Reg. No. | | | | | | | | | |

BCACAC 211

Credit Based Third Semester B.C.A. Degree Examination, Nov./Dec. 2018
(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) What is a process ? How it is different from a program ? **(10×2=20)**
   b) List any four services of O.S.
   c) What is PCB ? List the components of PCB.
   d) What is starvation ?
   e) What is thrashing ?
   f) What is race condition ?
   g) What is a wait for graph ?
   h) Define virtual memory.
   i) Differentiate between logical and physical address.
   j) List out any four file types with extensions.
   k) What is the purpose of cat command in Linux ?
   l) Give the syntax to add and delete a user in Linux.

PART – B

Unit – I

2. a) Explain process state transition with a neat diagram.
   b) Explain any three system components of operating system.

P.T.O.

c) Consider the following set of processes, their arrival time and CPU burst time given in milliseconds.

Process	Arrival time	Burst time
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

Draw Gantt chart and find average waiting time using preemptive SJF scheduling. **(4+6+5)**

3. a) Explain the concept of process scheduling using queuing diagram.

   b) Write a short note on :

      i) Batch process system

      ii) Multiprogramming system.

   c) Explain priority scheduling algorithm with an example. **(4+6+5)**

Unit – II

4. a) What is a semaphore ? Explain wait and signal operations with pseudo code.

   b) What is dead lock ? Explain how can we recover from deadlocks situation.

   c) Explain resource allocation graph with an example. **(5+5+5)**

5. a) What is critical section problem ? What are the requirements for solutions to critical section problem ?

   b) What is dining philosophers problem ? Explain.

   c) List and explain necessary conditions for deadlock to occur. **(5+5+5)**

Unit – III

6. a) Explain FIFO page replacement algorithm with an example.

   b) What is paging ? Explain with an example.

   c) What is fragmentation ? Explain. **(6+5+4)**

7. a) Write a note on :
   i) Direct file access
   ii) Sequential file access.
   b) Explain any five operations on files.
   c) Explain the concept of swapping with neat diagram. (6+5+4)

Unit – IV

8. a) Explain the features of Unix operating system.
   b) Explain any two iterative statements in Linux with syntax and example.
   c) Explain any five file oriented commands in Linux. (5+5+5)
9. a) Explain the Linux file system with a neat diagram.
   b) Explain the case statement with syntax and example.
   c) Explain any five process oriented commands available in Linux. (5+5+5)

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BCACAC 210

Credit Based Third Semester B.C.A. Degree Examination, Nov./Dec. 2018
(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 non-linear data structure. Give example. **(10×2=20)**
   b) Write the value of $\lceil 1.25 \rceil$, $\lfloor 15.7 \rfloor$, INT (–8.9), |11.11|.
   c) List any four data structure operations.
   d) List the advantages of linked lists over arrays.
   e) What is sorting ? Why is it necessary ?
   f) What is stack ? Write any two applications of stacks.
   g) What is a queue ? Why queue is called FIFO list ?
   h) What is recursion ?
   i) Write prefix and postfix equivalents of (a + b) * (c – d).
   j) Define adjacency matrix.
   k) What is binary search tree ? Give example.
   l) Define graph and multigraph.

PART – B

Unit – I

2. a) Explain algorithmic notations for selection control structure.
   b) Trace Bubble sort for the following data
   65, 25, 9, 75, 20, 12, 40, 32, 51
   c) Explain the concept of binary search technique with example. **(5+5+5)**

3. a) List and explain algorithmic notations for iteration logic.
   b) Write an algorithm to search for a number using linear search.
   c) Explain row-major and column major representation of two dimensional arrays with example. **(3+6+6)**

P.T.O.

Unit – II

4. a) Write algorithm to insert a node into a doubly linked list. Also draw the diagram to represent the same.

   b) Sort the following numbers using Insertion sort

   40, 11, 33, 77, 88, 22, 90, 66

   c) What are circular linked lists ? Explain with a figure to delete a node at the end of the same. **(5+5+5)**

5. a) Write an algorithm to insert a node after a given node in a singly linked list.

   b) Write an algorithm to merge two sorted arrays.

   c) Explain shell sort with example. **(5+5+5)**

Unit – III

6. a) Write algorithm to perform PUSH and POP operations on stacks using arrays.

   b) Evaluate the following postfix expression
   50, 40, +, 18, 14, –, 2, ^, +

   c) Write a note on De-queue and priority queues. **(4+7+4)**

7. a) Write algorithm to perform queue operations using array.

   b) Convert ((A + B) * D) ^ (E – F) to postfix using stack.

   c) Write recursive algorithm to find fibonacci series. **(5+6+4)**

Unit – IV

8. a) Draw binary tree for the following list of numbers and traverse the same using in order, pre order and post order 40, 60, 50, 33, 35, 56, 78, 90, 55, 11.

   b) Explain linked representation of graph with example.

   c) Define the following tree terminology :

   i) Siblings
   ii) Path
   iii) Node
   iv) Degree of node. **(7+4+4)**

9. a) Construct tree for the given infix expression :
   [a + (b – c)]* [(d - e)/(f + g – h)] traverse it in In order, post order and pre order.

   b) Explain the linked list representation of a binary tree with example.

   c) Write algorithm for breadth first search traversal for a graph. **(6+4+5)**

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BCACAC 208

Credit Based Third Semester B.C.A. Degree Examination, Nov./Dec. 2018
BASIC MATHEMATICS
(Common to All Batches)

Time : 3 Hours Max. Marks : 80

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

PART – A **(10×2=20)**

1. a) Prove that $\log\frac{x}{y}+\log\frac{y}{z}+\log\frac{z}{x}=0$.

   b) Find the value of x if

   i) $\log_5 x = 3$ ii) $\log_a x = 0$.

   c) Find the centre and radius of the circle whose equation is $x^2 + y^2 - 4x + 8y - 5 = 0$.

   d) Find the limit of $\frac{4x^4+3x^2-1}{x^3+7}$ when x = 1 and x = –1.

   e) If $y = 2x + x^2$, what is $\frac{dy}{dx}$?

   f) Integrate : $3 - 2x - x^4$.

   g) A = {2, 4, 6, 7, 9} B = {1, 2, 4, 7, 8} find A + B.

   h) Represent A ∩ B and ~A using Venn diagram.

   i) Define reflexive relation. Give example.

   j) Define digraph. Give an example.

   k) Define root and leaf nodes of a tree. Give an example.

   l) Define a loop. Give an example.

P.T.O.

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 $\left(x-\frac{1}{2y}\right)^7$.

   c) Find the equation of tangent and normal to the circle $x^2+y^2-6x+8y+17=0$ at $(1,-2)$. **(5+5+5)**

3. a) Evaluate $\log\frac{41}{35}+\log 70-\log\frac{41}{2}+2\log 5$.

   b) Find the coordinates of the point which divides internally and externally the line joining $(2,-4)$ and $(7,1)$ in the ratio $2:3$.

   c) Show that $(4,-5)$ $(8,1)$ $(14,-3)$ and $(10,-9)$ is a square. **(5+5+5)**

Unit – II

4. a) If $\sec\theta=\frac{13}{5}$ and θ is in the 4^{th} quadrant, find the value of $\frac{13\sin\theta+5\sec\theta}{5\tan\theta+6\operatorname{cosec}\theta}$.

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

   c) Prove that $4(\sin^4 30^\circ+\cos^4 60^\circ)-3(\cos^2 45^\circ-\sin^2 90^\circ)-2=0$. **(5+5+5)**

5. a) Prove that $\frac{(\sin 30^\circ+\cos 60^\circ)(\sin 0^\circ+\cot 45^\circ)(\cot 90^\circ+\tan 60^\circ)}{(\tan 45^\circ+\sec 60^\circ)(\operatorname{cosec} 30^\circ+\tan 0^\circ)}=\frac{1}{2\sqrt{3}}$.

   b) Evaluate $\lim_{x\to 2}\frac{2x^2-5x+2}{x^2-3x+2}$.

   c) Evaluate :

   i) $\int(4x^3+3x^2-2x+5)\,dx$

   ii) $\int_6^{10}\left(\frac{dx}{(x+2)}\right)$. **(5+5+5)**

Unit – III

6. a) $R = \{<1, 1>, <1, 2>, <1, 4>, <2, 1>, <2, 2>, <2, 3>, <3, 2>, <3, 3>, <4, 2>, <4, 4>\}$. Construct relation matrix of R and draw diagraph of R.

   b) $A = \{1\}$ $B = \{a, b\}$ $C = \{2, 3\}$ write $A \times B$, $B \times A$, $A^2 \times B$, $A \times B \times C$, $C^2 \times A$.

   c) Define surjective, injective and Bijective functions with example. **(5+5+5)**

7. a) 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 $f \circ g$, $g \circ f$, $s \circ s$, $f \circ h \circ g$, and $f \circ s$

   b) $A = \{x/x$ is an integer and $0 \leq x \leq 5\}$, $B = \{3, 4, 5, 17\}$ and $C = \{1, 2, 3\}$

   Find :

   i) $A \cup B$ ii) $A \cap B$

   iii) $A - B$ iv) $A - C$

   v) $A \cap C$.

   c) Given the relation matrices

$$M_R = \begin{vmatrix} 1 & 0 & 1 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{vmatrix} \quad M_S = \begin{vmatrix} 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 1 & 0 \end{vmatrix}$$

   Find $M_{R \circ S}$, $M_{\tilde{R}}$, $M_{\tilde{S}}$, $M_{R \circ S}$ and show that $M_{R \circ S} = M_{\tilde{S}} \circ M_{\tilde{R}}$. **(5+5+5)**

Unit – IV

8. a) Define the following with a example for each :

   i) Simple path

   ii) Null graph

   iii) Cyclic graph.

   b) Explain path and reachability with suitable example.

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

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

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

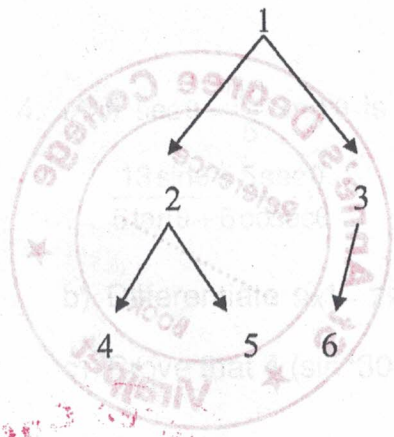
9. a) What are strongly connected and weakly connected graphs ? Explain with suitable examples.

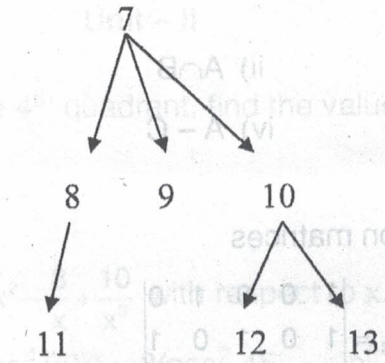
b) Define the following terms with example.

i) out degree of node

ii) length of a path.

c) Convert the following into binary tree **(5+4+6)**





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BCACAC 212

Credit Based Third Semester B.C.A. Degree Examination, November/December 2018
DATA MINING
(Common to All Batches)

Time : 3 Hours Max. Marks : 80

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

PART – A **(10×2=20)**

1. a) Define Data Cube.
   b) Define data mining.
   c) What is supervised learning ?
   d) Define FP tree.
   e) Define slicing and dicing operations of OLAP.
   f) List the structures used in Dynamic Item set Counting algorithm.
   g) Define clustering.
   h) What is splitting criterion ?
   i) Define Index and Reference node.
   j) What is spatial data mining ?
   k) What is page rank ?
   l) What is neural network ?

PART – B

Unit – I

2. a) Explain fact constellation with an example.
   b) Explain different stages of KDD.
   c) Explain data warehouse back end process. **(5+5+5)**

3. a) What is summary measures ? Explain.
   b) Explain the data warehouse architecture with neat diagram.
   c) What is a data mart ? Describe its types. **(4+7+4)**

Unit – II

4. a) Explain Apriori algorithm with an example.
   b) Differentiate agglomerative and divisive clustering techniques.
   c) Write a note on DBSCAN. **(6+5+4)**

5. a) Explain Partition algorithm with an example.
   b) Compare categorical and numerical clustering.
   c) Write a note on CLARA. **(5+5+5)**

Unit – III

6. a) List advantages and drawbacks of decision trees.
   b) What is RBFN ? Explain with a neat sketch.
   c) Explain the mutation and crossover operations in genetic algorithm. **(5+4+6)**

7. a) Explain the structure of an Artificial Neuron with neat diagram.
   b) Explain SVM.
   c) What is rough set ? Explain with an example. **(4+5+6)**

Unit – IV

8. a) Write a note on Web Content Mining.
   b) What are the features of unstructured text ? Explain.
   c) List and explain various temporal data mining tasks. **(4+5+6)**

9. a) Write a note on Web Structure Mining.
   b) Write a note on GSP algorithm.
   c) Explain episode discovery. **(5+5+5)**

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BCACAC 209

Credit Based Third Semester B.C.A. Degree Examination, Nov./Dec. 2018
(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) What is the purpose of SP and IP ? **(10×2=20)**

   b) Define bus. What is the width of data bus and address bus in 8086 microprocessor ?

   c) In real mode show that starting and ending address of segment with segment register value is 2300 H.

   d) If CS = 2300 H, IP = 1A00H, calculate the physical address of the next instruction to be executed by the processor.

   e) Write syntax and example for XLAT instruction.

   f) Differentiate LAHF and SAHF instructions.

   g) Differentiate AND and TEST instructions.

   h) Write the sequence of instruction that add AX, BX, CX and DX registers. Save the result in the AX register.

   i) Develop a short sequence of instructions that sets (1) the rightmost five bits of AX without changing the remaining bits. Save the results in CX.

   j) What is microcontroller ? Give example.

   k) List the instructions used to control carry flag.

   l) What is Interrupt vector ? Draw its diagram.

P.T.O.

PART – B

Unit – I

2. a) What are the salient features of 8086 processor ?

   b) Describe the functioning of all multipurpose registers of 8086.

   c) Explain flag register of 8086 with neat diagram. Perform following operation and also write the status of conditional flags. Add 1234H to 4567H. **(5+4+6)**

3. a) Explain Real Mode Memory Addressing.

   b) Explain the evolution of microprocessor from 4 bit to 8 bit.

   c) Explain how the real numbers are stored in single precision number format. **(6+5+4)**

Unit – II

4. a) Explain the different program memory addressing modes.

   b) Explain the following data addressing mode with examples :

      i) Register indirect.

      ii) Base plus indexed

      iii) Register relative.

   c) Explain any three string instructions with example. **(4+6+5)**

5. a) Assume DS=5000H, SS=7000H, BX=F000H, SI=4000H, BP=7000H. Calculate address accessed by each of the following instructions.

      i) MOV AX, [BX+SI]

      ii) MOV CX , [BP-20H]

      iii) MOV AX, [BX]

      iv) MOV AX, [BP+SI+100H]

   b) Explain various forms of IN and OUT instructions with example.

   c) Explain LEA, LDS and LES instructions with example. **(5+4+6)**

Unit – III

6. a) Explain MUL and DIV instructions with examples.
   b) Explain DAA and DAS instructions with examples.
   c) Which is/are the flags checked for the following jump instructions ? Also specify the operation performed by them.
      i) JA ii) JE iii) JO
      iv) JCXZ v) JBE **(4+6+5)**

7. a) Explain different Rotate instructions with examples to each.
   b) Compare (i) ADD and ADC (ii) SUB and CMP.
   c) Explain REP, REPE and REPNE prefix with examples. **(6+4+5)**

Unit – IV

8. a) Explain NEAR and FAR calls with suitable diagrams.
   b) Explain LOOP, LOOPE and LOOPNE with examples.
   c) Explain SHORT, NEAR and FAR Jump with suitable diagrams. **(4+6+5)**

9. a) Write a note on :
      i) WAIT
      ii) ENTER
      iii) BOUND
   b) Explain :
      i) INT 3
      ii) INTO.
   c) How to call the procedure with register as operand and a call with indirect memory addressing ? Explain with example. **(5+4+6)**