END TERM EXAMINATION

SECOND SEMESTER [BCA] APRIL - MAY 2019

Paper Code: BCA-102	**Subject: Mathematics-II**
Time: 3 Hours	**Maximum Marks: 75**

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

Q1 (a) Let Z be the set of integers and the relation defined over the set Z by aRb if $a^b = b^a$ where a, b ∈Z. Is the relation R an equivalence relation? **(5)**

(b) Let D_{36} denote the set of all divisors of 36 ordered by divisibility. Draw the Hasse diagram of D_{36}. **(5)**

(c) By means of truth tables, justify that the conditional statement "If p then q" is logically equivalence to the statement "Not p or q" **(5)**

(d) Let $f : R \rightarrow R$ be defined by $f(x) = 2x - 3$ and $g : R \rightarrow R$ be defined by $g(x) = (x+3)/2$ show that fog = gof **(5)**

(e) Define isomorphic and Hamilton Graphs with examples. **(5)**

UNIT-I

Q2 (a) $A = \{2,3,7,8\}$, $B = \{1,3,5\}$, $C = \{3,5,9,11\}$. Find (i) B⊕C (ii) (A-B) (iii) A x B (iv) Partition of set B. **(4)**

(b) If $A = \{1,2,3,4\}$; $B = \{1,2,3,4,5,6\}$; and $R = \{(a,b) : a \in A, b \in B \text{ and } b = a+1\}$, then: **(4)**
(i) Write R as a set of ordered pairs.
(ii) Find Domain and Range of R.
(iii) Find R^{-1}

(c) Show that the function $f : R \rightarrow R$ given by $f(x) = 3x - 4$ is a bijection. **(4.5)**

Q3 (a) Let the universal set $U = \{1,2,3,4,5,6,7\}$, $A = \{1,3,4,5\}$ and $B = \{1,2,4,6\}$. Verify De Morgan's Law. **(4)**

(b) Given $A = \{1,2,3,4,5,6\}$; Let R be a relation on A defined as $R = \{(x, y) : x + y \text{ is a divisor of } 24\}$ **(4)**
(i) Find the domain and range of R.
(ii) Compute transitive closure of R.

(c) In a group of athletic teams in a school, 21 are in Basket ball team, 26 are in Hockey Team and 29 in Football Team. If 14 play Hockey and Basket ball; 12 play Football and Basket ball; 15 play Hockey and Football and 8 play all the three games, Find: **(4.5)**
(i) How many players are there in all?
(ii) How many plays Football only?
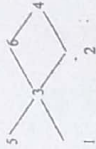(iii) How many plays Basket ball only?

UNIT-II

Q4 (a) Prove that in a Distributive Lattice if an element has a Complement then this Complement is unique. **(6)**

(b) Consider the poset $A = \{a,b,c,d,e,f,g,h\}$ whose Hasse diagram is shown. Find (i) all upper bounds (ii) all lower bounds (iii) lub (iv) glb of the following subsets $B_1 = \{a,b\}$ and $B_2 = \{d,e\}$ **(6.5)**

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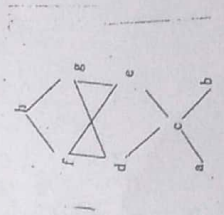
Q5 (a) Let $S = \{1,2,3,4,5,6\}$ be ordered on in the figure given below: **(6)**

Find (i) All minimal and maximal elements of S.
(ii) Greatest and least element.
(iii) All linearly ordered subset with three or more elements.

(b) Determine whether D_n is a finite Boolean algebra, where (i) $n = 12$ (ii) $n = 40$ (iii) $n = 75$ (iv) $n = 21$ (v) $n = 70$? **(5)**

UNIT-III

Q6 (a) Find the chromatic number of the graph given below using the Welch-Powell algorithms. **(6)**
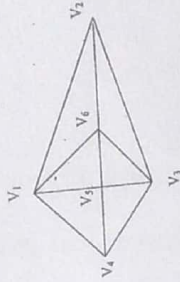
(b) Draw a 3- regular graph with 6 vertices and complete graph with 5 vertices. **(6.5)**

Q7 (a) Define (i) Bipartite graph (ii) Cut Vertices (iii) Cut Edges **(6)**

(b) Consider the following adjacent matrix $A = \begin{bmatrix} 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 1 \\ 0 & 0 & 0 & 1 & 1 \\ 1 & 1 & 1 & 0 & 1 \\ 0 & 1 & 1 & 1 & 0 \end{bmatrix}$.

Draw the undirected graph corresponding to the matrix A and also find the degree of all vertex. **(6.5)**

UNIT-IV

Q8 (a) Consider the following:-
p: Today is Monday
q: it is hot
r: it is not raining
Write in simple sentence the meaning of the following.
(i) $\sim p \rightarrow (r \wedge q)$
(ii) $(p \vee r) \leftrightarrow q$ **(6)**

(b) Prove that $p \vee (q \wedge r) = (p \vee q) \vee \sim r$. **(6.5)**

Q9 (a) By means of truth table, prove that $\sim (p \leftrightarrow q) = \sim p \leftrightarrow q \equiv p \leftrightarrow q$. **(6)**

(b) Verify whether it is tautology or not $(p \wedge (q \rightarrow p)) \rightarrow p$. **(6.5)**

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END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY 2019

Paper Code: BCA 104	Subject: *Principles of Management*
Time : 3 Hours	Maximum Marks :75

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

Q1.　Write short notes on **any five** of the following:　　　(5x5=25)
　a)　Types of planning
　b)　Management Vs Administration
　c)　Leadership Styles
　d)　Departmentation
　e)　Leader Vs. Manager
　f)　Authority & Responsibility
　g)　Managerial Levels
　h)　Process of Controlling

Unit-I

Q2.　Briefly discuss the Scientific and Administrative school of thought of management.　　　(12.5)

OR

Q3.　Define management and outline is essential characteristics. Also state Mintzberg's classification of managerial roles.　　　(12.5)

Unit-II

Q4.　Define planning. Discuss the planning process. What is the necessity of planning in modern organizations?　　　(12.5)

OR

Q5.　Explain the process of decision making. Also discuss the concept of Bounded Rationality Model of Decision Making.　　　(12.5)

Unit-III

Q6.　Briefly explain and discuss the Maslow's and Herzberg's theory of motivation.　　　(12.5)

OR

Q7.　Define staffing? Discuss its nature and importance for success of organizations.　　　(12.5)

Unit-IV

Q8.　Examine the four conceptual models of organization behaviour.　　(12.5)

OR

Q9.　What is Personality? Describe the Big five model of personality.　　(12.5)

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SECOND SEMESTER [BCA] MAY-JUNE 2019

Paper Code: BCA-106	Subject: Digital Electronics
Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions including Q.no.1 which is compulsory.
Select one questions from each unit. Assume missing data if any.

Q1   Attempt **any five** questions:
    (a) Explain Parity Generation and checking process with example.   **(4)**
    (b) Explain Excess-3, BCD and gray codes. Convert binary 1101 to equivalent gray code and also convert Gray code 0111 to equivalent Binary code.   **(4)**
    (c) Perform the following conversions: **(3)**
       (i) $(A3.1E)_{16} = (\quad)_{10}$
       (ii) $(532.03)_{8} = (\quad)_{16}$
    (d) Define fan-in, fan-out, propagation delay, noise margin and voltage parameters.   **(3)**
    (e) What is a D flip flop? Show how SR flip flop can be converted to D flip flop?   **(3)**
    (f) Explain the working of Serial in Serial Out shift right register.   **(4)**
    (g) What is binary multiplier? Discuss the multiplier using shift method. **(4)**

Unit-I

Q2   (a) Design the circuit of the Boolean Equation: **(4.5)**
       $Y = (\overline{A}+\overline{B})(A+\overline{C}+\overline{D})(A+\overline{B}+C)B$ using only NOR GATES.
    (b) Why NAND & NOR Gates are called Universal Gates? How an AND Gate can be implemented using only NOR Gates?   **(4)**
    (c) Implement Ex-OR using NAND gates only.   **(4)**

Q3   (a) Simplify the following Boolean Equation using Boolean Algebra Laws: **(4)**
       $Y = \overline{AC(ABD)} + \overline{AB}\overline{CD} + \overline{AB}\overline{C}$
    (b) Simplify the expression $F = \Sigma_m(0,2,3,6,7) + \Sigma_d(8,10,11,15)$ using the K-Map method.   **(4)**
    (c) Express the function $Y = A + BC$ in both: **(4.5)**
       (i) Canonical SOP form
       (ii) Canonical POS form

Unit-II

Q4   (a) Design a Full Adder Circuit using two Half Adders.   **(4)**
    (b) Design a 1:8 DMUX Circuit. How a 16:1 MUX can be designed using two 8:1 MUX and one OR Gate?   **(4)**
    (c) What is an encoder? Discuss the design of 8:3 (octal to binary) encoder.   **(4.5)**

Q5   (a) What are Multiplexers & DeMultiplexers? Implement the following function using Multiplexer.   **(6.5)**
       $F(A,B,C,D) = \Sigma_m(0,1,2,3,4,6,8,9,13,14)$
    (b) Design a 4-bit Parallel Adder/Subtractor with controlled inverter and explain its working.   **(6)**

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Unit-III

Q6 (a) Differentiate between Combinational and Sequential circuit. Design a S-R latch using 2 input NOR gates. (6)
    (b) What is Race-Around Condition and how it can be eliminated in Master-Slave JK Flip Flop? (6.5)

Q7 (a) What are Shift Registers? The content of a 4-bit shift register is initially 1101. The register is shifted 4 times to the right with the serial input being 101101. What will be the final content of the register after all the 4 shifts are over? (6)
    (b) Explain in detail the construction and working of Universal/Bi-Directional shift register. (6.5)

Unit-IV

Q8 (a) What is MOD 6 counter? Draw its state diagram and circuit. (6)
    (b) Draw and Explain the working of ripple counter. (6.5)

Q9 (a) Differentiate between RAM and ROM. (4)
    (b) Explain Johnson counter with truth table and clock pulses. (4)
    (c) Draw and explain Asynchronous 3 bit up/down counter. (4.5)

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END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY-JUNE 2019

Paper Code: BCA-108	Subject: Data Structures Using C
Time: 3 Hours	Maximum Marks: 75

Note: Attempt any five questions including Q.no.1 which is compulsory.

Q1 Attempt following in brief **(Any Five)**:   **(5x5=25)**
    (a) Explain array implementation of Priority queues and list implementation of Priority queues.
    (b) Describe Multi way search trees and its operations in detail.
    (c) Illustrate the linked list representation of list.
    (d) Explain the algorithms for Garbage collection.
    (e) Write a program to insert an element in sorted array at its deserving position and explain.
    (f) Explain Sparse Matrices and their types with the help of suitable example.
    (g) Write a program to implement linear link list, showing all the operations that can be performed on a linked list.

Q2 (a) The in-order and pre-order traversal of a tree are given below. Construct corresponding binary tree. Write its equivalent post order traversal.   **(6)**

    Inorder : DBMINEAFCJGK

    Preorder : ABDEIMNCFGJK

    (b) Create a stack of integer using a program. Make provision for checking overflow and underflow conditions.   **(6.5)**

Q3 (a) Write an algorithm which convert infix expression into postfix expression.   **(6)**

    (b) Convert following infix expression into equivalent post fix expression   **(6.5)**
      A+B*C-D/E

Q4 (a) Insert following values in BST and show the resultant tree   **(6)**

    12, 3, 4, 5, 11, 20, 54

    (b) Traverse the binary search tree made in section (a) in pre-order, in-order and post-order.   **(6.5)**

Q5 (a) Write a neat algorithm for Merge Sort and explain.   **(6)**
    (b) Perform the Merge Sort on following data: **(6.5)**
      12, 34, 43, 2, 1, 5, 6, 32, 90, 18

Q6 (a) How two dimensional errors are internally stored? What is column major and row major matrixes?   **(6)**
    (b) Write a neat algorithm for selection short and perform it on the following data: **(6.5)**
      12, 23, 3, 4, 5, 65, 76, 6, 54, 43, 32, 2

Q7 (a) Differentiate between left skew and right skew binary search tree.   **(6)**
    (b) What are the disadvantages of binary search tree? How AVL tree can compensate for these disadvantages? Explain using suitable example.   **(6.5)**

Q8 (a) Explain B+tree. How multi-level indexing can be achieved using B+ tree? Explain any one application of B+tree.   **(6)**
    (b) Create the B+ tree for the following insertions when the order is 3.   **(6.5)**
      12,24,35,46,68,77,82,19,11,90,13,87,65,54,23,88,33,99,22

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END TERM EXAMINATION

SECOND SEMESTER [BCA] MAY 2019

Paper Code: BCA-110	Subject: Database Management System
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 **(any five)**:-   **(5x5=25)**
   (a) Explain advantage of database management system over file processing system.
   (b) Explain sub class, super class, Specialization and Generalization with example and appropriate diagram.
   (c) Explain DDL, DML. Give three sql commands each for DDL and DML.
   (d) What do you mean by relationship cardinality? Explain its type with suitable example
   (e) What do you mean by data constrain? Define Domain Constraint, Entity integrity constraint, Referential integrity constraint.
   (f) Explain ACID properties of Transaction in DBMS.
   (g) Draw an ER diagram for library management system. Make assumptions as required.

UNIT-I

Q2 (a) Explain different types of attributes with example-composite, derived, multi-valued.   **(6)**
   (b) Discuss three tier architecture of database management system with diagram.   **(6.5)**

Q3 (a) Explain different types of keys with example. Differentiate between super key, candidate key, primary key and foreign key.   **(6)**
   (b) Explain physical and logical data independence with diagram.   **(6.5)**

UNIT-II

Q4 (a) Consider the following relations   **(10)**
       Customer {CustId, CusName, Address, State}
       Parts {Partnum, Description, Price}
       Order {OrderNo, Name, Partnum, Qty, CustId}
       Write Relational Algebra query for each of the following
       • Find all customers who have placed order for part description "Tyres".
       • Find customer name, address of customers who have purchased partnum 10 and quantity ordered is more than 100.
       • Find customer name, address of those customer residing in State="Delhi".
       • Find all order no, name, partnum of all orders placed by customer id=101.
       • Find all customer name who have placed order for product with price more than 500.
   (b) Explain views in DBMS with example.   **(2.5)**

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Q5　(a) Construct ER diagram for Company Management System. Assuming Company Works on different projects, for each project working hours is maintained for each employee and company has many departments located at different places. Explain each relationship in terms of cardinality, participation and describe each entity with its attributes. **(10)**

(b) Explain indexes in DBMS and its advantage. **(2.5)**

UNIT-III

Q6　Consider the following relations **(12.5)**

Stu{SID integer PK, Sname varchar, course varchar, sem integer}

Stu_Project{SID integer FK, PID integer, progress integer, PK(SID,PID)}

where PK-Primary Key, FK-Foreign Key

Write SQL query for each of the following.

- Create both table with constraints
- Add new column ProjectName varchar2(20) in Stu_Project.
- Find all student name who have made progress more than 40% in their project.
- Delete record form Stu_project where progress in less than 10%.
- Increase the progress by 10% for each student of BCA course.
- Create view SV having Sname, course, PID, progress.

Q7　(a) Explain functional dependency by taking the example of Stu_Project mentioned in Q6. **(6)**

(b) Explain 1st, 2nd and 3rd Normal form with example. **(6.5)**

UNIT-IV

Q8　(a) Define concurrency. Explain the problem of lost update, dirty read and incorrect summary with example. **(6)**

(b) Explain Discretionary Access Control [Grant/Revoke] method for database security. **(6.5)**

Q9　(a) Explain 2 Phase Locking Scheme for data recovery. How two phase locking helps in maintaining integrity of the database? **(6)**

(b) Explain Different types of security issues and threats to database system. **(6.5)**

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