CC-681

M.C.A. EXAMINATION, Dec. 2018

(Third Semester)

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

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. (a) What are the basics of C++ ? Explain header files and namespaces. **8**

(b) What is a Abstract Class ? State and explain inheritance phenomena. **7**

2. (a) How access modifier access control to a public and protected class ? Explain. **8**

(b) State and explain the significance of Pre-processor directive with example.3 **7**

Unit II

3. (a) What is the scope of a class in C++ ? How can you access class members ? Explain. **8**

(b) What are constructors ? How can you use default arguments using constructors ? **7**

4. (a) Explain the controlling of the access functions and utility functions. **8**

(b) What are container classes and integrators ? Also explain proxy classes. **7**

Unit III

5. (a) How the operator functions be used as class members and as friend functions ? Explain. **8**

(b) Discuss the inheritance in base class and in derived class. **7**

6. (a) What is operator overloading ? What are its fundamentals ? Explain in detail. **8**

(b) Discuss the inheritance using constructors and destructors in derived classes. **7**

Unit IV

7. (a) What are virtual functions ? Also explain virtual destructors. **8**

(b) What is a File ? How can you create a sequential access file and update it ? **7**

8. (a) What is a stream I/O classes and objects ? Explain stream manipulators also. **8**

(b) What is exception handling ? What an the exceptions specification ? Explain. **7**

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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. All questions carry equal marks.

Unit I

1. (a) What is DBMS ? Explain. Discuss the objectives of a database. List the advantages and disadvantages of DBMS. **7**

   (b) Discuss function of the database administrators. Also discuss the concepts of data independence and levels of abstraction. **8**

2. State and explain the Transaction Management Entity Relationship Model. Also discuss the features of E-R model. **15**

Unit II

3. Explain the following :

   (a) Reductions of E-R diagrams to relations **7**

   (b) Operations on Relational Algebra. **8**

4. Discuss in detail the concepts of Relational Model. Also discuss different types of operations on Relational Calculus. **15**

Unit III

5. Define normalization and explain various normal forms with the help of example. **15**

6. Explain the following :

   (a) Functional Dependencies **5**

   (b) Database Design and Data redundancy **5**

   (c) Embedded SQL. **5**

Unit IV

7. What do you understand by Concurrency Control ? Discuss in detail the different types of Concurrency control problems. **15**

8. Write short notes on the following :

   (a) Deadlocks **5**

   (b) Serializability **5**

   (c) ACID Properties and types of Failures. **5**

Section D

7. What is the meaning of the term Busy waiting ? What other kinds of waiting are there in an operating system ? Can busy waiting be avoided altogether ? Explain your answer.

15

8. Describe and compare different file allocation methods.

15

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MCA505

OPERATING SYSTEM

Time : 3 *Hours*]   [*Maximum Marks :* 75

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Note : Attempt *Five* questions from Sections A, B and C, D selecting at least *one* question from each Section. Each question carries equal marks.

Section A

1. List *five* functions of an operating system from user's point of view and list *five* functions from system's point of view. **15**

2. (a) Differentiate between a system program and system call. **5**

   (b) Write *five* characteristics of real-time operating systems. **10**

Section B

3. Differentiate between preemptive and non-preemptive scheduling ? Why strict non-preemptive scheduling is not used in an OS ? **15**

4. Consider a variant of round robin scheduling where entries in the ready queue are pointers to the PCBs. **15**

   (a) What would be the effect of putting two pointers to the same process in the 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 ?

Section C

5. Define demand paging. Which of the programming structures are "good" and which are "bad" for demand paging environment ? Explain your answers : **15**

   (a) Stack

   (b) Hashed Symbol Table

   (c) Binary search tree

   (d) Linked List.

6. What do you mean by a page fault ? Under what circumstances page fault occurs ? Describe the possible actions to be taken by the operating system when a page fault occurs. **15**

Unit IV

7. State and prove Cook's theorem. **15**

8. (a) What do you mean by Clique decision problem ? Show that the Clique decision problem in NP complete. **10**

   (b) Discuss Node cover decision problem. **5**

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MCA507

ALGORITHM ANALYSIS AND DESIGN

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 do you mean by best case and worst case of an algorithm ? Explain their significance with a suitable example. **7**

(b) What is Merge sort algorithm ? Find its complexity. Is Merge Sort the best sorting algorithm ? Explain. **8**

2. (a) What is Strassen's matrix multiplication ? How is it different from standard matrix multiplication ? Explain in detail. **8**

(b) What are recurrence relations ? Explain by taking appropriate example. **7**

Unit II

3. (a) Explain minimum spanning tree with example. **7**

(b) Describe Travelling salesperson problem. **8**

4. Write notes on the following : **15**

(a) Job sequencing with dead lines

(b) Optimal binary search tree.

Unit III

5. (a) Describe branch and bounded approach with a suitable example. Differentiate between backtracking branch and bound. **7**

(b) Explain 8 queens problem with algorithm. **8**

6. (a) Find all Hamiltonian cycles in the following graph using Backtracking. **8**
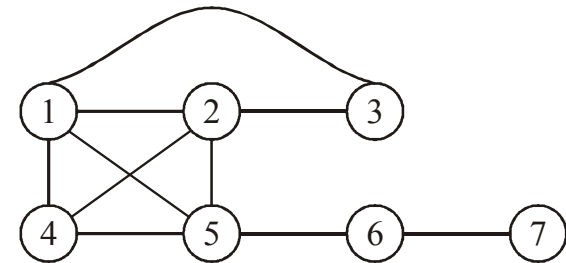
(b) Explain an algorithm for graph coloring problem using Backtracking and find its complexity. **7**

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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 Unit. All questions carry equal marks.

Unit I

1. (a) Define the term Software Crisis. Discuss various factors leading to software crisis. **8**

(b) What characteristics of Software differentiates it from other engineering disciplines ? **7**

2. (a) What is meant by Rapid Prototyping Model ? What are the activities involved in it ? **8**

(b) What are the major goals of software engineering ? How are they achieved by software engineers ? **7**

Unit II

3. What do you mean by Transform Mapping ? Explain the steps involved in the transformation of data flow diagrams into an architecture. **15**

4. (a) Briefly discuss the concepts involved in data modelling. **7**

(b) Can a system ever be completely 'de-coupled' ? Comment. **8**

Unit III

5. Compare the ISO and SEI CMM models for quality of a software product. **15**

6. (a) By whom code and design reviews should be performed ? What are their benefits ? **7**

(b) Write and briefly explain any *two* structural testing techniques. **8**

Unit IV

7. What do you mean by CASE repository ? Write the benefits of using CASE tools in the development of a software project. **15**

8. Show why and how software metrics can improve the software engineering process. Enumerate the effect of metrics on software productivity. **15**