

No. of Printed Pages : 03

Roll No. 19008541932

CC681

M. C. A. EXAMINATION, Dec. 2019

(Third Semester)

(B. Scheme) (Main & Re-appear)

MASTER OF COMPUTER APPLICATIONS

MCA501

Object Oriented Programming Using C++

Time : 3 Hours]

[Maximum Marks : 75

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

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Define a programming language. Explain the features of procedural, non-procedural, object based and object oriented programming languages. 15

2. (a) Define an object. What are access modifiers ? 7
(b) What do you mean by data hiding ? How is it supported by C++ ? 8

Unit II

3. What is a Class ? Explain the features of a class. How is it differentiated from a structure ? 15

4. Explain with examples :
(a) This Pointer 8
(b) New and Delete operator. 7

Unit III

5. What is Operator Overloading ? What are restrictions on operator overloading ? Explain it by taking a suitable example. 15

6. (a) What do you mean by public and private inheritance ? 8
(b) Explain the concept of function overloading and function overriding. 7

Unit IV

7. Write notes on the following :
(a) Virtual function
(b) Virtual destructor
(c) Re-throwing an Exception. 3×5
8. Define a function template. Can a function template be overloaded in C++ ? Explain by example. 15

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MASTER OF COMPUTER APPLICATIONS

MCA503

Database Management Systems

Time : 3 Hours]

[Maximum Marks : 75

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Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. What is E-R Model ? Explain its features. Discuss specialisation and Generalization with examples. 15

2. (a) What are different levels of Abstraction ? Explain. 8

(b) Discuss the data independence structure of a DBMS. 7

Unit II

3. What is a Relational Data ? Discuss important operations on the Relational Algebra in detail. 15

4. (a) What is Logical Database Design ? Explain. 8

(b) What is Tuple Relational Calculus ? Explain. 7

Unit III

5. What is Functional Dependency ? Explain 2nd and 2nd Normal form in detail. 15

6. (a) What is a nested Query ? Explain with example. 8

(b) State and explain Boyce Code Normal Form. 7

Unit IV

7. What are Transaction States ? Also explain deadlocks in detail. 15

8. (a) What are the types of failures ? Explain ARIES. 8

(b) State and explain concurrency control and problems. 7

Unit IV

7. Discuss various disk scheduling algorithm.
Give examples of each of them. 15
8. What is a deadlock ? What are the necessary
and sufficient conditions for a deadlock ? 15

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(Third Semester)

(B. Scheme) (Main & Re-appear)

MASTER OF COMPUTER APPLICATIONS

MCA505

Operating System

Time : 3 Hours]

[Maximum Marks : 75

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Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) What is an Operating System ? What are the different services offered by an operating system ? 10
- (b) Differentiate between system programs and system calls. 5
2. Differentiate between the following :
 - (a) Multiprogramming and Multiprocessing OS
 - (b) Distributed OS and Network OS
 - (c) Multiuser and Time sharing OS. 15

Unit II

3. (a) What is a process ? What are the different states in which a process can exist ? 6
- (b) Differentiate between pre-emptive and non-preemptive scheduling. Give suitable example to support your answer. 9

4. Consider a variant of round robin scheduling where entries in the ready queue are pointers to the PCBs :
 - (a) What would be the effect of putting two pointers to the same process in ready queue ?
 - (b) What would be major advantages and disadvantages of this scheme ?
 - (c) How would you modify the basic RR algorithm to achieve the same effect without the duplicate pointers ? 15

Unit III

5. What is Thrashing ? Why is it caused ? How does system detect it ? What steps are taken by system to eliminate this problem ? Discuss with suitable example. 15
6. (a) Compare and contrast internal and external fragmentation. Give suitable example to illustrate your answer. 9
- (b) What is Segmentation ? What are its advantages ? 6

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M. C. A. EXAMINATION, Dec. 2019

(Third Semester)

(B. Scheme) (Main & Re-appear)

MASTER OF COMPUTER APPLICATIONS

MCA507

Algorithm Analysis and Design

Time : 3 Hours]

[Maximum Marks : 75

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

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. What is an Algorithm ? What is the role of algorithms relative to other technologies used in computers ? Explain in detail, how we measure performance of an algorithm by using suitable example ? **15**

2. (a) What is divide and conquer technique ? Which sorting technique is the best for handling large amount of data in context to complexity ? **10**

(b) What is Strassen's matrix multiplication ? How is it different from standard matrix multiplication ? **5**

Unit II

3. (a) What is fractional knapsack problem ? Describe by taking suitable example. **10**

(b) Differentiate between greedy method and dynamic programming. **5**

4. What is minimum cost spanning tree ? Explain both algorithms for finding minimum Cost spanning tree using greedy method. **15**

Unit III

5. (a) Differentiate between backtracking and branch and bound technique. **7½**

(b) What is 8-queens problem ? Explain by using algorithm. **7½**

6. (a) What is 0/1 knapsack problem ? Explain by using branch and bound technique. **7½**

(b) What are efficiency consideration factors of branch and bound technique ? **7½**

Unit IV

7. (a) State and prove Cook's theorem. **7½**

(b) Justify Travelling-Salesperson decision problem is NP hard. **7½**

8. What is NP scheduling problem ? Explain various NP scheduling in brief. **15**

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*63
x 3015
842*

*130
3015
84
3.25*

- (b) Explain the process of building the software quality assurance plan. Discuss overall purpose and philosophy of the ISO-9000 quality model as well as the basic emphasis of this approach. 8,7

Section D

7. (a) What are Software Metrics ? What is their importance ?
- (b) Explain the following Software Metrics :
- (i) Lines of Code
 - (ii) Function Count
 - (iii) Token Count
 - (iv) Equivalent Size Measure. 7,8
8. Define CASE Tools. List any *four* important characteristics of CASE Tools. Also discuss the utility of this in Software Engineering. Explain in reference to Turbo Analyst. 15

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(Third Semester)

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MASTER OF COMPUTER APPLICATIONS

MCA509

Software Engineering

Time : 3 Hours]

[Maximum Marks : 75

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Note : Attempt *Five* questions in all, selecting at least *one* question from each Section.

Section A

1. (a) Define the terms "Software" and "Software Engineering". State and explain various software myths and reality.
- (b) What is a Software Process Model ? Identify and briefly discuss three benefits of using the spiral model as opposed to the Water fall model. 8,7
2. (a) Distinguish between software process and software project. Explain about personal and team process models.
- (b) Explain Software Requirement Specification. What are the characteristics good SRS ? 8,7

Section B

3. (a) What do you understand by software design and what are the main objectives of Software Design ?
- (b) Explain Problem Partitioning and Abstraction as a the major aspects of design fundamentals. 8,7

4. (a) Compare relative advantages of the function oriented and object oriented approaches to software design.
- (b) Define Module Coupling. Explain different type of coupling. 8,7

Section C

5. (a) What is the goal of software testing ? Explain about the functional and structural testing in detail.
- (b) What are drivers and stub modules in the context of integration and unit testing of a software product ? Why are stub and driver modules required ? Explain with examples. 8,7
6. (a) What do you understand by software configuration management ? What are the various activities that take place in SCM ? What are the tools used for it ?