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BCACAC 208

**Credit Based Third Semester B.C.A. Degree Examination,
October/November 2017
(Common to All Batches)
BASIC MATHEMATICS**

Time : 3 Hours

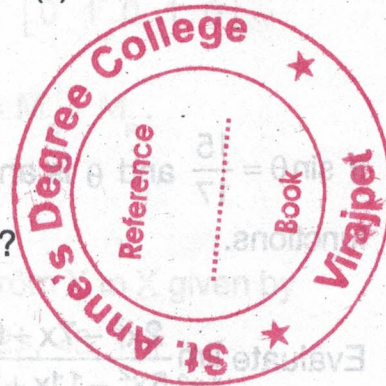
Max. Marks : 80

Note : Answer any ten questions from Part – A and one full question from each Unit of Part – B.

PART – A

(10×2=20)

1. a) $x = \log_7 27$, $y = \log_5 7$, $z = \log_3 5$ prove that $x.y.z = 3$.
- b) Find the coordinates of the centroid whose vertices are (2, 3) (–5, 2) and (1, 7).
Find the distance between (5, 5) (–3, 3).
- c) Find the centre and radius of the circle whose equation is
 $x^2 + y^2 - 2x - 6y + 7 = 0$.
- d) Represent the following angles in radians (i) 60° (ii) 40° .
- e) If $y = 2x + x^2$ what is $\frac{dy}{dx}$?
- f) Integrate $(x^2 - 1)^2$.
- g) $A = \{1, 2, 6, 7\}$, $B = \{2, 3, 4, 6, 7\}$ what is $A + B$?
- h) Represent $A \cup B$ and $\sim A$ using Venn diagram.
- i) $A = \{1, 2, 3\}$, $B = \{a, b\}$ write $A \times B$ and $B \times A$.
- j) Define null graph with an example.
- k) Define binary tree with example.
- l) Define multi-graph with example.



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PART - B

Unit - I

2. a) Prove that $\frac{\log \sqrt{27} + \log \sqrt{8} - \log \sqrt{125}}{\log 6 - \log 5} = \frac{3}{2}$.

b) Find the middle term in the expansion of $\left(x - \frac{1}{x}\right)^{18}$.

c) Prove that the points (4, 1) (7, 4) and (13, -2) form a right angled triangle. (5+5+5)

3. a) Show that $\log \frac{81}{8} - 2 \log \frac{3}{2} + 3 \log \frac{2}{3} + 3 \log \frac{3}{4} = 0$.

b) Find the coordinates of a point which divides the line joining two points P(8, 9) and Q(-7, 4) internally in the ratio 2 : 3 and externally in the ratio 4 : 3.

c) Find the equation of straight line passing through the point (-1, -5) and
(i) parallel (ii) perpendicular to the line $2x + 3y - 5 = 0$. (5+5+5)

Unit - II

4. a) If $\sin \theta = \frac{15}{17}$ and θ is an acute angle find the values of other trigonometric functions.

b) Evaluate $\lim_{x \rightarrow 2} \frac{2x^2 - 7x + 6}{5x^2 - 11x + 2}$.

c) Differentiate $9x^4 - 7x^3 + 8x^2 - \frac{8}{x} + \frac{10}{x^3}$ with respect to x. (5+5+5)



5. a) Express both in degrees and radians the angles of a triangle whose angles are to each other as 2 : 3 : 5.
- b) Determine x if $x \sin 30 \cdot \cos^2 45 = \frac{\cot^2 30 \sec 60 \cdot \tan 45}{\operatorname{cosec}^2 45 \operatorname{cosec} 30}$.
- c) Evaluate (i) $\int (4x^3 + 3x^2 - 2x + 5) dx$ (ii) $\int_6^{10} \left(\frac{dx}{(x+2)} \right)$. (5+5)

Unit - III

6. a) $A = \{3, 4, 5, 17\}$, $B = \{1, 2, 3\}$, $C = \{x | X \text{ is an integer and } 0 \leq x \leq 5\}$ write $A \cup B$, $A \cup C$, $B - C$, $A - C$, $A \cup (B \cap C)$.
- b) $R = \{<1, 2> <3, 4> <2, 2>\}$, $S = \{<4, 2> <2, 5> <3, 1> <1, 3>\}$ write $R \circ S$, $R \circ R$, $S \circ S$, $S \circ R$ and $R \circ (S \circ R)$.
- c) Define surjective, injective and bijective functions with example. (5+4)

7. a) Given the relation matrices $M_R = \begin{bmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$ $M_S = \begin{bmatrix} 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{bmatrix}$

Find $M_{R \circ S}$, $M_{\bar{R}}$, $M_{\bar{S}}$, $M_{\bar{R \circ S}}$ and show that $M_{\bar{R \circ S}} = M_{\bar{S}} \circ M_{\bar{R}}$.

- b) Prove that R is an equivalence relation.
- c) Let $X = \{1, 2, 3\}$ f, g, h and s are the functions from X to X given by
 $f = \{<1, 2> <2, 3> <3, 1>\}$ $h = \{<1, 1> <2, 2> <3, 1>\}$
 $g = \{<1, 2> <2, 1> <3, 3>\}$ $s = \{<1, 1> <2, 2> <3, 3>\}$
 Find $f \circ g$, $g \circ f$, $s \circ s$, $f \circ h \circ g$, $s \circ g$ and $f \circ s$. (5+)



Unit – IV

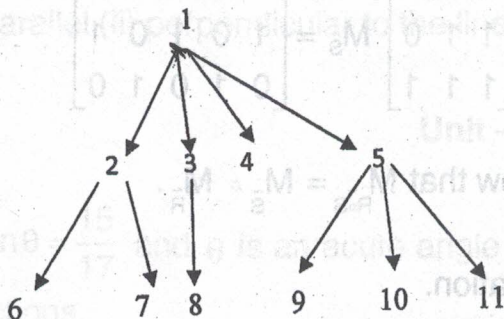
8. a) What are strongly connected, weakly connected and unilaterally connected graphs? Explain with suitable examples.
- b) Define following terms with an example :
- isomorphic graphs
 - simple path.

- c) $A = \{1, 2, 3, 4\}$ and R be a relation on A that has the matrix $M_R =$

$$M_R = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 \end{bmatrix}$$

construct relational graph of R and write in-degree and out-degrees of all the nodes. (6+4+5)

9. a) Define (i) simple graph (ii) parallel edges (iii) cyclic graph, with example.
- b) Define (i) isolated vertex (ii) undirected graph with example.
- c) Convert the following trees into a binary tree :



(6+4+5)

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BCACAC 209

**Credit Based Third Semester B.C.A. Degree Examination,
October/November 2017
(Common to all Batches)
MICROPROCESSORS**

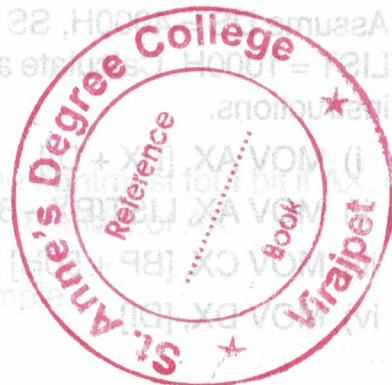
Time : 3 Hours

Max. Marks : 80

Note : Answer any ten questions from Part – A and one full question from each Unit in Part – B.

PART – A

1. a) Represent 358 in packed and unpacked BCD form. **(10x2=20)**
- b) If CS = 3456H and IP = ABCDH; find the physical address of the next instruction to be executed.
- c) In the real mode, show the starting and ending addresses of segment with segment register value is AB00H.
- d) Which registers remove from stack with POPA instruction ?
- e) Choose an instruction that requires BYTE PTR and WORD PTR.
- f) Identify the Addressing mode of the following.
 - i) MOV AX, [BX + 10H]
 - ii) MOV AX, [BX + SI + 20H].
- g) What is the Value of AX and Carry flag after the execution of following instructions ?
MOV AX, 1234H
MOV CL, 04H
ROR AX, CL



P.T.O.

- h) Write the function of CBW and CWD instructions.
- i) List the instructions used to control Interrupt flag.
- j) Write the length of SHORT, NEAR and FAR jump instructions.
- k) Write the start and end address of Interrupt Vector in real mode.
- l) What is a Microcontroller ? List any two applications of Microcontroller.

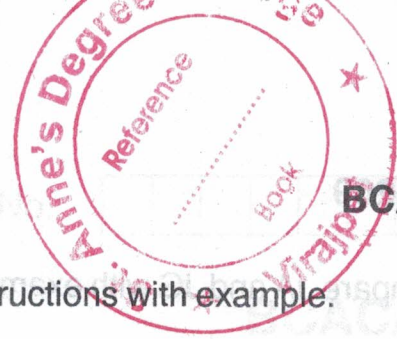
PART – B

Unit – I

2. a) Explain the Multipurpose register of 8086. (4+5+3)
- b) Explain the flag register of 8086 with neat diagram. Also write the status of conditional flag after subtracting ABCDH from 5678H.
- c) What are the salient features of 8086 processor ?
- d) If the physical branch address is 5A230H when (CS) = 5200H, what will it be if (CS) is changed to 7800H ?
3. a) Explain the following assembler directives. (4+4+4)
 - i) EXTRN.
 - ii) ASSUME.
- b) Explain Real Mode Memory addressing.
- c) With a suitable diagram explain the bus architecture of microprocessor based computer system.
- d) Write a note on TPA.

Unit – II

4. a) Assume DS = 4000H, SS = 9000H, BX = A000H, DI = 8000H, BP = 6000H, LIST = 1000H. Calculate address accessed by each of the following instructions. (5+4+3+)
 - i) MOV AX, [BX + DI]
 - ii) MOV AX, LIST[BX – 80H]
 - iii) MOV CX, [BP + 50H]
 - iv) MOV DX, [DI].



- b) Explain various forms of IN and OUT instructions with example.
 - c) Explain LEA and LDS instructions with examples to each.
 - d) Show which JMP instruction assembles (short, near, or far) if the JMP THERE instruction is stored at memory address 10000 H and the address of THERE is:
 - i) 10020H
 - ii) 11000H
 - iii) 0FFFEH
 - iv) 30000H.
5. a) Explain following data addressing mode with example. **(4+4+5+2)**
- i) Register relative.
 - ii) Base plus Index.
- b) Explain the following string instructions with example.
- i) CMPSW
 - ii) OUTS.
- c) Explain Stack Memory Addressing mode.
- d) Write a note on segment override prefix.

Unit – III

6. a) Explain BCD arithmetic instructions with suitable examples. **(4+4+4+3)**
- b) Explain MUL and DIV instructions with example.
- c) Suppose BX and DX contain 4 digit BCD numbers 3099H and 1234H respectively. Write the sequence of instructions to add BX and DX and store the result in CX.
- d) Explain following instructions with example.
- i) XLAT
 - ii) CMP.
7. a) Write the sequence of instructions that set the rightmost four bit if AX, clears the leftmost three bits of AX and inverts bit 7, 8 and 9 of AX. **(3+4+2+6)**
- b) Explain various SHIFT instructions with example.



- c) Compare JA and JG with example.
- d) Differentiate following :
- AND and TEST
 - NOT and NEG
 - MOV and XCHG.

Unit – IV

8. a) Explain following instructions. **(4+4+5+2)**
- BOUND
 - HLT
 - ENTER.
- b) Explain Near and Far call instructions with examples.
- c) Explain LOOP, LOOPE, and LOOPNE instructions with examples.
- d) Draw the block diagram of microcontroller.
9. a) Compare RET and IRET instructions. **(2+4+4+5)**
- b) What is an Interrupt ? Explain the following interrupts INT 03H, INTO.
- c) Explain parameter passing using stack with the program to add two 16 bit number using stack.
- d) With example explain call with register as operand and a call with indirect memory addressing.

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BCACAC 210

Credit Based Third Semester B.C.A. Degree Examination, Oct./Nov. 2017
(Common to all Batches)
DATA STRUCTURES

Time : 3 Hours

Max. Marks : 80

Note : Answer any ten questions from Part – A and one full question from each unit of Part – B.

PART – A

1. a) Define linear data structure and non linear data structure. **(10×2=20)**
- b) What is sparse matrix ? Give example.
- c) Write the value of $[-7.2]$ and $[7.5]$.
- d) What do you mean by traversing a linear array ?
- e) Give two advantages of linked list over an array.
- f) What is doubly linked list ? Draw the diagram of doubly linked list.
- g) What is stack ? Write any two applications of stack.
- h) Define dequeue and what are its types.
- i) Differentiate queue and circular queue.
- j) What is a binary tree ? Give an example.
- k) Define path matrix.
- l) Represent $(A+B)/((D/(E*F)))$ using binary tree.

PART – B

Unit – I

2. a) Briefly explain any five data structure operations.
- b) Write an algorithm to find a number using binary search.
- c) Explain with an example how to represent polynomial using an array. **(5+5+5)**



P.T.O.

3. a) Explain the algorithmic notations for looping structure.
b) Write and explain algorithm to search an element using linear search.
c) Write a note on strings as ADT. (5+5+5)

Unit – II

4. a) Write an algorithm to insert a node at the beginning of a linked list.
b) Explain with an example to sort the number using selection sort method.
c) Explain with a figure to delete a node from doubly linked list. (5+5+5)
5. a) Sort the following numbers using insertion sort method
70, 11, 33, 77, 88, 22, 90, 66
b) Write an algorithm to search for a given element in a singly linked list.
c) What is linked list ? Explain different types of linked list with a neat diagram. (5+5+5)

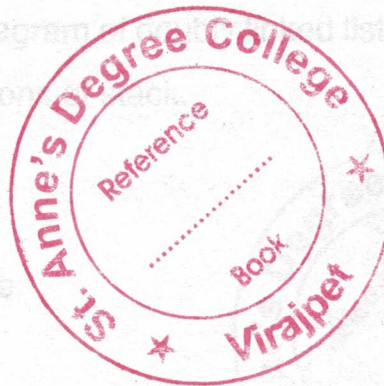
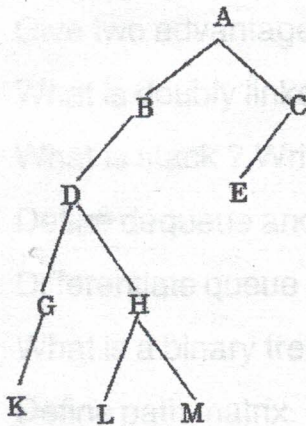
Unit – III

6. a) Write an algorithm to convert infix expression to postfix.
b) Write an algorithm to perform PUSH and POP operation on stack using linked list.
c) Write a note on
i) circular queue
ii) priority queue. (6+5+4)
7. a) Write an algorithm to perform insert and delete operations on queue using arrays.
b) Evaluate the following postfix expression.
i) 50, 40, +, 18, 14, -, 2, ↑, +
ii) 3, 1, +, 2, ↑, 7, 4, -, 2, *, +, 5, -.
c) Write an algorithm to find the factorial of a number using recursion. (6+5+4)



Unit – IV

8. a) Explain the following terms with respect to binary tree with example :
- i) Degree of node
 - ii) path
 - iii) siblings
 - iv) leaf node.
- b) Draw a binary search tree for the following list of numbers and traverse it in preorder, postorder and inorder : 40, 60, 50, 33, 55, 11, 22, 77, 99.
- c) Define graph. Explain linked representation of graph with example. **(5+5+5)**
9. a) Write a depth first search traversal algorithm for a graph.
- b) Write an algorithm to search a node in binary search tree.
- c) Consider the following binary tree and traverse preorder traversal algorithm showing the contents of the stack.



(5+5+5)

- a) Briefly explain any five data structure operations.
- b) Write an algorithm to find a number using binary search.
- c) Explain with an example how to represent polynomial using an array. **(5+5+5)**

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BCACAC 211

Credit Based Third Semester B.C.A. Degree Examination, Oct./Nov. 2017

(Common to all Batches)

OPERATING SYSTEM

Time : 3 Hours

Max. Marks : 80

Note : Answer any ten questions from Part – A and one full question from each Unit of Part – B.

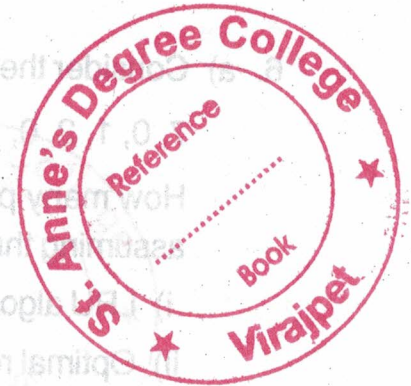
PART – A

1. a) Distinguish between program and process. (10×2=20)
- b) Define PCB. Mention the components of PCB.
- c) Define the terms throughput and response time.
- d) What is a critical section ? Name the requirements for solution to the critical section problem.
- e) What are semaphores ?
- f) Define deadlock.
- g) Differentiate logical address over physical address.
- h) Name the different attributes of a file.
- i) What is swapping ?
- j) Write the use and syntax to add and delete a user in Linux.
- k) List relational operators of Linux.
- l) Differentiate the wild card characters used in Linux.

PART – B

Unit – I

2. a) Explain the service provided by operating system.
- b) Explain process State Transition with a neat diagram.
- c) Discuss FCFS and SJF CPU scheduling policies with example and also compare the same. (6+4+5)



P.T.O.



3. a) Explain any three system components of operating system.
b) Explain the following :
i) Multiprogramming System.
ii) Time Sharing System.
c) Explain the concept of process scheduling using queuing diagram. (5+6+4)

Unit – II

4. a) What is readers-writers problem ? Explain.
b) Explain the necessary conditions for a deadlock to occur.
c) Explain the resource allocation algorithm in Banker's algorithm. (5+4+6)
5. a) Write a note on resource allocation graph.
b) Explain deadlock prevention method.
c) Explain dining philosophers problem. (6+4+5)

Unit – III

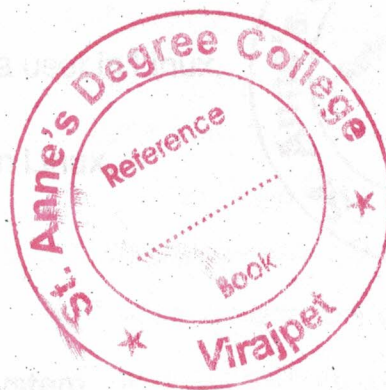
6. a) Consider the following page reference string :
7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1
How many page faults would occur for the following replacement algorithm assuming three frames ?
i) LRU algorithm.
ii) Optimal replacement algorithm.
b) Write a short note on fragmentation.
c) Explain two level directory structure of a directory. (6+4+5)
7. a) Explain FIFO page replacement algorithm with example.
b) With a neat diagram explain paging.
c) Explain any five operations on file. (5+5+5)



Unit – IV

- 8. a) Explain different IF statement in Linux with syntax and example.
- b) Explain any four file oriented commands in Linux.
- c) What are different types of file permissions ? Explain how they can be changed using the chmod command.
- d) Give the syntax and explain while loop with an example. (3+4+5+3)

- 9. a) Give the syntax and explain the case statement with an example.
- b) Explain the features of UNIX operating system.
- c) Explain following commands.
 - i) Sort
 - ii) Wc
 - iii) Date
- d) List and explain any four directory oriented commands with syntax and example. (4+4+3+4)



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BCACAC 212

**Credit Based Third Semester B.C.A. Degree
Examination, October/November 2017
(Common to all Batches)
DATA MINING**

Time : 3 Hours

Max. Marks : 80

Note : Answer **any ten** questions from Part – A and **one full** question from **each** Unit in Part – B.

PART – A

(10×2=20)

1. a) Define data mining.
- b) What is dimension modeling ?
- c) Define slicing and dicing operations of OLAP.
- d) List different types of frequent episodes.
- e) List the structures used in Dynamic Itemset Counting Algorithm.
- f) Define FP-tree.
- g) Define clustering.
- h) What is splitting criterion ?
- i) Define index node and reference node.
- j) What is page rank ?
- k) Define temporal data mining.
- l) What is spatial data mining ?

PART – B

Unit – I

2. a) Explain any five application areas of data mining.
- b) Explain fact constellation schema with a diagram.
- c) Explain the different stages of KDD.

(5+5+5)

P.T.O.



3. a) With a diagram, explain the data warehouse architecture.
 b) Explain various issues and challenges of data mining.
 c) With a neat diagram, explain snowflake schema.

(5+5+5)

Unit – II

4. a) Explain Apriori algorithm.
 b) Differentiate agglomerative and divisive clustering.
 c) Write a note on DBSCAN.

(6+5+4)

5. a) Explain partition algorithm.
 b) Compare categorical and numerical clustering.
 c) Write a note on PAM.

(6+4+5)

Unit – III

6. a) Explain decision trees with suitable example.
 b) Describe the learning technique in Multi Layer Perceptron.
 c) Explain support vector machine.
 7. a) Explain how RBF networks are trained.
 b) Write a note on Rough Set Theory.
 c) Explain the genetic algorithm.

(5+5+5)

(5+5+5)

Unit – IV

8. a) What are the features of unstructured text ? Explain.
 b) Explain the different types of temporal data mining tasks.
 c) Write a note on web structure mining.
 9. a) Write a note on GSP algorithm.
 b) Write a note on web usage mining.
 c) Explain episode discovery.

(6+5+4)

(5+5+5)