Ewing Christian College, Department of Computers [BCA]
Internal Assessment Exam – 2022-23
Semester II / Paper-3

Digital Electronics and Computer Organization

Time:1Hr. MM:20

Note: There are four questions of 10 marks each. Question no. 1 and 2 is compulsory and question 3 and 4 have internal choices out of which you have to attempt one part from each.

Q1: What is Computer? Explain its Characteristics.

Q2: Draw and explain Block Diagram of Computer.

Q3. Write short note on the following:

1. Cloud Storage
2. Dynamic drive

OR

3. Cache Memory
4. Static Ram

Q4. Solve the following:

1. $(352.563)_8 = (\quad)_2$
2. $(1011001)_2 = (\quad)_8$

OR

3. $(1101.0111)_2 = (\quad)_{10}$
4. $(1011001)_2 = (\quad)_{16}$

Ewing Christian College, Department of Computers (BCA)

Internal Assessment Exam – 2022-2023

Semester 2 / Paper 6

Principles of Programming Languages (BCA 206)

Time: 1hrs

MM:20

All questions carry equal marks.

Q1: What are the basic features of a programming language.

Q2: What are the various programming methodologies? Give examples of each.

Q3: What are the factors that led to the development of programming languages?

OR

Q3: What are translators? Explain their types.

Q4: a) Differentiate between syntax and semantics.

b) What is binding and binding time.

OR

Q4: What are elementary data types? What are their features?

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Ewing Christian College, Department of Computers [BCA]
Internal Assessment Exam – 2022-23
Semester II / Paper-5

Linux & Shell Programming (BCA205)

Time:1Hr. MM:20

Note: There are four questions of ~~10~~ 5 marks each. Question no. 1 and 2 is compulsory and question 3 and 4 have internal choices out of which you have to attempt one part from each.

1. Write about Basic Architecture of Unix/Linux system.
2. What is kernel and shell?
3. Write about file comparisons command with example?

or

Which are the commands used to create, edit and delete files with example?

4. Discuss about some disk related commands with example.

or

Explain features of Linux operating system.

Ewing Christian College, Department of Computers [BCA]
Internal Assessment Exam – 2022-23
Semester II / Paper-1

Mathematics-II

Time:1Hr. MM:20

Note: There are four questions of 10 marks each. Question no. 1 and 2 is compulsory and question 3 and 4 have internal choices out of which you have to attempt one part from each.

Ques1:Using Comparision test determine the convergence /divergence of the series:

$$\sum_{k=0}^{n} \frac{3n-1}{2n3-4n+5}$$

Ques 2: Find the convergence/ divergence of the series using ratio test:

$$\sum_{n=1}^{\infty} \frac{(-10)^n}{4^{2n+1}} \frac{}{(n+1)}$$

Find the convergence or divergence for the series with the best suited test:

Ques3(a) :

$1/2.3+1/3.4+1/4.5.....+\infty$

Or

(b) Show that the series $\sum_{n=1}^{\infty} 1/n^p$ is convergent if $p>1$ and divergent if $0<p<=1$.

Ques 4(a)Test for the convergence or divergence:

$(2.1^3+5)/(4.1^5+1)+(2.2^3+5)/(4.2^5+1)+.....+(2n^3+5)/(4n^5+1)+----$

Or

(b)Test for the convergence or divergence of the series

$\sum_{n=1}(3^n+5)/(2n)!$

Ewing Christian College, Department of Computers [BCA]
Internal Assessment Exam – 2022-23
Semester II / Paper-4

Data Structures (BCA204)

MM:20

Time:1Hr.

Note: There are four questions of 10 marks each. Question no. 1 and 2 is compulsory and question 3 and 4 have internal choices out of which you have to attempt one part from each.

1. What is data structure? And What is ADT? 5
2. What are the Types of ~~channels~~ DS. 5
3. What is the Asymptotic Notation? 5

or

What is Linked List? Write the step to insert a node at mid.

4. What is Stack? Write step for Push and Pop. 5

Or

What is Queue? Write step for insertion and deletion?

2BCATH2

Ewing Christian College, Department of Computers [BCA]
Internal Assessment Exam – 2022-23
Semester II / Paper-2

Basic Electronics

Time:1Hr. MM:20

Note: There are four questions of 10 marks each. Question no. 1 and 2 is compulsory and question 3 and 4 have internal choices out of which you have to attempt one part from each.

Ques1:Differentiate between Intrinsic and extrinsic type of semiconductor.

Ques2:Explain different type of biasing in p-n junction diode with graph.

Ques3(a)Derive the expression for conductivity of semiconductor:

$$\sigma = e[n_e m_e + n_h m_h]$$ OR

(b) What is Full wave rectifier? Explain its working.

Ques 4(a): What is half wave rectifier? Explain its working and PIV,derive expression for V_{DC}.

Or

Explain:

(a) Drift and Diffusion current.
(b) Clipper and Clamper.

90

2BCATH4

BCA-2/4

BCA Second Semester Examination, 2021-22

BCA

Fourth Paper

Data Structures

Time : 2 hours ***Max. Marks : 60***

Note : Attempt all 4 questions Section A contains question nos. 1 and 2 which are short answer type questions and carry 12 marks each. Section B contains question nos. 3 and 4 which are long answer type questions and carry 18 marks each.

SECTION - A

1. Write algorithm for Push and Pop operations in stack. Transform the following expression into its equivalent postfix expression using stack :

$$A + (B * C - (D/E \uparrow F) * G) * H.$$

OR

How binary search is different from linear search ? Apply binary search to find item 40 in the sorted array :

11, 22, 30, 33, 40, 44, 55, 60, 66, 77, 80, 88, 99.

Also discuss the complexity of binary search.

2. Find the minimum spanning tree in the following graph using Krushal's algorithm :

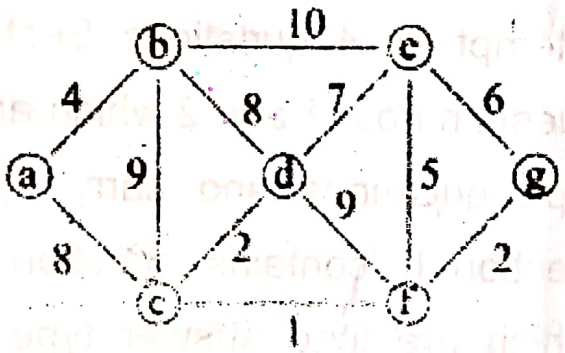

Figure 1.0 Undirected Graph

OR

What are the merits and demerits of array ? Given two arrays of integers in ascending order, develop an algorithm to merge these arrays to form a third array sorted in ascending order.

SECTION – B

3. Define tree, binary tree, complete binary tree and full binary tree. Write algorithm or function to obtain traversals of a binary tree in preorder, postorder and inorder.

OR

Write the breadth first search and depth first search graph traversal algorithm and explain with examples. What are their complexities.

4. Write the algorithm for the merge sort. Explain its complexities. Sort the following using merge sort method :

75, 10, 20, 70, 80, 90, 100, 40, 30, 50.

OR

Write algorithm to convert a postfix expression into an infix expression. Consider the following arithmetic expression in postfix notation :

7 5 2 + * 4 1 5 – / –

(i) Find the value of the expression.

(ii) Find the equivalent prefix form of the above expression.

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BCA-2/I

2BCATH1

BCA Second Semester Examination, 2021-22

BCA

First Paper

Mathematics

Time : 2 hours ***Max. Marks : 60***

Note : Attempt all 4 questions Section A contains question nos. 1 and 2 which are short answer type questions and carry 12 marks each. Section B contains question nos. 3 and 4 which are long answer type questions and carry 18 marks each.

SECTION - A

1. Show that $f(z)=\overline{z}$ is not differentiable at $z = 0 \in C$.

OR

Find the directional derivative of $\phi(x, y, z) = x^2yz + 4xz^2$ at P(1, –2, 1) in the direction $2\hat{i} - \hat{j} - 2\hat{k}$.

2. Show that $\int_0^\infty \frac{\sin t}{t}\, dt = \frac{\pi}{2}$.

OR

Obtain the Maclaurin's series expansion of $f(x) = \log(1 + x)$; $-1 < x \leq 1$.

SECTION – B

3. Attempt any two parts :

(a) If $u(x, y) = e^{-x}(x\sin y - y\cos y)$ then find $V(x, y)$ such that $f(z) = u(x, y) + iv(x, y)$ is analytic.

(b) Define curl of a vector function. Show that curl $(\text{grad}\phi(x, y, z)) = 0$ where $\phi(x, y, z)$ is a scalar point function.

(c) Test the convergence of the series

$$1 + \frac{2^2}{3^2} + \frac{2^2 . 4^2}{3^2 . 5^2} + \frac{2^2 . 4^2 . 6^2}{3^2 . 5^2 . 7^2} + \ldots\ldots$$

4. Attempt any two parts :

(a) Let $f(z)=e^{-z^{-4}}$ $(z\neq 0)$ and f(0) = 0. Show that f(z) is not analytic at origin.

(b) Show that the series $\sum_{n=1}^{\infty}\left(\frac{1}{n}+\frac{(-1)^n}{\sqrt{n}}\right)$ is divergent.

(c) If $\vec{a}(x,y,z)$ and $\vec{b}(x,y,z)$ be two differentiable vector function in space then show that $\text{Curl}(\vec{a}\times\vec{b})=\text{Curl}\,\vec{a}+\text{Curl}\,\vec{b}$.

Curl : $\vec{a}\times\vec{b} = \vec{a}\,\text{div}\,\vec{B} - \vec{B}\,\text{div}\,\vec{a} +$

$(\vec{b}\cdot\Delta)\vec{a} - \vec{a}\cdot\Delta\vec{b}$

Fail

BCA-2/2

B.C.A. Second Semester Examination, 2022-23

BASIC ELECTRONICS

Second Paper

Time : 2 hours ***Max. Marks : 60***

Note : Attempt all 4 questions. Section-A contains question nos. 1 & 2 which are short answer type questions and carry 12 marks each. Section B contains question nos. 3 & 4 which are long answer type questions carrying 18 marks each.

SECTION - A

1. What is semiconductor ? How n and p-type semiconductors are formed ? Explain with suitable examples and diagrams.

OR

Draw energy band diagram of followings :

(i) intrinsic semiconductor

(ii) p-type semiconductor

(iii) n-type semiconductor

2. Distinguish between Zener and Avalanche breakdown mechanism in p-n junction diodes. Draw circuit diagram of Zener diode to study its characteristic.

OR

Differentiate between drift and diffusion currents in p-n junction diode and discuss it under following conditions :

(i) unbiased

(ii) forward biased

(iii) reverse biased.

SECTION – B

3. What is FET ? How is it different from BJT ? Describe working of n-channel JFET with its circuit diagram.

OR

What are different parameter in JFET ? Define them and obtain relationship among them.

4. Draw block diagram of regulated power supply and discuss its working in detail. Draw circuit diagram of Half wave and full wave rectifier.

OR

What is transistor ? Describe working of p-n-p and n-p-n transistor in common base mode alongwith its circuit diagram.

BCA-2/3

B.C.A. Second Semester Examination, 2022-23

Digital Electronics and Computer Organization

Third Paper

Time : 2 hours ***Max. Marks : 60***

Note : Attempt all 4 questions. Section-A contains question nos. 1 & 2 which are short answer type questions and carry 12 marks each. Section B contains question nos. 3 & 4 which are long answer type questions carrying 18 marks each.

SECTION - A

1. Write Short note on the following :

   (a) Mouse

   (b) Cloud Storage

   (c) Printer

OR

(a) Pen drive

(b) Scanner

(c) Booting

2. (a) What is Computer? Explain Block diagram of computer with diagram.

(b) What is the difference between Static RAM and Dynamic RAM?

OR

(a) Explain the difference between Primary and Secondary Memory.

(b) What is Universal Gate? Why it is called Universal Gate. Draw all basic gates with the help of universal gate.

SECTION – B

3. (a) Minimize the following Boolean function : K-map

$F(A, B, C, D) = \Sigma m(1, 3, 4, 6, 8, 9, 11, 13, 15) + \Sigma d(0, 2, 14)$

Also design its minimize expression circuit

(b) Explain Full Adder draw block and Circuit diagram of Full adder. Also design and explain full adder with the help of two half adder.

OR

(a) Minimize the following Boolean function :

$F(A, B, C, D) = \Sigma m(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$

Also design its minimize expression circuit.

(b) What is Multiplexer? Draw block diagram of Multiplexer. Design 8×1 multiplexer with the help of 4×1 multiplexer, how many 4×1 multiplexer are required to design 8×1 multiplexer ?

4. Simplify the following expression to sum of product using Quinne Mclusky Method :

$F(a, b, c, d) = \Sigma(0, 1, 2, 3, 4, 6, 7, 11, 12, 15)$

Also draw its simplified expression circuit.

OR

Simplify the following expression to sum of product using Quinne Mclusky Method :

$F(a, b, c, d) = m(0, 4, 8, 10, 12, 13, 15) + d(1, 2)$

Also draw its simplified expression circuit.

BCA-2/4

B.C.A. Second Semester Examination, 2022-23

Data Structures

Fourth Paper

Time : 2 hours ***Max. Marks : 60***

Note : Attempt all 4 questions. Section-A contains question nos. 1 & 2 which are short answer type questions and carry 12 marks each. Section B contains question nos. 3 & 4 which are long answer type questions carrying 18 marks each.

SECTION - A

1. Answer the following in brief :
   (a) What do you understand by the term algorithm? Describe the characteristics of an algorithm

   (b) Let A be a two dimensional array declared as int A[20][35], If the first element of array is stored at location 5025, find the address of element A[13][27], considering that the matrix is stored in:

   (i) Row Major Ordering

   (ii) Column Major

OR

(a) What is data structure? Briefly describe various types of data structures.

(b) Let A be a two dimensional array declared as int A[20][35]. If the first element of array is stored at location 6025, find the address of element A[24][28], considering that the matrix is stored in :

(i) Row Major Ordering

(ii) Column Major

2. Answer the following in brief

(a) What are doubly circular linked list? Write algorithm to create, insert at end and traverse a doubly circular linked list

(b) Write an algorithm to convert a valid arithmetic infix expression in to an equivalent post fix expression. Trace your algorithm for following infix expression:
A + (B * C – (D / E – F * G) * H)

OR

(a) What are queues? Write down the algorithm for insertion and deletion operation performed on the queues

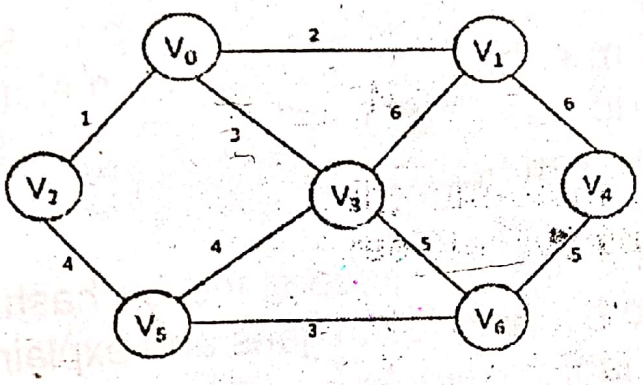
(b) Write an algorithm to find reverse of string using the operations of a stack. Illustrate your answer.

SECTION – B

3. (a) Draw the tree T if the pre-order and in-order traversal of binary tree are given below as:

Inorder : E A C K F H D B G
Preorder : F A E K C D H G B

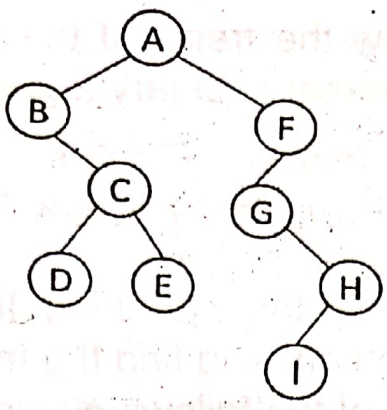
(b) Define the spanning tree. Write the Prim's algorithm and find the minimum cost spanning tree of the following using Kruskal's algorithm.



OR

(a) Define AVL tree. Starting with an empty tree, build the AVL tree by following sequence of insertions: D, J, A, M, J, O, F, N. Also label the rotations according to their types

(b) What is graph traversal? Write an algorithm to perform Breadth First Search Traversal of a graph and draw the BFS tree for following graph



4. (a) What is a heap? Show step by step creation of max heap for the following elements in the order as : 25, 57, 4, 37, 12, 92, 86, 33. Perform heap sort.

(b) What do you understand by hashing? Name two hashing techniques and explain them with suitable example

OR

(a) Write an algorithm for sorting a set of positive integers in ascending order using Radix sort procedure. Give worst case and average case time of the algorithm. Illustrate this procedure for following keys: 780, 568, 828, 911, 443, 759, 865, 326.

(b) What is collision? Explain any two collision resolution techniques used in hashing with example.

BCA-2/5

B.C.A. Second Semester Examination, 2022-23

Linux and Shell Programming

Fifth Paper

Time : 2 hours *Max. Marks : 60*

Note : Attempt all 4 questions. Section-A contains question nos. 1 & 2 which are short answer type questions and carry 12 marks each. Section B contains question nos. 3 & 4 which are long answer type questions carrying 18 marks each.

SECTION - A

1. (a) What is Linux ? Explain the advantages of Linux.

(b) What do you mean by boot block ?

OR

(a) What do you mean by Shell and Kernel ? Explain.

(b) Describe the basic architecture of Linux System.

2. (a) Explain the various utility of *cat* command.

(b) Which command is used for rename the existing file ?

OR

(a) What are the file permission in Linux ?

(b) Discuss the different type modes which is used in VI editor ?

SECTION – B

3. (a) Write a script to, read marks of five subjects and print the total, percent and division, division follow the following rules :

if percent >= 80, 1st division, if percent >= 60 2nd division, if percent >= 40 3rd division, otherwise fail.

(b) Which Command is used for delete the file and directory ?

OR

(a) What is loop ? Discuss the different way which is use for apply the For loop with suitable example.

(b) What do we use sleep command ?

4. (a) How do you write a *case* statement in shell ? Explain with example.

(b) Differentiate between *more* and *less* command.

OR

(a) How to read multiple arguments with for loop of while loop ?

(b) How to perform the conditional statement with bc command ? Explain.

BCA-2/6

B.C.A. Second Semester Examination, 2022-23

Principles of Programming Language

Sixth Paper

Time : 2 hours ***Max. Marks : 60***

Note : Attempt all 4 questions. Section-A contains question nos. 1 & 2 which are short answer type questions and carry 12 marks each. Section B contains question nos. 3 & 4 which are long answer type questions carrying 18 marks each.

SECTION - A

1. Answer the following in brief :

(a) What constitutes a programming environment ?

(b) What mixed-mode assignments are allowed in C and Java?

(c) What is an alias? What are the problems associated with it?

OR

(a) What are the merits of sub range types?

(b) For what sort of application logic programming is useful? Briefly explain.

(c) What do you mean by a general purpose language? Is C a general purpose language?

2. Answer the following in brief :

(a) What do you mean by binding? Give examples of some of the bindings and their binding times.

(b) Discuss precedence and associativity rules of different programming languages.

OR

(a) With respect to the object oriented programming, briefly explain virtual functions.

(b) What is meant by type checking? Differentiate between static type checking and dynamic type checking and give their relative advantages.

SECTION – B

3. (a) What is dangling-else problem? Discuss how it can be handled by the programming language.

(b) What are dangling pointers and lost heap-dynamic variables? How are they created?

OR

(a) Discuss about the various attributes of a good language and explain the process of evaluating attributes with example.

(b) Explain different parameter passing methods with an example.

4. (a) What is exception handling? How exceptions are handled in C++and JAVA.

(b) What are design issues of Two-Way Selection Statement? Explain with suitable example.

OR

(a) Write about Meta Language declaration statements. Describe deep access and shallow access methods for implementing dynamic scoping.

(b) Explain features of Object-Oriented Programming Languages.

Vector - directional

Unit - 3, 2