Roll No. .....

67001-N

MCA 1st Semester (Bridge Course) (MCA 2 Year Programme) w.e.f. 2020-21 Examination – December, 2024

COMPUTER FUNDAMENTALS & PROGRAMMING IN C

Paper : 20BCC11C1

Time : Three Hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) What are the limitations of human processing ? How these can be removed ? $8 \times 2 = 16$

(b) What are the major secondary storage devices ?

(c) Explain briefly volatile and non-volatile memory.

(d) Explain functions of OS in information management.

(e) What is file pointer ? What information is provided by it ?

(f) What is the purpose of return statement ?

(g) Describe fputs() and fgets() functions.

(h) What are capabilities of computers ?

UNIT – I

2. (a) What are the essential components of a computer ? Draw the schematic block diagram of a computer showing its essential components. Discuss the function of each unit. 12

(b) Give a disadvantage for each type of network topology. 4

3. (a) What are high-level languages ? Why are they known as problem oriented languages ? Name some high-level languages. 8

(b) Explain use of computer in marketing and education. 8

UNIT – II

4. (a) Write a macro that is run using the shortcut Ctrl + F for formatting the files as :

(i) Change the left margin of entire files as 2.0 inches.

(ii) Change the line spacing to 2 (Double).

(iii) Change the format of file in 3 columns. 8

(b) What do you mean by Mail-Merge in MS-Word ? 8

5. (a) Create a list of 10 best friends. Create a Thank You letter. Use Mail-Merge feature of MS-WORD to create a Thank You letter for each of your friends from the above two files. 12

(b) Explain the working and importance of Header and Footer in MS-Word. 4

UNIT – III

6. (a) What is the purpose of while and do-while statement ? What is the minimum number of times while and do-while statement will be executed ? 8

(b) Write a program to find whether the given year is a leap or not. 8

7. (a) Draw a flowchart to print the sum of even numbers of a set of natural numbers. 8

(b) Explain the terms character set, tokens, constant and variables. 8

UNIT – IV

8. (a) Write a function big to find largest for two numbers and use this function in the main program to find largest of three numbers. 8

(b) How pointer can be passed on to functions as the variables ? 8

9. (a) What is Structure ? Explain C syntax of structure declaration with example. 8

(b) What is Pointer ? Explain how the pointer variable declared and initialized. 8

Roll No. .....

67007-N

MCA 1st Semester (MCA 2 Year Programme) w.e.f. 2020-2021 Examination – December, 2024

DIGITAL DESIGN & COMPUTER ARCHITECTURE

Paper : 20MCA21C4

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) What is a Decade Counter ? $8 \times 2 = 16$

(b) Differentiate between Edge-triggered and Level-triggered flip-flops.

(c) What is CISC architecture ?

(d) What is a bus system ?

(e) What do you mean Instruction Formats ?

(f) What are Gray Codes ?

(g) What is a Decoder ?

(h) What is Flynn's computer organization ?

UNIT – I

2. (a) What is K-map ? Using K-map, obtain the minimal expression in SOP and POS of the following expression :

$F = \Sigma_m (0, 2, 4, 6, 7, 8, 10, 12, 14, 15)$

Implement the same in using universal gate. 10

(b) What are Error-Detecting and Error-Correcting Codes ? Illustrate the significance of each. 6

3. (a) What is Booth's coding ? Perform $(-12)_{10} \times (-8)_{10}$ using this method. 5

(b) What is BCD arithmetic ? Perform the following BCD operations : 6

(i) $(678)_{10} + (432)_{10}$

(ii) $(976)_{10} - (789)_{10}$

(c) Perform the operation $(1001 \times 1110)_2 + (75.45)_8$ and find out the result in an Hexadecimal Number System. 5

UNIT – II

4. (a) What is Multiplexer (MUX) ? How will you design a 64×1 MUX using 8×1 MUX ? Illustrate. 8

(b) What is combinational circuit ? Design a combinational circuit that receives 2-bit binary number input and produces its square at the output. 8

5. (a) What is Master-Slave flip-flop ? Discuss its working and show how the race around condition is eliminated in this flip-flop. 8

(b) What is a counter ? Show that N-bit counter connected to $N \times 2^N$ decoder is equivalent to a ring counter with 2^N flip-flop. Illustrate it with $N = 2$. 8

UNIT – III

6. (a) What is the structure of 8086/8088 Assembly Language program ? Illustrate the purpose of all its elements/structural components. 8

(b) What do you mean by micro-operations ? What are its various types ? Illustrate the implementation of each category of micro-operations through its block diagram(s). 8

7. Explain the following :

(a) Microprogrammed Control Unit 8

(b) Addressing modes 8

UNIT – IV

8. (a) What is Pipelining ? When, where and why is it necessary ? Also differentiate between the Instruction Pipelining and Arithmetic Pipelining. 8

(b) What are array processors ? How are these designed ? Illustrate. 8

9. (a) What is an Input/Output (I/O) module ? What are the functions performed by an I/O module ? Illustrate the general structure of an I/O module. 8

(b) What are parallel computers ? What are their structures ? How are these classified ? Discuss. 8

Roll No. .....

67005-N

MCA 1st Semester (MCA 2 Year Programme) w.e.f. 2020-21 Examination – December, 2024

COMPILER DESIGN

Paper : 20MCA21C2

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. ***Compulsory question*** :

(a) What is bootstrapping ?

(b) What do you understand by cross compiler ?

(c) What are the *two* types of conflicts in shift reduce parsing ? Give example.

(d) Define left recursion. Is the following grammar left recursive : E->E+E | E*E | a | b ?

(e) What is hashing ? Discuss.

(f) Differentiate between Abstract Syntax tree and DAG representation of intermediate code.

(g) Explain the algorithm for basic block identification.

(h) What is code optimization ? Illustrate with example.

UNIT – I

2. (a) What is system software ? Explain working of system software tool. Give any *five* example of system software tools.

   (b) What is loader ? Differentiate between direct linkage and reallocating loader scheme with an example.

3. (a) Explain any *four* components available as integral part of system programming environment.

   (b) What is self-relocating program ? Explain with appropriate example.

UNIT – II

4. (a) Describe the mathematical model used for creating finite automata.

   (b) What functions are performed by code Optimizer and code generator during synthesis phase ? Discuss.

5. (a) Consider the production :

   $S \rightarrow aAb$

   $A \rightarrow cd / C$

   Show that recursive descent parsing fails for input string "acdb", also explain Recursive Descent Algorithm.

   (b) Why it is important to perform operator precedence during compiler processing.

UNIT – III

6. (a) Give the general structure of activation record. Explain the purpose of each component.

   (b) What do you mean by attributed grammars ? Discuss the translation scheme for Converting an infix expression to its equivalent postfix form.

7. (a) Explain the use of symbol table in compilation process. List out the various attributes for implementing the symbol table.

   (b) Describe how three address code can be represented as triples.

UNIT – IV

8. (a) Explain various code optimization techniques. Discuss the strategies for loop optimization and dead code elimination.

(b) How register allocation and assignment is performed during code generation ? Explain.

9. (a) Explain the different storage allocation strategies.

(b) What are major sources of optimization in a given code ? Discuss.

Roll No. .....

67004-N

MCA 1st Semester (MCA 2 Year Programme) w.e.f. 2020-2021 Examination – December, 2024

OBJECT ORIENTED PROGRAMMING USING JAVA

Paper : 20MCA21C1

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) What is Final keyword ? $8 \times 2 = 16$

(b) What is Object reference variable ?

(c) What is byte and character ?

(d) What is Iterator ?

(e) What is console output ?

(f) What is synchronization ?

(g) What is Frame ?

(h) What is thread priority ?

UNIT – I

2. (a) What do you mean by Java Program Structure and Java's class library ? Explain with example. 7

   (b) How Internet is play role in the Java application ? Explain with example. 5

   (c) What is Automatic Garbage College ? Explain with example. 4

3. Explain the following with example : $4 \times 4 = 16$

   (a) Array

   (b) String Buffer class

   (c) Control statement

   (d) Variable and Data Types

UNIT – II

4. (a) What is Interface ? How Interface replaced with Multiple Inheritance in Java ? Explain Nested Interface with example. 12

   (b) How is Access Specifier used in Package ? Explain with example. 4

5. What is Package ? What are types of Package ? Explain by taking two users define Package then import these Packages in java file. 16

UNIT – III

6. How Multithreading is main component of Java language ? What are commonly Constructors used in Multithreading ? Explain with example. 16

7. Explain the following with example : 6 + 5 + 5

   (a) Exception Handling

   (b) I/O Basic and I/O Classes

   (c) Stream Benefits

UNIT – IV

8. (a) What is Applet ? What basic Applet Architecture ? Explain the life cycle of Applet with example. 10

   (b) How are AWT classes used ? Explain any *three* inbuilt AWT classes. 6

9. Explain the following with example : 6 + 6 + 4

   (a) Layout managers and Menus

   (b) AWT control and Text Output

   (c) Window fundamentals

Roll No. .....

67006-N

MCA 1st Semester (MCA 2 Year Programme) w.e.f. 2020-21 Examination – December, 2024

COMPUTER GRAPHICS & MULTIMEDIA

Paper : 20MCA21C3

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

1. (a) Name any Graphics standards used for maintain Graphics quality.

(b) Briefly discuss any ***two*** functions used to set area fill attributes.

(c) What do you mean by rigid body transformations ?

(d) Write down any ***four*** characteristics of quadric surfaces used 3D object representations.

(e) Write down the rotation matrix about z-axis used in three dimensional Computer Graphics.

(f) Explain how Diffuse reflection illumination method works to illuminate the required images ?

(g) Pictorially represent the architecture followed by most of the Multimedia systems.

(h) Write down any *four* characteristics of messages created for mobiles.

UNIT – I

2. (a) How graphics output is decided by the phosphorus persistence value ? Explain.

(b) Illustrate Bresenham's approach to draw a line with positive slope less than 1 based on decision parameter value.

3. (a) How character attributes can be set to make graphics more effective and efficient ?

(b) Differentiate between boundary fill and flood fill algorithms with proper examples.

UNIT – II

4. (a) Elaborate the 2D rotation matrices used for rotation around pivot point and origin with example.

(b) Explain how 3D objects can be represented as meshes and curved lines with their respective characteristics.

5. (a) Write down the Cohen Sutherland line clipping algorithm. Also mention its advantages and disadvantages.

(b) Describe how natural objects are represented in 3D graphics (Bezier Curve) better than in Euclidean geometry.

UNIT – III

6. (a) Define composite transformation. Discuss any *two* scenarios where composite transformation can be of great help. Write down the composite transformation matrix used in both 2D and 3D Graphics.

(b) Why and how Back face detection method works as Object space method on the given graphics image ?

7. (a) State the relevance and importance of vanishing point in perspective and parallel projection in 3D viewing with an apt example.

(b) Compare the color models : XYZ, RGB, YIQ and CMY in terms of their properties and functions.

UNIT – IV

8. (a) Detail out what challenges multimedia system faces while handling the following heterogeneous data types as one umbrella : text, image, audio, video and animation.

   (b) Differentiate between message and hypermedia message components of multimedia data.

9. (a) "Quality of Multimedia majorly depends on the effectiveness of Compression & Decompression approaches." Comment

   (b) Write down salient features of distributed multimedia systems required to deploy major functionalities in working domain.

Roll No. .....

67008-N

MCA 1st Semester (MCA 2 Year Programme) w.e.f. 2020-2021 Examination – December, 2024

ADVANCE DATA STRUCTURES USING C++/JAVA

Paper : 20MCA21C5

Time : Three hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all, selecting ***one*** question from each Unit. Question No. 1 is ***compulsory***. All questions carry equal marks.

1. (a) What are Euler graphs ? $2 \times 8 = 16$

(b) What is Prim's algorithm ?

(c) What is Divide and Conquer method ?

(d) What is topological sort ?

(e) What is threaded binary tree ?

(f) What do you mean by non-deterministic algorithms ?

(g) What are minimal spanning tree ?

(h) What do you mean by Recurrences ?

UNIT – I

2. (a) What is meant by Strassen's method ? How is it significant ? Illustrate. 8

(b) What do you understand by complexity of algorithms ? What is the importance of algorithm and data structure in computer science ? Explain. 8

3. Explain the following :

(a) Recurrence Tree Method 8

(b) Substitution Method 8

UNIT – II

4. (a) What are AVL trees ? What are their applications ? How are these implemented ? Illustrate. 8

(b) What is binary search ? Determine its complexity and write down an algorithm for binary search technique. 8

5. Explain the following :

(a) B-tree and their implementation using C++/Java. 8

(b) Concept of heap and heap operations. 8

UNIT – III

6. (a) How is DFS traversal different from BFS traversal ? Discuss their pros and cons. 8

(b) What is a spanning tree ? How Kruskal's algorithm results in a minimum-cost spanning tree ? Illustrate. 8

7. Explain the following :

(a) Ford-Fulkerson algorithm 8

(b) Max flow - Min cut theorem 8

UNIT – IV

8. (a) What is Knuth-Morris-Pratt algorithm ? How is it significant ? Explain. 8

(b) What is 0/1 Knapsack problem ? How Greedy method can be applied to solve the Knapsack problem ? Justify. 8

9. Explain the following :

(a) NP Complete problems 8

(b) 8-Queens problem 8

Roll No. .....

67003-N

MCA 1st Semester (Bridge Course) (MCA 2 Year programme) w.e.f. 2020-2021 Examination – December, 2024

VISUAL BASIC & DATABASE SYSTEMS

Paper : 20BCC11C3

Time : Three Hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt ***five*** questions in all. Question Number 1 will be ***compulsory***. In addition to ***compulsory*** question, student will have to attempt ***four*** more questions selecting ***one*** question from each Unit. All questions, carry equal marks.

1. (a) What is VB(IDE) Integrated Development Environment ?

(b) Discuss about built in functions in VB.

(c) Discuss Arrays in VB.

(d) What is RDO ?

(e) Define ER Modelling.

(f) Explain the applications of Database system.

(g) Define Database Languages.

(h) Define the uses of Join dependencies.

UNIT – I

2. (a) Explain in detail the uses of List Box, Combo Box, Image Box and frames in VB through suitable example.

   (b) Explain the following in detail :

   (i) Variable and Constants in VB.

   (ii) Arithmetic operations and String operations in VB.

3. (a) Explain VB as Event-driven & Object-based language. Explain about some of the event supported by VB object ? Also describe the role of event processor in VB.

(b) Explain different Looping Statements in VB through suitable example.

UNIT – II

4. (a) What is Dialog Boxes and Menu ? Describe the methodology to create a menu using Visual Basic.

   (b) What is the significance of a form in Visual basic (VB) ? Explain how to create an MDI application in VB. Also Difference between SDI and MDI in detail.

5. What is database programming ? What are Data Controls and Data-Bound controls ? How we connect a VB form to Database by using DAO ? Explain in detail.

UNIT – III

6. (a) What is relational calculus ? Explain the different variants of relational calculus with example.

   (b) What is relational algebra ? Explain projection and join operation of relational algebra with suitable examples.

7. (a) What is relational model ? What is integrity rule in relational model ? Also explain the advantages and disadvantages of relational model in detail.

(b) What is Data Model ? Differentiate the different data models used in database management system.

UNIT – IV

8. Explain the following in detail :

(a) Various methods of Concurrency control

(b) Dealing with deadlocks

9. What is Normalization ? Explain with examples the various types of normal forms in detail.
