CC 1: Programming Fundamentals using C

1. Answer any *five* questions from the following: 1×5 = 5

(a) What is the use of continue statement?
(b) What is the difference between actual and formal parameter?
(c) What are preprocessor directives?
(d) What is the use of sizeof()?
(e) What is the difference between a character and a string?
(f) What is a header file? Why is it used?

(g) What is a flow chart?
(h) What is a pointer in C?
(i) What are command line arguments?
(j) What is the role of "%" in "C"?

2. Answer any *three* questions from the following: 5×3 = 15

(a) Explain the different types of operators in C.
(b) Write down the properties of 'C' as a type of programming languages. Explain briefly these properties.
(c) What are enumerated data types? Explain with suitable example.
(d) Explain the concept of recursive functions with the help of a suitable example.
(e) Demonstrate the use of switch statement with the help of a suitable example.

(f) Explain bitwise operators in C by giving examples.

3. Answer any *two* questions from the following: 10×2 = 20

(a) Discuss the different iterative controls available in C with the help of small program segments.
(b) Explain the various types of primitive data types available in C with their purpose of usage.
(c) What is a file? Explain the different file opening modes supported in C with their suitability. Give a suitable example.
(d) Discuss the different type of user defined data types supported in 'C' with the help of a program segment.
(e) What are arrays? Why arrays are required? Explain with the help of a program segment how arrays can be implemented using pointers.

(f) What are user defined data types? Discuss the utility of structures and unions. Explain array of structures.

B.Sc. Honours 1st Semester Examination
CC2-COMPUTER SCIENCE
COMPUTER SYSTEM ARCHITECTURE
....

1. Answer the following questions (1 mark for each question)
   a. Define hit-ratio.
   b. Name any three special purpose registers.
   c. Which logic gates are called universal logic gates?
   d. Define a sequential circuit and give an example.
   e. What is an instruction code?
   f. What do you mean by an interrupt:
   g. What is a CISC architecture?
   h. How many select lines does an 8×1 MUX require?
   i. What is cache memory?
   j. $(1001)_2 = (?)_8$
   k. $(123)_8 = (?)_{10}$
   l. $(21.5)_{10} = (?)_2$
   m. Write down two applications of multiplexer.
   n. What is De-Mogan's law?
   o. Define Boolean algebra.
   p. How many minterms are there in an *n* variable truth table?

2. Answer the following questions (5 marks for each question)
   a. Write a short note on cache memory.
   b. Write a short note on T flip flop.
   c. What do you mean by 'race around condition'? How it can be overcome?
   d. Write short note on 8X1 multiplexer.
   e. Discuss working principle of JK flip-flop by drawing its circuit diagram and truth table.
   f. S-R flip-flop can be called as mother of all flip-flop-Discuss.
   g. What do mean by micro-operation? Discuss.
   h. Discuss direct addressing mode with example.
   i. Discuss immediate addressing mode with suitable example.
   j. Write short note on instruction format.
   k. Discuss instruction cycle with suitable diagram.
   l. Discuss bus interconnection design of a basic computer.
   m. Write short note on instruction format.
   n. Compare programmed I/O and interrupt driven I/O.
   o. Draw an XOR gate using NAND gate only.
   p. What is a full adder? Design a full adder using two half adder.
   q. The four variable function *f* is given in terms of min-terms as

   $f(A, B, C, D) = \Sigma m(2, 3, 8, 10, 11, 12, 14, 15)$. Using the K-map minimize the function.
   r. Compare the Combinational circuits and Sequential circuits.

3. Answer following questions (10 marks for each question)
   a. Explain the working of a 16-bit common bus system.
   b. Discuss the role of control unit in computer system. Explain hardwared control unit with the steps to design such a control unit.
   c. What are addressing modes? Discuss different addressing modes with the help of suitable diagrams
   d. Discuss the structure of a micro-programmed control organisation with a suitable diagram. What is its advantage over hardwired control?

e.   What is a register? Discuss few special purpose registers available in a typical computer.
f.   Differentiate CISC and RISC architecture.
g.   Discuss a decoder with the help of its diagram and truth table. Write down few application of decoder.
h.   Construct a 8 to 1 Multiplexer using two 4 to 1 Multiplexer and also give the truth table of the same. Differentiate between Multiplexer and De-multiplexer.
i.   Discuss 1's complement and 2's complement method of representing binary numbers with suitable example.
j.   Discuss 4 bit parallel binary adder with proper diagram.
k.   Discuss the SOP form of Boolean expression. Reduce the following Boolean expression in SOP form using K-map. $F(A, B, C, D) = \Sigma(0, 1, 2, 5, 7, 8, 9, 10, 13, 15)$.
l.   Discuss Cache memory and explain the Associative mapping with suitable example.

CC3 : Programming in JAVA

Answer any five questions   **1×5 = 5**

1. What is Java virtual machine?

2. What is Java String?

3. What is exception handling?

4. Why Java is called object oriented?

5. Define package in Java.

6. What is 'final' keyword in Java"?

7. What is 'super' keyword in Java?

8. What do you mean by JSP page in Java?

Answer any three questions   **5×3 = 15**

9. Mention major differences between an interface and a class.

10. Write a Java program to check whether a given number is prime or not.

11. Discuss Logical operators and arithmetic operators used in Java.

12. Explain method overriding with proper example.

13. Explain operator precedence with proper example.

Answer any two questions   **10×2 = 20**

14. What do you mean by inheritance? Discuss multilevel inheritance with example. Write a short note on method overloading.   (2+5+3)

15. Discuss different types of loops used in java with examples.

16. What is constructor in java? What are the different types of constructors in java? Describe them with example.

17. Write short notes on: (5+5)

(a) Unboxing

(b) Autoboxing.

CBCS BSc. Honours 2ND Semester Examination
COMPUTER SCIENCE
CC4-DISCRETE STRUCTURES
....

1. Answer following questions (3 marks for each question)
   a. Construct the truth table for $(P \to Q) \lor (Q \to P)$.
   b. Construct the truth table of $(P \lor Q) \land (Q \lor R)$.
   c. What is asymptotic notation? Explain Big Theta notation.
   d. State De-Morgan's law.
   e. What is partial ordering relation?
   f. State Pigeonhole principle.
   g. Write a short note on recurrence tree.
   h. Name different types of set.
   i. What is in degree and out degree of a vertex?-Explain with example.
   j. Explain radius and diameter of a graph with suitable example.
   k. Explain regular graph and complete graph.
   l. Differentiate Bipertite graph and complete Bipertite graph with the help of example.
   m. Explain how to represent a graph as a matrix.
   n. Define spanning tree and give an example.
   o. How many odd numbers of 3 digits can be formed with 1, 2, 3, 4, 5 ?
   p. Prove that the number of vertices of odd degree in a graph is always even.
   q. What is Euler graph? Give example.

2. Answer following question(6 marks for each question)
   a. Find the number of ways of placing n people in (n-1) rooms, no room being empty.
   b. Using Venn diagram, prove that $(A \cap B)' = A' \cup B'$.
   c. Using Venn diagram, prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.
   d. Suppose R and S are relations from A to B. Then show that-
      $(R \cap S)^{-1} = R^{-1} \cap S^{-1}$.
   e. Show that the two statements are logically equivalent:"It is not true that all comedians are funny" and "There are some comedians who are not funny".
   f. Define with example: Proper subset, Power set.
   g. If U={0,1,2,3,4,5,6,7,8,9}is the universal set, A={2,3,4,8}, B={1,3,4} and C={3,4,5,6} then verify that-
      $(A \cap B)' = A' \cup B'$ and $(A \cup B)' = A' \cap B'$.
   h. Show that maximum number of edges in a simple graph with n vertices is n(n-1)/2.
   i. Show that a tree T with n vertices has $(n-1)$ edges.
   j. Prove that by induction $1^2 + 2^2 + 3^2 + ...+ n^2 = n(n+1)(2n+1)/6$ for all n.
   k. Write a short note on Bounding Summation.
   l. Explain equivalence relation with proper example.
   m. Explain Hamiltonian path with example.
   n. Discuss different properties of a tree.

3. Answer following questions(12 marks for each question)
   a. Using the laws of propositions prove that:
      (i) $\sim (p \lor q) \lor (\sim p \land q) \equiv \sim p$
      (ii) $(p \to q) \land (r \to q) \equiv (p \lor r) \to q$
   b. Discuss Master Theorem.
   c. Explain big O, big theta and big omega notations used in complexity analysis of algorithms.
   d.
      (i). Prove that any two cyclic graphs of the same order are isomorphic.
      (ii) State and prove the fundamental theorem of isomorphic for graphs.

e. Write short note on- (i) Well formed formula (ii)Tautology .
f. Discuss Injective, Bijective and Surjective function with example.
g. Discuss various applications of graph.

CC5 : Data Structures

1. Answer any five questions: **1×5 = 5**

(a) Define data structure.

(b) Give any two example of non-linear data type.

(c) What is base address?

(d) What is postfix notation of an expression?

(e) Write any two applications of stack in computer architecture.

(f) Write any two applications of Queue in computer architecture.

(g) The in-order traversal of a BST will present the elements in which order?

(h) Define priority Queue.

2. Answer any three questions: **5×3 = 15**

(a) State the advantages of linked-list over array.

(b) Write an algorithm for binary search and explain it with a suitable example.

(c) Write an algorithm for postfix evaluation and explain it with a suitable example.

(d) Write an algorithm to insert a node in BST.

(e) What are the drawbacks of array implementation of Queue? Explain with an example.

3. Answer any two questions: **10×2 = 20**

(a) Define stack. Write an algorithm to implement a stack using linked list.

Convert the following expression to its postfix equivalent.   (2+3+5)

(b) Define array. What is sparse matrix? Give example. State the advantages and

disadvantages of recursion. Analysis the complexity of linear search. (2+2+3+3)

(c) Consider the following array   (5+5)

9	2	1	8	2	5	6

Sort the above array using insertion and selection sort.

………..

1. Answer following questions (1 mark for each question)
    a. What is an operating system?
    b. What is the function of kernel of operating system?
    c. Define PCB.
    d. What do you mean by process?
    e. What the basic difference between multiprogramming and multiprocessing system?
    f. What is a thread?
    g. What do mean by pre-emptive type process scheduling?
    h. Define a semaphore.
    i. What is demand paging?
    j. What is segmentation?
    k. What is deadlock?
    l. What is external fragmentation?
    m. What is internal fragmentation?
    n. What do you mean by spooling?
    o. What is Belady's anomaly?
    p. What is thrashing?
2. Answer the following questions (3 marks for each question)
    a. Differentiate multiprogramming and multiprocessing system.
    b. What is fragmentation? Describe different types of fragmentation.
    c. Discuss different states of a process with diagram.
    d. Write a short note on paging.
    e. Differentiate paging and segmentation.
    f. Differentiate fixed partition and variable partition memory allocation.
    g. Discuss pre-emptive SJF scheduling algorithm with an example.
    h. Discuss different threading issues.
    i. Discuss different file allocation methods.
    j. What do you mean by authentication and authorization?
3. Answer the following questions (10 marks for each question)
    a. Discuss different services provided by an operating system.
    b. Discuss the Critical-Section Problem. Explain the requirements of a solution that must be satisfied to solve the Critical Section Problem. How can semaphores be used to solve the Critical Section Problem?
    c. Discuss different necessary conditions to achieve a deadlock situation.
    d. Describe Banker's algorithm with an example to show how deadlock can be avoided.
    e. Describe round-robin and multilevel feedback queue scheduling with proper example.
    f. Discuss FIFO and LRU page replacement algorithm with suitable example.
    g. Define 'Turnaround Time' and 'Waiting Time'. Consider the following set of processes with the length of the CPU burst given in milliseconds:

Process	Arrival Time	C.P.U. Burst Time
P0	1	3
P1	2	6
P2	0	2
P3	3	7
P4	2	4
P5	6	2

Compute the average waiting time using FCFS and SJF scheduling.

1. Answer following questions (**1 mark for each questions**)
   a. Expand OSI
   b. What is network topology?
   c. Give name of any four types of network topology.
   d. Name two error correction code.
   e. What is the task of transport layer?
   f. In which layer switching is done?
   g. In which layer packeting is done?
   h. Name any two protocols of application layer.
   i. Expand DNS and FTP.
   j. Expand CRC.
   k. What is repeater?
   l. Assume '7' devices arranged in a mesh topology. How many cables are needed?
   m. Define FDM.
   n. Name any two types of guided transmission media.
   o. Define circuit switching.
   p. What are the tasks of data link layer?
   q. Expand CSMA.
   r. What do you mean by flow control?

2. Answer following questions (**5 marks for each question**)
   a. Differentiate between Half-duplex and Full-duplex.
   b. Explain FDM and TDM with suitable examples.
   c. Discuss ring topology with advantages and disadvantages.
   d. Discuss the different protocols present in TCP/IP reference model.
   e. Describe Fibre optic cable.
   f. Discuss Coaxial cable.
   g. Discuss WAN with suitable example.
   h. Write a short note on DNS.
   i. Write a short note on WWW.
   j. Write a short note on HTTP.
   k. Differentiate between parallel and serial transmission.
   l. Discuss NRZ encoding technique with suitable diagram.
   m. Discuss bipolar encoding with suitable diagram.
   n. Discuss sampling and quantization technique of analog to digital data conversion.
   o. Discuss line of sight transmission.
   p. Discuss tasks of data link layer.

3. Answer the following questions (**10 marks for each question**)
   a. What is ARQ? Explain stop and wait ARQ and go-back-n ARQ.
   b. Discuss connection-oriented virtual circuit switching with the help of examples.
   c. Discuss different types of topologies.
   d. Discuss the objectives of architecture. Describe the architecture of the TCP/IP model with a neat diagram.
   e. Explain different switching techniques with diagram.
   f. Discuss different routing techniques.
   g. Discuss IP and ICMP protocols.
   h. Explain User Datagram Protocol (UDP).
   i. Differentiate between TCP and UDP.
   j. Discuss different flow control methods used in transport layer.

CC8 : Design and Analysis of Algorithms
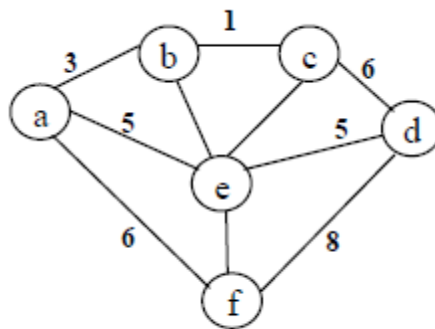
1. Answer any five of the following: **1×5 = 5**

(a) What is an Algorithm?

(b) What are the types of algorithm efficiencies?

(c) What is worst-case efficiency?

(d) What is order of growth?

(e) Define recurrence relation.

(f) Define convex hull problem.

(g) Define Knapsack problem.

(h) Define max heap.

2. Answer any three of the following: **5×3 = 15**

(a) Discuss the properties of Algorithm.

(b) Explain the divide and conquer strategy.

(c) What are the different applications of DFS and BFS?

(d) Explain Greedy Technique.

(e) Using Prim's algorithm, determine minimum cost spanning tree for the weighted

graph shown below:

3. Answer any two of the following: **10×2 = 20**

(a) Explain Asymptotic Notations.

(b) Write an algorithm for binary search. Further derive the algorithmic complexity of binary search.

(c) Write an algorithm for quick sort. Further derive the algorithmic complexity of quick sort.

(d) Define Dijkstra's Algorithm. Calculate the efficiency of Dijkstra's Algorithm.

(e) Describe the Warshall's algorithm with example and analyze its efficiency.

CBCS BSc. Honours 4TH Semester Examination
COMPUTER SCIENCE
CC9-SOFTWARE ENGINEERING
....

1. Answer following questions (1 mark for each question)
   a. Define Software engineering.
   b. Define SDLC.
   c. What is the basic difference between classical waterfall model and iterative waterfall model of software development?
   d. What do you mean by 'feasibility study' in software development process?
   e. Expand SRS.
   f. Mention one disadvantage of prototyping model of software development.
   g. Which model of software development process, according to you, depict user requirements accurately?
   h. Name the characteristics of a good SRS?
   i. What is software reliability?
   j. What is reliability metric?
   k. Expand DFD.
   l. What is the idea of software quality assurance (SQA)?
   m. What do you mean by software risk ?
   n. What is schedule slippage?
   o. Why software testing is needed?
   p. What is white box testing?
   q. What is black box testing?
   r. What do you mean by unit testing?
   s. What is system testing?
   t. What is acceptance testing?
   u. What are the different types of system testing?
   v. What is coupling?
   w. What is cohesion?

2. Answer following questions (5 marks for each question)
   a. Differentiate between classical waterfall model and iterative waterfall model.
   b. Discuss spiral model of software development process.
   c. Show software engineering as a layered technology.
   d. Discuss different components to draw a DFD.
   e. Discuss different characteristics of good software.
   f. Discuss different characteristics of good SRS.
   g. Write a short note on software quality assurance.
   h. Write a short note on black box testing.
   i. Explain different types of system testing.
   j. Discuss the needs of SRS.
   k. Discuss different techniques of user requirement gathering.
   l. What are size metrics? How function point metric advantages over LOC metric?
   m. Explain in brief about Project scheduling using PERT and GANTT charts.
   n. Differentiate software process framework and umbrella activities.

3. Answer following questions (10 marks for each question)
   a. Discuss iterative waterfall model.
   b. Discuss evolutionary model of software development.
   c. Discuss advantages and disadvantages of classical waterfall model.
   d. What are the differences among formal, semiformal and informal methods of software development?
   e. Differentiate between white box testing and black box testing methods.
   f. What is software reverse engineering? When it is useful?

g. How cost of software development is estimated? Are these estimation processes always correct? If not, then why?

h. Define the meaning of software quality and detail the factors which affect the quality not productivity of a software product?

i. What are the best practices for software quality assurance? Discuss.

j. Distinguish between software quality assurance and software quality control.

k. Discuss different risks related to software development process with suitable example.

l. Explain in detail the risk management process in during software development.

m. Briefly discuss and differentiate between the following: (i) Verification and Validation (ii) Alpha and Beta testing.

n. Discuss Data Design at the Architectural Level and Component Level.

1. Answer following questions (1 mark for each question)
   a. Define DBMS.
   b. What are the different types of keys, used in database?
   c. What do you mean by foreign key?
   d. What is candidate key? Give an example.
   e. What is secondary key?
   f. What are the different levels of three level architecture of DBMS?
   g. What is data abstraction?
   h. What do you mean by instance of database?
   i. What do you understand by logical data abstraction?
   j. Name various types of DBMS language.
   k. Give example of transaction control language (TCL).
   l. What is relational algebra?
   m. What is transaction in DBMS?
   n. What is granularity of data?
   o. What is view in DBMS?
   p. Define attribute.
   q. What is cardinality?
   r.

2. Answer following questions (5 marks for each question)
   a. Explain three-tier architecture of DBMS.
   b. Write short note on Instance and schema.
   c. Write a short note on data abstraction.
   d. Define normalization, structural constraints, interfaces, and scheduling
   e. Differentiate between instance and schema.
   f. Differentiate between Physical and logical data independence.
   g. Discuss different types of relationship in ER diagram.
   h. Write a short note on functional dependency.
   i. Discuss advantages and disadvantages of Hash file organization.
   j. Write a short note on cluster file organization.

3. Answer following questions (10 marks for each question)
   a. Discuss advantages of DBMS over file system.
   b. Discuss three-level architecture of DBMS.
   c. Discuss various DBMS language with suitable example.
   d. What is data model? Briefly describe different data models.
   e. What is an ER diagram? Draw and discuss ER diagram of library management system
   f. Explain data redundancy and inconsistency with the help of an example.
   g. What is normalization? Discuss different normalization with example up to 3NF.
   h. Discuss different data integrity constraints in DBMS.
   i. Discuss different keys in DBMS with suitable example.
   j. Why normalization is required? Discuss different anomalies in DBMS.
   k. Explain ACID property in DBMS.
   l. Discuss different concurrency control protocols in DBMS.
   m. Consider the following tables: Part(p_id, p_name, p_cost), Customer(c_id, p_id, c_name), Supplier(s_id, s_name, p_id, p_city) ,Shop(sh_id, p_id, c_id, s_id, sh_city) and perform following operations-

      Insert into table part a new column named part details.
      List the name of customers who are from the same city
      List the customers who have been supplied with minimum number of parts.

CC11 : Internet Technologies

Answer any five questions from the following   **1×5 = 5**

1. Which programming language always makes platform-independent application?

 (a) Java (b) Visual Basic (c) C++ (d) C

2. The transport layer protocol is

 (a) ALP (b) PPX (c) TCP (d) None

3. JDK include

(a) Java (b) Javac (c) JDB (d) All

4. Buffer overflow attacks means

 (a) Collect and relay some data (b) Get full system access (c) Play and display advertisement (d) Slow down system

5. A firewall can be

 (a) A Hardware (b) A Software (c) Both Hardware and Software (d) Network Engine

6. Encoding data to make them unintelligible to unauthorized persons

 (a) Decoding (b) Encoding (c) Encryption (d) Decryption

7. Which one of the following is not used to generate dynamic web pages?

 (a) PHP (b) ASP.NET (c) JSP (d) None of the mentioned

8. Which of the following is not a web browser?

(a) Opera (b) NetSurf (c) WWW (d) Google Chrome

Answer any three questions from the following   **5×3 = 15**

9. What is the difference between HTTP GET and POST methods?

10. Write a JavaScript program to find the sum of squares of 10 numbers. The script should accept the numbers from the user.

11. What do you mean by registering an event handler? Explain with an example.

12. Name any four built-in methods for performing operations using Math objects in JavaScript. Also write its usage.

13. What is token? List the various type of tokens supported by the Java.

Answer any two questions from the following   **10×2 = 20**

14. Write down the purpose of client-side scripting and server-side scripting. How it can be achieved in web applications? Write an example for each.

15. What do you understand by web services? Make a general diagram for any application involving web services. It should show various technologies/tools used for creating such applications.

16. What is JSP? What are the life-cycle methods for a JSP? List out some advantages of using JSP. How is JSP used in the MVC model?
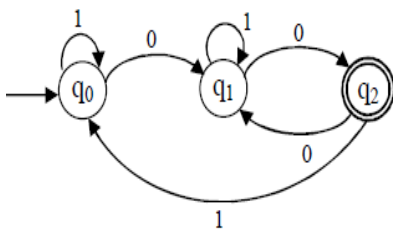
17. What are Java Beans? What is bean persistence property? Why is not a Bean an Applet? What are the security implications for downloading Beans over the internet?

1. Answer following questions (3 marks for each question)
   a. What is regular expression? Explain different regular expression notations.
   b. Write a short note on Finite automata.
   c. Give four example of regular set.
   d. Define Chomsky's Normal Form with an example
   e. What is context free grammar?
   f. What is multi tape Turing Machine?
   g. What are the applications of pumping lemma?
   h. Define transition graphs.
   i. Define parse tree. Give an example.
   j. What are the different operations done on regular language?
   k. Define alphabet and string with example.
   l. Test the grammar for ambiguity-
      $S \rightarrow AB$
      $A \rightarrow aA \mid \epsilon$
      $B \rightarrow ab \mid bB \mid \epsilon$

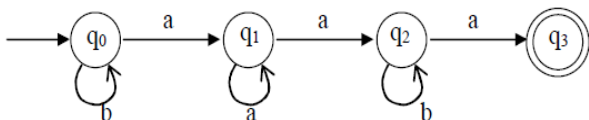2. Answer following question(6 marks for each question)
   a. Differentiate between DFA and NFA.
   b. Test whether the string 010010 and 01010 are accepted by the finite automata given in the following figure or not-

   c. Construct a DFA from the given NFA-

Present State	Next State	
	0	1
$\rightarrow q_0$	q_0, q_1	q_0
q_1	q_2	q_1
q_2	q_3	q_3
q_3	—	q_2

   d. State Arden's theorem and prove it.
   e. Find the regular expression for the language accepted by the following automata

   f. Let G be a grammar:
      $S \rightarrow aAS \mid a$
      $A \rightarrow SbA \mid SS \mid ba$
   Derive a string "aabbaa" using left most and right most derivations.
   g. Design a PDA for the language $a_n b_n$.
   h. Write a short note on Turing Machine.
   i.

3. Answer following questions(12 marks for each question)

a. Discuss closure properties of regular languages.
b. Explain with example different types of grammar according to Chomsky's hierarchy.
c. Explain steps of equivalence theorem to minimize a DFA .Give an example.
d. Construct a minimized DFA that accepts all binary strings starts with a substring '00' and ends with '11'.
e. Let G be a grammar-

   E=E+T|T

   T=T*F|F

   F=(E)|a

   Now construct (i) leftmost derivation (ii) rightmost derivation and (iii) parse tree

   of the following sentence-

$$W: (a+a * a)* (a + a)$$

f. Convert the following regular expression into finite automata: $(a+b)*$ aba$(a+b)*$.

g. State Pumping lemma for regular language. Show that the language $L=\{a^n b^n : n>=0\}$ is not regular using pumping lemma.
h. Using parse tree show that the grammar S→S+S|S*S|a is ambiguous. Use a+a*a as the string.

CC13 : Artificial Intelligence

Answer any five questions   **1×5 = 5**

1. Who is the Father of Artificial Intelligence?

2. Blind search used in which situation?

3. Which is the common language for AI?

4. What are the logic symbols in AI?

5. Write the form of a procedural domain knowledge in a rule based system.

6. How many types of quantification are there in AI?

7. Define Complete Algorithm.

8. Write the name of machine learning methods.

Answer any three questions   **5×3 = 15**

9. Distinguish between BFS and DFS.

10. Write an algorithm for simple hill climbing.

11. Explain architecture of an Expert System. Give its three application areas.

12. Describe different types of knowledge required to build an Expert system.

13. List various task domains of AI.

Answer any two questions   **10×2 = 20**

14. Explain the effect of overestimation and underestimation of it on A* Algorithm.

15. Explain the Resolution algorithm used for reasoning under predicate logic with an example.

16. Describe any four informed searching technique with suitable example.

17. What are the possible heuristic for the travelling salesman problem?

CBCS BSc. Honours 6TH Semester Examination
COMPUTER SCIENCE
CC14-Computer Graphics
....

1. Answer following questions (**1 mark for each question**)
   a. What do you mean by Resolution?
   b. List three input devices that are used as graphics device.
   c. Define aspect ratio.
   d. What is clipping?
   e. What are the different types of 2D transformation?
   f. What is shearing?
   g. What do you mean by morphing?
   h. Expand CRT.
   i. Expand DDA.
   j. Expand DVST.
   k. Define pixel.
   l. What is viewport?
   m. What is frame buffer?
   n. What are homogenous coordinates?
   o. Define colour depth.
   p. Expand VIM.
   q. What is vanishing point?
   r. Define intensity.

2. Answer following question(**5 marks for each question**)
   a. Differentiate between random scan display and raster scan display.
   b. Explain the concept of line clipping.
   c. Discuss DDA line drawing algorithm.
   d. Compare Flood fill algorithm and Boundary fill algorithm.
   e. Explain text clipping.
   f. Write a short note on projection.
   g. Explain 2D rotation with the help of an example.
   h. Discuss working principle of two input and two output devices.
   i. A point (4, 3) is rotated counter clockwise by an angle 45°. Find the rotation matrix and the resultant point.

3. Answer following questions(**10 marks for each question**)
   a. What is transformation? Discuss different types of 2D transformation with suitable example.
   b. What is clipping? Explain Sutherland-Hodgeman algorithm of polygon clipping.
   c. Explain the working process of CRT monitor with proper diagram.
   d. Explain midpoint circle drawing algorithm.
   e. Discuss applications of computer graphics.
   f. Derive the expression for decision parameter used in Bresenham's circle drawing algorithm.
   g. Explain Bezier curves and surface.
   h. Explain any two types of 3D geometric transformation with proper diagram.
   i. What is shading? Explain phong shading.

E1-MICROPROCESSOR

1. Answer following questions (**1 mark for each question**)
   a. Name some special purpose registers in 8085.
   b. What is an instruction code?
   c. What are the various types of instruction formats ?
   d. What do you mean by addressing mode?
   e. What is hit ratio?
   f. Name various types of interrupts in 8085 microprocessor.
   g. What is cache memory?
   h. What is program status word (PSW)?
   i. What is the task of program counter?
   j. What is the size of data bus in 8085?
   k. What are the different types of system bus?
   l. What type of signal is transmitted through control bus?
   m. Which interrupt is the non-vectored in 8085?
2. Answer following question(**5 marks for each question**)
   a. Write a short note on general purpose registers.
   b. Write a short note on accumulator.
   c. Discuss different flag registers present in 8085 microprocessor.
   d. Discuss any two addressing modes of 8085 microprocessor.
   e. With suitable diagram, explain how the Address/Data bus (AD0-AD7) of 8085 microprocessor is de-multiplexed.
   f. Explain instruction cycle with proper diagram.
   g. Write a short note on cache memory.
   h. Discuss zero addressing, one addressing and two addressing instruction format with suitable example.
3. Answer following questions(**10 marks for each question**)
   a. Discuss memory interfacing techniques with 8085 microprocessor.
   b. Explain different special purpose registers of 8085 microprocessor.
   c. What are vectored interrupts? How is the address of the Interrupt Service Routine calculated in vectored interrupts? Explain with an example.
   d. Discuss various addressing modes in 8085 microprocessor.
   e. Explain internal architecture of 8085 microprocessor with diagram.
   f. Explain the need of DMA. Discuss in detail about the DMA data transfer scheme.
   g. Draw and explain system bus architecture of 8085 microprocessor.
   h. Write an assembly program to find if a given number is odd or even. Explain each instruction of the program.
   i. Discuss the data transfer instructions of 8085 microprocessor.

E2-INFORMATION SECURITY

1. Answer the following questions (**1 mark for each question**)
   a. What is information security?
   b. Mention the components of Information security.
   c. What are worms in context to information security?
   d. What are viruses in context to information security?
   e. What is the importance of digital signatures?
   f. What is phishing?
   g. What is data confidentiality?
   h. What is Data Integrity?
   i. What is cipher key?
   j. What is the aim of encryption?
   k. What is authentication? What is hash function?
   l. What is inference?
   m. What do you understand by "security policy"?
   n. What are the worms?
   o. What is firewall?
   p. What are Trojan Horses?
   q. What is denial of service attack?
   r. What is the difference between attack and vulnerability?
   s. What is residual risk?

2. Answer the following questions (**5 marks for each question**)
   a. Explain various types of attack on computer system.
   b. Explain the various components of an Information system.
   c. Write a short note on digital signature.
   d. Give a brief discussion on "memory and address protection".
   e. Write a short note on transposition cipher.
   f. Differentiate between symmetric and asymmetric encryption.
   g. What are the integrity and confidentiality of data?
   h. Explain cryptanalysis. Discuss any one technique for it.
   i. Explain limitation of DES in detail.

3. Answer the following questions (**10 marks for each question**)
   a. What are Security Services and Security Mechanisms? Briefly classify the categories of Security Services and Security Mechanisms.
   b. What is digital certificate? Explain purposes of making digital certificate.
   c. What is the difference between a 'digital signature' a 'digital certificate' and a 'digital signature certificate (DSC)'?
   d. What are the different types of Hacker? Differentiate between Hackers and Crackers.
   e. What do you mean by cryptography? Explain Plain Text and Cipher Text?
   f. What is a code? Briefly explain malicious and Non malicious code.
   g. With neat illustration explain Data Encryption Standard (DES) algorithm.
   h. Compare public key and private key in cryptography with examples.
   i. Discuss different ethical issues in security.

1. Answer the following questions (**1 mark for each question**)
   a. What do you mean by uniformity test?
   b. What is model of a system?
   c. Define queuing system.
   d. What is point estimation?
   e. What is Simulation?
   f. Define Markov Chain.
   g. What is a deterministic activity?
   h. When Simulation is not appropriate tool?
   i. What do you mean by discrete systems?
   j. What do you mean by continuous systems?
   k. What are Real Time Systems?
   l. List two simulation SW packages.
   m. What is a stochastic activity?
   n. What is model validation?

2. Answer the following questions (**5 marks for each questions**)
   a. Write a short note on discrete system modelling.
   b. Write a short note on feedback system.
   c. What are the various types of simulation models?
   d. What do you mean by pseudo random numbers?-Explain with example.
   e. Explain with example: calibration and validation of models.
   f. Write a short note on stochastic system.
   g. Differentiate between analytical model and numerical model.
   h. Explain the steps in Simulation study.
   i. Discuss the Monte-Carlo Method with example.
   j. Write short notes on Cobweb Models.

3. Answer the following questions (**10 marks for each question**)
   a. What is simulation? List some advantages and disadvantages of simulation.
   b. What do you mean by system modelling? Differentiate between continuous and discrete system.
   c. Discuss about a simulation of a manufacturing shop.
   d. What is queuing model? How it is useful for simulation?
   e. Differentiate between Dynamic physical models and Static physical models with suitable examples.
   f. Explain Markov Chains with examples and its applications.
   g. List any five circumstances, when the simulation is the appropriate tool and when it is not.
   h. What are pseudorandom numbers? What are the problems that occur while generating pseudorandom number?

DSE - 2 - E1: Operational Research for Computer Science

1. Answer any five questions: 1×5 = 5

(a) What is called unit matrix?

(b) Define rank of a matrix.

(c) Show that

$$\begin{vmatrix} 5 & 2 & 3 \\ 7 & 3 & 4 \\ 9 & 4 & 5 \end{vmatrix} = 0$$

(d) When we get infinite number of solutions in a linear programming problem?

(e) In simplex method, when can we say the current solution is the optimal solution?

(f) Give the advantage to solve the dual rather than to solve the primal of an LPP.

(g) Why artificial variables are used along with surplus variables in LPP?

(h) Can we say an assignment problem is a special type of transportation problem?

Answer any *three* questions   **5×3 = 15**

2. Find the initial basic feasible solution by North West corner rule of the following transportation problem.

Destination

Source	D_1	D_2	D_3	D_4	Supply
S_1	2	3	11	7	6
S_2	1	0	6	1	1
S_3	5	8	15	9	10
Demand	7	5	3	2	

3. Use graphical method to solve the following

$$\text{Maximize } Z = 15x_1 + 20x_2$$
$$\text{Subject to } x_1 + 2x_2 \geq 10$$
$$2x_1 - 3x_2 \leq 6$$
$$x_1 + x_2 \geq 6$$
$$x_1, x_2 \geq 0$$

4. Find the rank of the matrix

$$A = \begin{bmatrix} 3 & -1 & 2 \\ -6 & 2 & -4 \\ -3 & 1 & -2 \end{bmatrix}$$

5. Compute the inverse of the matrix

$$A = \begin{bmatrix} 1 & 6 & 4 \\ 0 & 2 & 3 \\ 0 & 1 & 2 \end{bmatrix}$$

6. What is dual simplex method? Give the differences between regular simplex method and dual simplex method.

Answer any two questions 10×2 = 20

7. Use dual simplex method to solve

$$\text{Maximize } Z = -3x_1 - 2x_2$$

$$\text{Subject to } x_1 + x_2 \geq 1$$

$$x_1 + x_2 \leq 7$$

$$x_1 + 2x_2 \geq 10$$

$$x_2 \leq 3$$

$$x_1, x_2 \geq 0$$

8. Solve by simplex method

$$\text{Maximize } Z = 5x_1 + 3x_2$$

$$\text{Subject to } \quad x_1 + x_2 \leq 2$$

$$5x_1 + 2x_2 \leq 10$$

$$3x_1 + 8x_2 \leq 12$$

$$\text{and} \qquad x_1, x_2 \geq 0$$

9. Describe the mathematical formulation of an assignment problem. Explain the steps of the Hungarian method for solving assignment problems.

10. Solve the following transportation problem.

	D_1	D_2	D_3	D_4	Supply
O_1	6	1	9	3	70
O_2	11	5	2	8	55
O_3	10	12	41	7	70
Demand	85	35	50	45	

DSE 2 : E2 (Combinatorial Optimization)

1. Answer any *five* questions: **1×5 = 5**
(a) What is global optimum?
(b) What do you mean by degeneracy?
(c) Which method is used to solve LPP without artificial variables?
(d) What do you understand by optimization problems?
(e) What do you understand by feasible solution?
(f) What is Neighbourhood in optimization?
(g) What is LPP?
(h) What is convex set?

2. Answer any *three* questions: **5×3 = 15**
(a) Explain Cutting Plane algorithm.
(b) Explain strong duality in LPP.
(c) Explain Dantzig-Wolfe algorithm.
(d) Write short notes on Exhaustive search method.
(e) Write short note on Simplex Method.

3. Answer any *two* questions: **10×2 = 20**
(a) Explain the Travelling Salesman Problem (TSP). Which approximation algorithm is suitable to solve the TSP? Justify your answer.
(b) Explain Variable Neighbourhood Search (VNS) algorithm with suitable example.
(c) Write algorithm for Dual Simplex method. Further explain the algorithm.
(d) Find solution of the following using Branch and Bound method:

$$\text{Maximize } Z = 5x_1 + 6x_2 + 4x_3$$
$$\text{Subject to } 5x_1 + 3x_2 + 6x_3 \le 20$$
$$x_1 + 3x_2 \le 12$$
$$x_1, x_3 \ge 0$$
$$x_2 \ge 0 \text{ and integer}$$

NUMERICAL METHODS

1. Answer any *five* questions: 1×5 = 5
(a) What do you mean by transcendental equation?
(b) What are the advantages of Regula Falsi Method?
(c) What is statistical inference?
(d) When the Newton-Raphson method may fail?
(e) What is polynomial interpolation?
(f) What are the disadvantages of Newton-Raphson's method?
(g) Write down the advantages of Modified Euler Method.
(h) What is the main difference between the Jacobi and Gauss-Seidel?

2. Answer any *three* questions: 5×3 = 15

(a) Find the root which lies between 1 and 2 of $f(x) = 2x^3 - 2.5x - 5 = 0$ using Newton-Raphson's method.

(b) Find a root which lies between 1 and 2 of $f(x) = x^3 + 2x^2 + 10x - 20$ using the Regula-Falsi method.

(c) Determine the root of the given equation $x^2 - 3 = 0$ using Bisection Method.

(d) A real root of the equation $f(x) = x^3 - 5x + 1 = 0$ lies in the interval (0, 1). Perform Secant Method for finding root.

(e) What are iterative methods and how do they differ from direct methods?

3. Answer any *two* questions: 10×2 = 20

(a) Solve the following system of equations using Gauss-Seidel iterative method
$$8x - y + z = 18$$
$$2x + 5y - 2z = 3$$
$$x + y - 3z = -6$$

(b) Solve the following equations using Jacobi's iteration method
$$28x + 4y - z = 32$$
$$x + 3y + 10z = 24$$
$$2x + 17y + 4z = 35$$

(c) Using Runge-Kutta method of fourth order, solve $\dfrac{dy}{dx} = \dfrac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $x = 0.2, 0.4$

(d) Solve the following set of equations by Gauss Elimination method:
$$x + 3y + 10z = 24$$
$$2x + 17y + 4z = 35$$
$$28x + 4y - z = 32$$

DSE3

DSE 3 : [E1: Digital Image Processing]

Answer any five questions   **1×5 = 5**

1. Define a digital image.

2. Give an example of each image that can be created by the following electromagnetic rays: (i) Gamma rays (ii) Infrared

3. Define weber ratio.

4. What is aliasing?

5. What is image compression?

6. Expand DCT.

7. Give two example of edge kernel operator.

8. Define contrast stretching.

Answer any three questions   **5×3 = 15**

9. Discuss the piecewise Linear transformation.

10. Write a short note on Co-ordinate convention.

11. Write a short note on sampling and quantization.

12. Discuss the concept of Contrast Stretching.

13. Write a short note on Huffman coding.

Answer any two questions   **10×2 = 20**

14.(a) Consider the following 3 bit image.

$$I = \begin{array}{|c|c|c|c|c|c|c|c|c|c|}
\hline
2 & 2 & 2 & 5 & 5 & 5 & 4 & 4 & 5 & 3 \\
\hline
2 & 2 & 2 & 5 & 4 & 5 & 3 & 3 & 3 & 2 \\
\hline
2 & 3 & 3 & 5 & 2 & 1 & 5 & 5 & 5 & 2 \\
\hline
3 & 2 & 2 & 5 & 3 & 4 & 4 & 4 & 2 & 1 \\
\hline
2 & 2 & 3 & 2 & 1 & 1 & 5 & 4 & 2 & 0 \\
\hline
2 & 2 & 3 & 2 & 2 & 1 & 5 & 5 & 5 & 3 \\
\hline
3 & 3 & 2 & 2 & 2 & 2 & 3 & 3 & 3 & 3 \\
\hline
2 & 2 & 2 & 4 & 4 & 4 & 2 & 2 & 2 & 2 \\
\hline
2 & 2 & 2 & 5 & 4 & 2 & 2 & 2 & 2 & 1 \\
\hline
\end{array}$$

find the histogram equalized image of I.

(b) Discuss LZW coding. (7+3)

15.(a) Discuss Fourier Transformation and its properties. (6+4)

(b) Discuss spatial correlation and convolution operation in digital image processing.

16. Discuss image morphing in detail. 10

17. What is image compression? Differentiate Lossy and Lossless image compression. (2+8)

DSE 3: [E2: Introduction to Data Sciences]

Answer any five from following   **1×5 = 5**

1. Define Data Science.

2. What do you mean by Data Pre-processing?

3. What are the techniques available to clean data in an excel sheet?

4. Define cross validation.

5. What is the syntax for defining a matrix in R?

6. How Data Science differs from Big Data?

7. Why data cleansing is important?

8. What is GitHub used for?

Answer any three from following   **5×3 = 15**

9. What is Data Science and its benefits?

10. What are the goals of Data Science?

11. What are the problems face when handling large data?

12. Explain R objects.

13. Discuss how to collect data from a website.

14. Explain different stages of data science.

Answer any two from following   **10×2 = 20**

15. Explain the application of Data Science in various fields.

16. Write about the various methods of Data Collection involved in Data Science.

17. Explain data security issues with suitable examples.

18.(a) What are vectorized operations in R? Give example. (3+3+4)

(b) Briefly explain "for loop" and "while loop" in R.

(c) Briefly explain how the objects and classes defined in R.

DSE 3: [E3: Data Mining]

1. Answer any five questions: **1×5 = 5**

(a) What is Data mining?

(b) Write the name of four data mining tools.

(c) What is metadata?

(d) Define Spatial Data mining.

(e) Mention the need of Data mining.

(f) Define Data cleaning.

(g) Mention the relation between Data mining tools and Query tools.

(h) Write the name of appropriate Data mining technologies.

2. Answer any three questions: **5×3 = 15**

(a) Compare Data, Information and Knowledge with suitable example.

(b) Briefly mention the major issues of Data mining.

(c) Discuss the noisy data with suitable example.

(d) Mention few real time applications of Data mining.

(e) Compare Descriptive Data mining and Predictive Data mining.

3. Answer any two questions: **10×2 = 20**

(a) With appropriate examples explain the classification of Data mining.

(b) Explain in detail the "Decision tree" with suitable example. Also justify why prune is needed in such tree.

(c) Discuss in brief any four data pre-processing approaches.

(d) Discuss the steps of the Data mining process.

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E1-MACHINE LEARNING

1. Answer following questions (**1 mark for each question**)
    a. What are the key elements of Machine Learning?
    b. Define supervised type machine learning.
    c. Define unsupervised type machine learning.
    d. What is neural network?
    e. What is over fitting?
    f. What is regularization?
    g. What is training set and test set in a machine learning model?
    h. List the supervised machine learning techniques.
    i. List different unsupervised machine learning techniques.
    j. What is logistic regression technique?
    k. What is 'naive' in Naive Bayes classifier?
    l. Give some examples of classification problem.
    m. What is random forest?
    n. Expand KNN.
    o. Expand ANN.
    p. What is 'bias' and 'varience' in machine learning model?
    q. Can we say machine learning is a subset of Artificial Intelligence?
    r. What is Training set in Supervised Learning?
    s. Give an example of supervised learning from our life experience.
    t. Give an example of unsupervised learning from our life experience.
    u.
    v.

2. Answer following question(**5 marks for each question**)
    a. Differentiate between machine learning and deep learning.
    b. Discuss KNN model of machine learning.
    c. Briefly explain logistic regression model.
    d. Write a short note on supervised learning.
    e. Write a short note on unsupervised learning.
    f. Explain the difference between K-Nearest Neighbours and *K* means clustering.
    g. Discuss "matrix addition" with an example.
    h. Why graphical representation of data through data plotting is important?
    i. Discuss gradient and perception training.

3. Answer following questions(**10 marks for each question**)
    a. Explain the multi-layer perceptron model .
    b. Describe in detail all the steps involved in designing a learning system. Explain with an example the 'Training Set' and 'Test Set'.
    c. Explain Naive Bayes classifier with an example. Discuss with example some useful applications of machine learning.
    d. Discuss how logistic regression is different from linear regression with example.
    e. Discuss applications of machine learning in different fields with example.
    f. What is vectorization? How it is used to speed up Program Code?
    g. Discuss Backpropagation in neural network.
    h. Discuss different learning methods.

1. Answer the following questions (**1 mark for each question**)
   a. What is compiler?
   b. What is cross-compiler?
   c. What is the main task of assembler?
   d. What are the different types of assembler?
   e. Mention the task of linker and loader.
   f. What is the basic difference between 'pass' and 'phase'?
   g. What is the task of syntax analyzer phase?
   h. What is parsing?
   i. Define symbol table.
   j. What do mean by 'token'?
   k. What is dynamic linking?
   l. What is the main difference between compiler and interpreter?
   m. What is the bootstrap loader?
   n. What is code optimization?
   o. What is the need of a language translator in a computer system?
   p. What is debugging?
   q. What is the main task of lexical analyzer?
   r. Mention the role of linker.

2. Answer the following questions (**5 marks for each question**)
   a. Differentiate one pass and two pass assembler.
   b. Compiler is system software-Explain.
   c. Define compiler. What are the phases of a compiler?
   d. Write a short note on Lexical analyzer.
   e. What are the different code optimization techniques?
   f. Explain different linking scheme.
   g. Write a short note on LR parser.
   h. Write a short note on syntax directed translation.
   i. Write a short note on different forms of object code.
   j. What do you mean by semantic error and syntactic error? Explain with example.

3. Answer the following questions (**10 marks for each question**)
   a. Discuss any three phases of a compiler with a neat sketch.
   b. Describe the logic flow of a two pass Assembler.
   c. Differentiate between a top down and a bottom-up parse.
   d. Give the database specification of pass I and pass 2 of a two-pass assembler.
   e. Explain LR parser with its parsing algorithm.
   f. What is absolute loader? Explain its algorithm.
   g. Discuss different storage allocation techniques.

E3-CLOUD COMPUTING

1. Answer the following questions (**1 mark for each question**)
   a. Define cloud computing.
   b. Differentiate private cloud and public cloud.
   c. What is the significance of a Virtual Machine?
   d. What is cluster computing?
   e. What is Utility Computing?
   f. What is client-server architecture?
   g. What is a distributed file system?
   h. What is grid computing?
   i. What is Hybrid Cloud?
   j. What is Community Cloud?
   k. What is NIST?
   l. What is pre-cloud computing?
   m. What are the different types of users of cloud?
   n. Name different layers of cloud architecture.
   o. What is authentication in cloud computing?
   p. What is scalability?
   q. What is the basic difference between cloud computing and traditional computing?
   r. What are the basic clouds in cloud computing?

2. Answer the following questions **(5 marks for each question**)
   a. Write a short note on Software as a Service (SAAS).
   b. Discuss various security benefits of cloud computing.
   c. What are the open source cloud computing platform databases?
   d. Differentiate between different types of virtualization.
   e. What are the types of risk in cloud computing?
   f. Draw two level architecture of resource allocation in cloud.
   g. Write short note on "Google App Engine".
   h. Write short note on "Microsoft Azure".
   i. Discuss various applications of cloud computing.
   j. Differentiate between 'SaaS' and 'PaaS'.

3. Answer the following questions (**10 marks for each question**)
   a. Discuss different services that are provided at various levels of cloud computing.
   b. Briefly discuss the NIST cloud computing reference architecture.
   c. Explain major deployment models for cloud computing with a neat diagram. Discuss cloud Governance.
   d. Discuss Grid computing, Cluster Computing and Distributed Computing with suitable example.
   e. What is Service Level Agreements (SLAs)? Discuss.
      Discuss scaling hardware of traditional and cloud computing.
   f. Discuss Eucalyptus.
   g. Discuss benefits and limitations of cloud computing.
   h. Discuss different characteristics of cloud computing.

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SEC-E1
(DIGITAL ELECTRONICS AND SYSTEM MAINTENANCE)

1. Answer following questions (3 marks for each question)
   a. Draw OR gate using NAND gate.
   b. Write $(A+B').(A'+B)$ in SOP form.
   c. Differentiate between combinational circuit and sequential circuit.
   d. Draw a full adder using two half adders.
   e. State and prove De-Morgan's law.
   f. $(120.5)_{10} = (\, ? \,)_2 = (\, ? \,)_8$
   g. Convert $A'B+C$ into its equivalent standard SOP form.
   h. SR flip flop can be called as mother of other flip flop-Explain.
   i. Write down some applications of multiplexer.
   j. Which logic gates are called as universal gates? Why they are called so?
   k. Write a short note on XOR gate.
   l. Name any four network devices.
   m. What do you mean by utility software? Give some example.
   n. What are the importance of installing antivirus software in your computer system?-Briefly Discuss.
   o. Write a short note on parity generator.
   p. Discuss briefly the need of disk defragmentation.

2. Answer following questions (6 marks for each question)
   a. Minimize the following Boolean function using K-MAP
      $F(A,B,C,D)=\sum m(0,1,2,5,7,8,9,10,13,15)$.
   b. Describe triggering of Flip-Flops and explain operation of an edge-triggered T Flip-Flop.
   c. Explain partitioning process of HDD.
   d. Write a short note on register.
   e. Write a short note on system software.
   f. Write a short note on EPROM.
   g. Write a short not on full adder.
   h. What is operating system? Discuss about system backup, system recovery and disk defragmentation.
   i. Design and implement a 8X 1 multiplexer.
   j. Write a short note on modem.
   k. Draw and explain basic building blocks of a computer system.

3. Answer following questions (12 marks for each question)
   a. Why is disk defragmentation needed? Describe the process of disk defragmentation in a windows environment.
   b. What do you mean by 'race around condition'? How this problem can be overcome using a master-slave JK flip flop? –Discuss using proper diagram and truth table.

   c. Construct and explain a 4-bit Parallel ADDER.
   d. Construct and explain a Octal-to-Binary Encoder
   e. Construct and explain a 2-bit magnitude Comparator
   f. Design and implement a clocked SR flip flop.

   g. Differentiate between asynchronous counter and ripple counter. Explain BCD ripple counter with logic diagram and timing diagram.

1. Answer following question (3 marks for each question)
   a. What are lists? How many types of lists are there?
   b. What are link attributes? Give examples.
   c. What are default arguments?
   d. Define PHP function with example.
   e. Write down advantages of PHP.
   f. List various string functions in PHP.
   g. Distinguish HTML and XHTML.
   h. What is dynamic HTML?
   i. How do you create an HTML form?
   j. Write an example specifying the anchoring tag in HTML to create bookmark inside a document.
   k. What is the use of drop down list box in HTML? Explain with example.
   l. Explain numeric array in PHP with suitable example.
   m. What is the difference between 'for' loop and 'for each' loop in PHP? Explain.
   n. Explain classes and objects in PHP.
   o. What are the necessities of using HTML form?
   p. Write a short note on PHP operators.
2. Answer following questions (6 marks for each question)
   a. How tables are used in HTML.
   b. Explain data types in PHP.
   c. Explain internal and external linkage of HTML with example.
   d. What is the importance of HTML DOCTYPE?
   e. Write an HTML code to provide hyperlink to a website http://www.mywebsite.co.in.
   f. What is inheritance? Explain with suitable example.
   g. Explain the concept of overriding in detail.
   h. Discuss various string functions in PHP.
   i. Discuss difference between 'while' and 'do-while' loop.
   j. Explain how to redirect a form after submission.
   k. Differentiate 'break' and 'continue' statement.
   l. Discuss PHP variables and constants with examples.
   m. Differentiate between call by value and call by reference.
3. Answer following questions (12 marks for each question)
   a. Explain different types of lists in HTML. Explain attributes and controls of HTML form.
   b. Explain various types of HTML tags. What are the characteristics of HTML?
   c. Explain creation of tables and frames in HTML.
   d. Explain branching statements and loops in PHP.
   e. Discuss in detail styling forms with CSS.
   f. Explain CSS3 shadow effect in detail. Discuss how to write and format dates in PHP.
   g. Write a program in PHP that check whether a string is palindrome or not.
   h. Differentiate between HTML and DHTML. Discuss some tags used in HTML.What is the advantage of using XML over HTML?

   i. Explain the significance of PHP. Discuss inventions and versions, scope, important tools and software requirements of PHP.
   j. Explain XML and its Goals and also explain XML Structure and Syntax.

1. Answer following questions(3 marks for each question)
   a. Python program is compiled or interpreted? Explain.
   b. Explain identifiers in Python.
   c. What are the different types of operators in python? Give example of each type.
   d. Discuss 'tuples' with suitable example.
   e. Discuss debugging in python.
   f. Give some examples of library functions used in python.
   g. What is a list in python? How lists differ from tuples?
   h. How to slice a list in python?-Explain with example.
   i. Write methods to rename and delete files.
   j. Write methods to create a nested directory with example.
   k. What is dictionary in python? Give example.
   l. Discuss different access modifiers available in python.
   m. Discuss how 'map' function works with an example.
   n. Write a python code which takes an input string and returns its length.
2. Answer following questions (6 marks for each question)
   a. Write a program in python to convert a decimal number to its equivalent binary number.
   b. Write a program to show prime numbers between 1 and 100.
   c. Discuss on different python keywords.
   d. Write a Python program to check if a string is palindrome or not.
   e. Write a Python program to check whether a given number is Armstrong or not.
   f. Draw a flow chart to find roots of a quadratic equation.
   g. Explain the use of 'break' and 'continue' statement with example.
   h. Explain how exceptions are handled in python with suitable example.
   i. Write a python program to demonstrate 'while loop'.
   j. Explain various data types in python.
   k. Discuss assignment operators in python.
3. Answer the following questions(12 marks for each question)
   a. Differentiate top-down and bottom-up programming methodologies.
   b. Discuss different types of errors those may occurs in programming.
   c. Design a python program to find the second largest number in a list. Draw the flowchart.
   d. Write a menu driven program to find the Area of a square, rectangle and circle, after receiving appropriate input from user.
   e. Discuss the different types of problem solving techniques in detail.
   f. Explain loops in python with suitable example.
   g. Write python code to demonstrate different file and directory operations.
   h. Discuss different input output statements in python.

SEC - E1: Android Programming

1. Answer any four questions: **3×4 = 12**

(a) What is Hardware Abstraction Layer (HAL)?

(b) What is Android virtual device?

(c) What is the difference between overloading and overriding?

(d) What is JVM and DVM?

(e) Explain Fragments in Android.

(f) What are the features of Android SDK?

2. Answer any four questions: **6×4 = 24**

(a) Explain Android Activity Life cycle.

(b) What are the different ways to store data in Android from an application? Give example.

(c) Write short note on the following: (i) Text Field, (ii) Button Control (iii) Dialog.

(d) What is Emulator in Android development tool? Explain.

(e) Explain the following layouts with example: (i) Relative Layout (ii) Frame Layout.

(f) Write short note on 'Intents'.

3. Answer any two questions: **12×2 = 24**

(a) Create an Android application to display some web content using Web View. How to deploy it on a device?

(b) Explain SQLite database in Android by giving an example of an application connected to the database.

(c) How to create services on an Android application. Give example and explain it.

(d) Create a simple registration form and display the entered data in Android with

proper validation check.

SEC - E2: Programming in MATLAB

Answer any four questions   **3×4 = 12**

1. What are the different components of computer?

2. What are variables?

3. Name some built in functions in MATLAB.

4. What are Waveforms in MATLAB?

5. What are M-files?

6. Write the code in MATLAB to add two matrices.

Answer any four questions   **6×4 = 24**

7. Demonstrate arguments and return values in MATLAB with the help of an example.

8. Write a program in MATLAB to find the determinant of a matrix.

9. Draw a graph that joins the points (1, 0), (5, 4) and (2, 1).

10. Discuss assignment statement in MATLAB with the help of examples.

11. Write a program in MATLAB to arrange 'n' numbers in descending order.

12. Discuss 'if-else' in MATLAB.

Answer any two questions   **12×2 = 24**

13. Write a program in MATLAB to demonstrate binary division with the help of an example.

14. Write a program in MATLAB to demonstrate polynomial multiplication with the help of an example.

15. Explain different types of loops in MATLAB with the help of an example.

16. Write a program in MATLAB to read a text file containing integers and search a particular item from the list using binary search.

SEC - E3: VB.NET Programming

Answer any four question   **3×4 = 12**

1. What is Class library with reference to .Net framework?

2. What is IntelliSense? Mention any two types.

3. Explain the use of Val() and Str() functions.

4. What does Option Explicit refer to?

5. What is Collection?

6. Explain SDI and MDI.

Answer any four questions   **6×4 = 24**

7. Explain the following parts of VB IDE.

(a) Properties Window

(b) Code Window

(c) Toolbox

8. Explain MsgBox() function with syntax and example.

9. Write the syntax and explain InputBox() function.

10. Write the codes for the following:

(a) To add a string in a listbox

(b) To delete a given string from a listbox

(c) To check if a given string is present in a listbox or not

11. Explain any six noteworthy public properties of textbox.

12. Explain the use of timer control with its different events and properties.

Answer any two questions   **12×2 = 24**

13. What do you mean by visual and non-visual programming, Procedural and Object

Oriented Programming? Explain in detail.

14. What is an Array? Explain the difference static and dynamic array with example. Explain the use of control array in VB.NET with proper example.

15. Explain the different types of conditional statements and iterative statements used in VB.NET with examples.

16. Explain user defined function and procedures with examples. What is MSIL and CLR? Describe the methodology to create a menu in VB.NET.