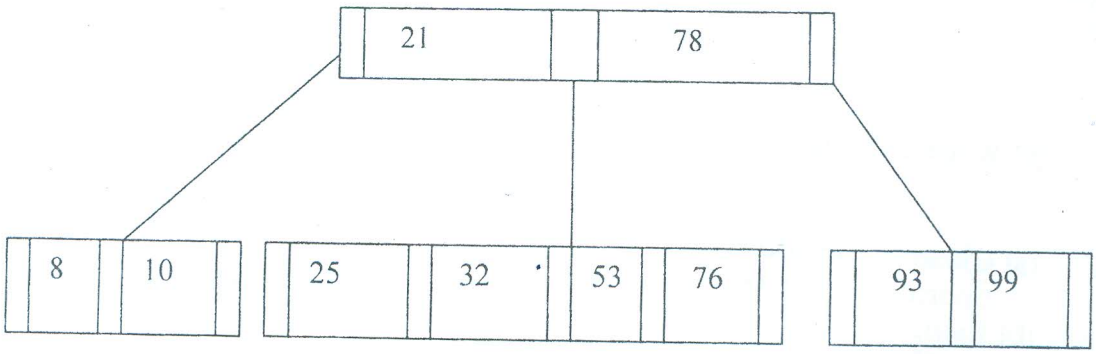
(b) Construct Binary Search Tree of the following keys in the order shown **(6)**

1, 2, 3, 15, 8, 25, 7, 9, 10, 13

Q7 (a) Construct an AVL search tree of the following values **(6)**

11, 20, 23, 5, 3

(b) Insert the following values in the order of their occurrence 30, 31 in the given B tree of order 5. **(6.5)**



UNIT-IV

Q8 (a) Define hashing. Why do we use hashing? Discuss any two hashing methods with example. **(6.5)**

(b) Which searching technique is best and under what conditions? Justify your answer with the help of an example. **(6)**

Q9 (a) Compare Selection sort and Merge sort. **(6)**

(b) Which sorting technique is better and why? Explain with an example. **(6.5)**

****

(Please write your Exam Roll No.) *Exam Roll No. .....*

END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY 2017

Paper Code: BCA-110 ***Subject: Database Management Systems***

Time: 3 Hours ***Maximum Marks: 75***

Note: Attempt any five questions including Q no.1 which is compulsory. Select one question from each unit.

Q1 Answer the following:- **(5x5=25)**

(a) What do you mean by functional dependency? Discuss with suitable example.

(b) What is lock? What are the various types of locks used for concurrency control?

(c) Describe any four main functions of a database administrator.

(d) Define the following terms giving examples for each of them: Entity, attribute, role and relationship between the entities.

(e) Differentiate between database management system and file system.

UNIT-I

Q2 (a) Write a short note on three scheme architecture. **(4.5)**

(b) Explain different types of Data Independence. **(3)**

(c) Write a short note on the following:- **(5)**

(i) Primary Kky

(ii) Candidate key

(iii) Super key

(iv) Derived attribute

(v) Multivalued attribute

Q3 (a) Explain the term Generalization and Specialization with suitable example. **(4)**

(b) Suppose you have a table for a dance studio. The attributes are dancer's identification number, dancer's name, dancer's address, dancer's telephone number, class identification number, day that the class meets, time that the class meets, instructor name, and instructor identification number. Assume that each dancer takes one class, each meets only once a week and has one instructor and each instructor can teach more than one class. Dancer (Dancer_ID, Dancer_Name, Dancer_Address, Dancer_Phone, Class_ID, Class_Day, Class_Time, Instructor_Name, Instructor_ID) Draw an entity-relationship diagram (ERD) for this database. **(8.5)**

UNIT-II

Q4 (a) Explain the SQL operators BETWEEN, AND, IN, LIKE and IS_NULL by taking suitable examples. **(5)**

(b) Discus various data types available in SQL. **(4.5)**

(c) SQL allows attributes to have a special value NULL, which is called the null value. What are three common interpretations that can be put on null values? **(3)**

Q5 (a) What is a weak entity set? What are two principles sources of weak entity sets? Give examples to explain. **(6)**

(b) What do you understand by referential integrity constraint and attribute-based check constraint? **(6.5)**

P.T.O.

UNIT-III

Q6 (a) Given the following relations: **(6)**

Vehicle (reg-no, make, colour)
Person (eno, name, address)
Owner (eno, reg-no)

Write expressions in relational algebra to answer the following queries:

(i) List the names of persons who do not own any car.
(ii) List the names of persons who own only Maruti Cars.

(b) Differentiate between Data Definition Language (DDL) and Data Manipulation Language (DML). **(3)**

(c) Write a short note on 3NF. **(3.5)**

Q7 (a) List the difference between Equijoin and Natural join. Give example of each join operation. **(6)**

(b) What are the problems caused by data redundancies? Can data redundancies be completely eliminated when a database approach is used? Explain this with the help of an example. **(6.5)**

UNIT-IV

Q8 (a) Describe Two Phase Locking protocol with suitable example. **(6)**

(b) Describe Deadlock with suitable example and also explain about recovery from the deadlock. **(6.5)**

Q9 Write short notes on the following:-

(a) Time Stamp Based Concurrency Control. **(4)**
(b) Backup and Recovery Techniques **(4)**
(c) Serializable and Non Serializable Transactions **(4.5)**

****