

19. (a) Explain the properties of homomorphism with different theorems.

Or

- (b) Explain the :
- (i) Monoids with example.
 - (ii) Homomorphism of semi groups and monoids.
 - (iii) Sub semigroups and monoids.

20. (a) A lattice L is modular if and only if for all $x, y, z \in L$

(i)
$$(X \vee (Y \wedge Z)) \wedge (Y \vee Z) = (X \wedge (Y \vee Z)) \vee (Y \wedge Z)$$

- (ii) Explain distributive equation.

Or

- (b) (i) Every distributive lattice is modular.
(ii) Explain cancellation rule.

1789/PCSC01

NOVEMBER 2016

**MATHEMATICAL FOUNDATIONS OF COMPUTER
SCIENCE**

Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Define well-formed formulae.
2. Define conditional statements.
3. Define corollary.
4. Define Isomorphism.
5. Define reflexive-transitive closure.
6. Define context-free grammar.
7. Define quotient group.
8. Define semi groups.
9. Define Boolean polynomial.
10. Define minterm.

SECTION B — ($5 \times 6 = 30$ marks)

Answer ALL questions.

11. (a) Explain replacement process with example.

Or

- (b) Explain conjunction with example.

12. (a) Explain the algorithm minima.

Or

- (b) Explain the incidence matrix of a diagraph.

13. (a) Explain equivalence of FA and NFA.

Or

- (b) Give a deterministic Finite automation, accepting the set of all strings over $\{0, 1\}$ with three consecutive 0's.

14. (a) Explain the cosets and Lagrange's theorem.

Or

- (b) Consider $(\mathbb{Z}_{12}, \oplus)$, then $H = \{0, 4, 8\}$ is a sub group of G .

15. (a) If L is a distributed lattice with 0 and 1, then each element $X \in L$ has almost one complement.

Or

- (b) Explain Boolean algebra with example.

SECTION C — ($5 \times 10 = 50$ marks)

Answer ALL questions.

16. (a) Find a conjunctive normal form of $\neg(P \vee Q) \leftrightarrow (P \wedge Q)$.

Or

- (b) Explain well-formed formulae and Tautology with examples.

17. (a) Explain the adjacency matrix of a diagraph with example.

Or

- (b) Explain the directed and binary trees.

18. (a) Explain the derivations in a grammar G .

Or

- (b) State different types of grammar with example.

20. (a) Explain inheritance and its type with an example.

Or

- (b) Write a C++ program for bubble sort using pointers.

1790/PCSC02 **NOVEMBER 2016**

PROGRAMMING IN C AND C++

Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is mean by Identifiers?
2. Write Purposes of Escape sequences.
3. Define Function Prototype?
4. Write any four string functions.
5. Write types of Pointers.
6. Write basic operations in File Handling in C.
7. Define Encapsulation.
8. Write use of Objects.
9. Define Polymorphism.
10. Write Usage of Dynamic Binding.

SECTION B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) Define storage classes with example Program.

Or

- (b) Explain formatted I/O functions with conversion specifications used in them.

12. (a) Write a program for Recursion Function.

Or

- (b) Define Pointers to a Function.

13. (a) What is the purpose of fflush() and write a example program?

Or

- (b) Explain Pointers to functions with an example.

14. (a) Explain Friend Function with example.

Or

- (b) Define Destructor with example program.

15. (a) Difference between Constructor and Destructor.

Or

- (b) Describe the various classes available for file operators.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Explain the various Operators and expressions that are used in the 'C' language.

Or

- (b) Write a 'C' program to student mark sheet system using if – else statement.

17. (a) Explain various types of array functions and its types.

Or

- (b) Write a c program to reverse a string without using string functions.

18. (a) Explain accessing variable through its pointers.

Or

- (b) Write ac program to file creation using 'C' language.

19. (a) Explain in details about the basic concepts of OOPS with example.

Or

- (b) Write a C++ program to swap two numbers using friend function.

20. (a) Explain concept of Virtual memory.

Or

(b) Explain Asynchronous data transfer.

1791/PCSC03

NOVEMBER 2016

**DIGITAL PRINCIPLES AND COMPUTER
ORGANISATION**

Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What are steps for product-of-sum in k-map simplification?
2. What is flip-flop? And their types.
3. Define ALU.
4. What is an instruction code? And list out the operations.
5. What is direct address mode?
6. Define micro program.
7. What are the different types of data considered for computer arithmetic?
8. Define MIMD.
9. List the different types of transfer.
10. Define daisy chaining method.

SECTION B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) Define binary counter, give the circuit diagram of 4 bit synchronous binary counter.

Or

- (b) Define ROM. Explain their types.

12. (a) Explain Arithmetic logic shift unit.

Or

- (b) Briefly about instruction cycle.

13. (a) Explain Fetch Routine.

Or

- (b) Explain memory stack.

14. (a) Explain how a four segment instruction pipeline works.

Or

- (b) Write a Hardware algorithm for computer arithmetic.

15. (a) Explain DMA controller.

Or

- (b) Briefly explain Direct mapping.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Define complements. Explain their types.

Or

- (b) Explain the floating point numbers representation. Give the suitable example.

17. (a) Discuss about input, output and interrupt.

Or

- (b) Explain program interrupt and interrupt cycle.

18. (a) Discuss briefly about data transfer and manipulation.

Or

- (b) Discuss briefly about :

- (i) Design of control unit
- (ii) Micro program sequencer.

19. (a) Explain :

- (i) Addition and subtraction
- (ii) Addition and subtraction with signed 2's complement data.

Or

- (b) Explain Booth Multiplication algorithm.

18. (a) Explain about management spectrum in software project.

Or

- (b) Describe in detail about web APP project metrics.

19. (a) Explain about measuring software quality.

Or

- (b) Describe detail about software project estimation?

20. (a) Explain about managing complexity.

Or

- (b) Discuss in detail about CMMI.

1792/PCSC04

NOVEMBER 2016

SOFTWARE ENGINEERING

Time : Three hours

Maximum : 100 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Mention the different types of software product.
2. What is agility?
3. What is association and dependencies in class based modeling?
4. What is validating requirements?
5. Explain non incremental integration testing.
6. Differentiate between bottom-up integration and top-down integration.
7. Difference between private and public uses for software metric.

8. Discuss about process based estimation in problem based estimation.
9. What is open source software?
10. What is soft trends?

PART B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) Write a short notes on incremental model.

Or

- (b) Describe in detail about process pattern.

12. (a) Develop use case for making withdrawal at ATM.

Or

- (b) Describe about negotiating requirements.

13. (a) Describe in detail about project management techniques.

Or

- (b) What are the elements of software quality assurance?

14. (a) Describe about software teams?

Or

- (b) What are the matrices for small organizations?

15. (a) Describe in detail about software building blocks.

Or

- (b) Explain about SPI process.

PART C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Explain about unified process model.

Or

- (b) Explain about evolutionary process model.

17. (a) Explain about validation principles and deployment principles.

Or

- (b) Explain about UML models.

18. (a) Explain Binary Search Algorithm with an example.

Or

- (b) Explain Quick Sort with an example.

19. (a) Explain Greedy knapsack algorithm in detail.

Or

- (b) Explain Kruskal's Algorithm with example.

20. (a) State the All-Pairs Shortest path problem.

Or

- (b) Explain the way of finding the optimal path in travelling salesman problem.

1793/PCSC05

NOVEMBER 2016

DATA STRUCTURE AND ALGORITHMS

Time : Three hours

Maximum : 100 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is Data Structure?
2. Define Linked Lists.
3. Define Stack.
4. Write any two applications of Queue.
5. What is the procedure for merge sort?
6. What is the worst case time complexity and average computing time of Selection Algorithm?
7. Define Spanning Tree.
8. What is the worst case time complexity of Kruskal's Algorithm?
9. What are the main difference between Greedy method and Dynamic programming?
10. Define Diagraph.

PART B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) Explain one dimensional array with an example.

Or

- (b) Explain Doubly Linked List.

12. (a) Explain stack with its operations.

Or

- (b) Explain the following tree terminologies.

- (i) Node
- (ii) Root
- (iii) Branch
- (iv) Successor
- (v) Predecessor.

13. (a) Explain the control abstraction of divide and conquer strategy.

Or

- (b) Write down an algorithm for finding maximum and minimum of n elements.

14. (a) Write down the control abstraction of Greedy method.

Or

- (b) Write down the algorithm to optimal storage in tape.

15. (a) Explain about Multistage Graphs with diagram.

Or

- (b) Write OBST Algorithm.

PART C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Explain two dimensional arrays with a program to add two matrices.

Or

- (b) Explain various operations performed in Circular Linked List with a program.

17. (a) Explain in detail about various representation of Stack.

Or

- (b) Explain in detail about various representation of Tree.

19. (a) Explain in detail about File directory structure.

Or

- (b) Explain in detail about various methods of allocating disk space.

20. (a) Explain in detail about readers – writers problem.

Or

- (b) Explain in detail about the dining – philosophers problem.

1794/PCSC06

NOVEMBER 2016

OPERATING SYSTEM

Time : Three hours

Maximum : 100 marks

PART A — (10 × 2 = 20 marks)

Answer ALL questions.

1. Briefly explain about Priority based Pre-emptive Scheduling.
2. What is the need of swapping in OS?
3. Define Aging.
4. What is dispatcher?
5. What is stack frame?
6. Define paging.
7. Write down about any two input devices.
8. Write down about plotter.
9. What is spinlock?
10. What is mutual exclusion?

PART B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) What are the features of real time operating system?

Or

- (b) Explain in detail about the memory management with its advantages and disadvantages.

12. (a) Explain in detail about Client – Server Communication.

Or

- (b) Explain in detail about Shortest job first.

13. (a) Explain any three techniques to perform a fresh allocation from a free list.

Or

- (b) Write down the advantages of using Non-Contiguous memory allocation.

14. (a) Explain in detail about security in a file system.

Or

- (b) Explain authentication and authorization.

15. (a) Explain briefly about deadlocks and starvation.

Or

- (b) Explain about deadlock prevention methods.

PART C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) What is scheduling? Explain in detail about Round Robin Scheduling with time slicing.

Or

- (b) Explain in detail about Batch Processing System.

17. (a) Explain in detail about Inter Process Communication.

Or

- (b) Explain in detail about Round Robin Scheduling.

18. (a) Explain in detail about Memory fragmentations.

Or

- (b) Explain in detail about Virtual memory handler.

20. (a) Illustrate three dimensional reflection and shearing with an example.

Or

- (b) Describe about parallel projection with an example.

1795/PCSC07

NOVEMBER 2016

COMPUTER GRAPHICS

Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. State the use of refresh buffer.
2. What do you mean by aspect ratio?
3. What are the advantages in storing color codes in a lookup table?
4. What are the fill area attributes?
5. Define differential scaling.
6. Name the basic geometric transformations.
7. State the purpose of creating a window.
8. Define curve clipping.
9. What do you mean by isometric projection?
10. Define reflection.

SECTION B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) Illustrate the basic operations of a CRT.
Or
(b) What is digitizer? Explain about the graphical tablet.
12. (a) Give a detailed note on various attributes applied to text.
Or
(b) Briefly explain pen and brush options.
13. (a) Describe about the two dimensional rotation.
Or
(b) Briefly explain general pivot-point rotation.
14. (a) Illustrate the two dimensional viewing transformation pipeline.
Or
(b) What is meant by clipping? Explain about point clipping.
15. (a) Briefly describe about rotation with respect to three dimensional objects.
Or
(b) Discuss about viewport clipping in detail.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) List and explain any four data input devices on graphics workstation.
Or
(b) Explain about digital differential analyzer algorithm in detail.
17. (a) What are the basic attributes of a line? Explain it with an example.
Or
(b) Elucidate about character attributes in detail.
18. (a) Explain about basic transformations with respect to 2D objects.
Or
(b) What is composition of matrices? Explain about composite transformations in detail.
19. (a) Explain about Liang-Barsky line clipping in detail.
Or
(b) Discuss in detail about Sutherland-Hodgeman polygon clipping.

20. (a) Explain about user data gram protocol in detail.

Or

- (b) What do you mean by domain name space? How can you design the names? Explain it with an example.

1796/PCSC08

NOVEMBER 2016

COMPUTER NETWORKS

Time : Three hours

Maximum : 100 marks

SECTION A -- (10 × 2 = 20 marks)

Answer ALL questions.

1. What do you mean by network?
2. Mention the use of data compression.
3. Define wavelength.
4. What is the bit rate for high definition TV?
5. List the types of error correcting methods.
6. Define single-bit-error.
7. What are user support layers?
8. Draw a structure of local addresses in IPV6.
9. What is the function of transport layer?
10. State the use of socket address.

SECTION B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) Describe about different components of a data communications system.

Or

- (b) Compare Port, Logical and Physical address.

12. (a) Mention the categories and use of unshielded twisted pair cables.

Or

- (b) Explain the characteristics of virtual-circuit networks.

13. (a) Write short notes on variable size framing.

Or

- (b) Briefly explain flow control and error control.

14. (a) Define address space. Name and explain the two prevalent notations in IPV4.

Or

- (b) State and explain the need for Network Layer.

15. (a) Name and explain the mechanisms that can remove congestion.

Or

- (b) What are the four types of flow characteristics in QOS? Explain.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Explain in detail about the functions and responsibilities of the transport layer.

Or

- (b) Name the different layers supported by the OSI model and explain its functions and duties of each layer.

17. (a) What are the factors that depends on data rate limits? How to calculate the data rate? Explain it with an example.

Or

- (b) Write the advantages and disadvantages of optical fiber cable and also explain its propagation modes.

18. (a) What do you mean by stop-and-wait protocol? Explain its design and algorithms.

Or

- (b) Explain about high-level data link control (HDLC) in detail.

19. (a) Describe in detail about Internet Control Message Protocol (ICMP).

Or

- (b) Explain about distance vector routing in detail.

19. (a) How does a B-tree differ from B+ tree? Why B+ tree usually preferred as an access structure to a data file? Illustrate the features of the B+ tree with an example.

Or

- (b) What are the different ways of organizing records in files? Explain it with suitable example.
20. (a) Narrate an environment to identify the concurrency control. Design and develop the Circumstances using time-stamp based concurrency control method.

Or

- (b) What is the purpose of Locks in data base? Describe the two-phase locking protocol with suitable example.

1797/PCSC09

NOVEMBER 2016

RELATIONAL DATABASE MANAGEMENT SYSTEM

Time : Three hours

Maximum : 100 marks

SECTION A — ($10 \times 2 = 20$ marks)

Answer ALL questions.

1. Define database.
2. List the different types of database system users.
3. What are the different types of attributes?
4. Define Entity Set.
5. What do you mean by persistent object?
6. Write the advantages of object relational systems.
7. Compare dense index and sparse index.
8. Define bucket.
9. What are ACID properties?
10. Define recoverable schedule.

SECTION B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) What is DDL? Explain any five DDL commands with suitable example.

Or

- (b) Draw a schema diagram for banking enterprise.

12. (a) What do you mean by weak entity set? Draw a suitable E-R diagram for weak entity set.

Or

- (b) Explain about mapping cardinalities.

13. (a) State and explain the different approaches to make object persistent.

Or

- (b) Compare object oriented and object relational databases.

14. (a) Discuss about sequential file organization.

Or

- (b) How to handle bucket overflow? Explain it with suitable example.

15. (a) What are the various failure classification? Explain.

Or

- (b) Explain about validation based protocols.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Illustrate and construct the component modules of a database management system.

Or

- (b) Explain in detail about relational databases.

17. (a) Draw an E-R diagram for banking system.

Or

- (b) Consider the relation order (order-id, product_id, quantity, customer-id, Customer-address). Draw a functional dependency diagram for the above relation and perform higher order normalization to the extent possible.

18. (a) What do you mean by JDO? How JDO model for object persistence in java programs differs from the model for persistence in C++ programs? Explain.

Or

- (b) Give a detail about the object identity and reference types in SQL.

20. (a) Discuss in detail about File and directories.

Or

- (b) Describe about BufferedReader and BufferedWriter in detail.

1798/PCSC10

NOVEMBER 2016

OBJECT ORIENTED PROGRAMMING WITH JAVA

Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. List the simple data types of Java.
2. Define Scope of variables.
3. What are the uses of break statement?
4. State the function of new operator.
5. What is an exception?
6. How to import a package?
7. Name the four methods of Thread class.
8. How to find the length of a string?
9. What is the function of FileInputStream?
10. What do you mean by CharArray Writer?

SECTION B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) Explain the different types of integer with example.

Or

- (b) Write a java program to demonstrate Booleans.

12. (a) Illustrate switch statement with an example.

Or

- (b) Write a java program to implement the concept of object as parameter.

13. (a) What is an Interface and How to extend an Interface? Explain.

Or

- (b) Write a note on Java's Built-in exceptions.

14. (a) How to create multiple threads? Explain.

Or

- (b) Illustrate how to change the case of a character within a string and finding the substring?

15. (a) Briefly explain FileOutputStream class.

Or

- (b) What is serialization? Explain its interfaces.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Illustrate the concept of array with example.

Or

- (b) Discuss about three OOP principles in detail.

17. (a) Discuss about logical and assignment operators in detail.

Or

- (b) Illustrate inheritance and its types in detail.

18. (a) What is classpath? Explain access protection mechanisms in detail.

Or

- (b) Enumerate creating exception subclass with an example.

19. (a) Discuss in detail about Main Thread.

Or

- (b) Explain string comparison in detail.

20. (a) Elucidate in detail about conditional processing in JSP.

Or

- (b) Discuss in detail about sharing session and application data.

1799/PCSC11

NOVEMBER 2016

WEB TECHNOLOGY

Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. State the function of SMTP.
2. Distinguish between java and javascript.
3. What are cascading style sheets?
4. Write the possible values of text-decoration property.
5. What is the format of request header?
6. What do you mean by session tracking?
7. What is meant by Scriptlet?
8. State the purpose of webapps directory.
9. Distinguish between page and session scope.
10. How to run a JSP page?

SECTION B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) What is Forms Object? Explain.
Or
(b) Write a note on Head Section of HTML.
12. (a) How will you position the various elements in a web page? Explain.
Or
(b) Differentiate the use of CLASS and ID parameter in creating styles in the Web pages.
13. (a) What is cookie? Explain the advantages and disadvantages of cookies.
Or
(b) How to deploy a servlet on tomcat? Explain.
14. (a) Briefly explain JSP application design with MVC.
Or
(b) List and explain the problems with servlet.
15. (a) Explain about the JSP implicit objects.
Or
(b) State and explain JSP scripting elements.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Discuss about linking, embedding images and text formatting of body section in detail.
Or
(b) Create a HTML document for college web page.
17. (a) Discuss about filters and transitions in detail.
Or
(b) Explain pseudo classes, pseudo elements, backgrounds and element dimensions in detail.
18. (a) What is servlet? Explain its lifecycle
Or
(b) Explain about security issues in detail.
19. (a) Discuss in detail about JSP elements.
Or
(b) Describe about setting up JSP environment.

19. (a) What is Gain ratio? How it differs from information gain? Explain it with an example.

Or

- (b) Describe about decision tree induction.
20. (a) Discuss about agglomerative and divisive hierarchical clustering algorithm.

Or

- (b) Describe density-based local outlier detection.

1800/PCSC12

NOVEMBER 2016

DATA MINING

Time : Three hours

Maximum : 100 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.

1. What is data mining?
2. List the various measures in multidimensional data model.
3. Why do we need interestingness measure?
4. State the use of binning.
5. Why do we need boxplot?
6. Define support and confidence.
7. Why are decision tree classifier so popular?
8. State the use of confusion matrix.
9. What is meant by dissimilarity matrix?
10. Write the advantages and disadvantages of k-means algorithm.

SECTION B — (5 × 6 = 30 marks)

Answer ALL questions.

11. (a) Give a brief account on indexing OLAP data.

Or

- (b) Explain data characterization and discrimination with an example.

12. (a) Explain data mining query language.

Or

- (b) Write a note on data integration.

13. (a) Briefly explain measuring central tendency.

Or

- (b) What is constraint-based mining? List the different constraints and explain metarule-guided mining.

14. (a) Why is tree pruning useful in decision tree induction? What is a drawback of using a separate set of tuples to evaluate pruning?

Or

- (b) Briefly explain preparing the data for classification and prediction.

15. (a) Write the requirements of clustering in data mining.

Or

- (b) Enumerate Interval-scaled variables with an example.

SECTION C — (5 × 10 = 50 marks)

Answer ALL questions.

16. (a) Explain constrained gradient analysis in data cubes with example.

Or

- (b) What are the differences between three main types of data warehouse applications? Discuss the motivation behind OLAP mining.

17. (a) How designing GUI based on a data mining query language can be possible? Explain.

Or

- (b) Describe dimensionality reduction in detail.

18. (a) Discuss in detail about mining class comparisons.

Or

- (b) Explain mining multilevel association rules in detail.