

MCA-2
May, 2023

Roll No. [] [] [] [] [] [] [] [] [] []
Total No. of Questions : 09

Total No. of Pages : 09

MCA (Sem-3)
DESIGN AND ANALYSIS OF ALGORITHMS
Subject Code : PGCA-1920
M.Code : 79616
Date of Examination : 21-06-2023

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION - B & C. have FOUR questions each.
- Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
- Select atleast TWO questions from SECTION - B & C.

SECTION-A

- Write briefly :
 - Define algorithm. List the criteria that an algorithm should follow.
 - Define time complexity and space complexity of an algorithm.
 - What are asymptotic notations? List various asymptotic notations used in the analysis of algorithms.
 - Prove that if $f_1(n) = O(g_1(n))$ and $f_2(n) = O(g_2(n))$ then $f_1(n) + f_2(n) = O(g_1(n) + g_2(n))$.
 - Give the recurrence relation for worst case behavior of quick sort algorithm.
 - What is the difference between backtracking and branch-and-bound algorithm design techniques?
 - What are the applications of BFS and DFS?
 - What are NP-hard and NP-complete problems?
 - In context of backtracking, define the following terms: implicit constraints, explicit constraints, e-node and live node.
 - In context of dynamic programming, define principle of optimality.

SECTION-B

- What is all-pairs shortest path problem? Write an algorithm that makes use of dynamic programming to solve all-pairs shortest path problem. Analyze its time complexity.
- What do you mean by control abstraction? Using the control abstraction, describe in detail divide-and-conquer algorithm design strategy.
- What is 8-queens problem? Describe and write an algorithm that makes use of backtracking for solving 8-queens problem.
- What is 0/1 Knapsack problem? How it is different from fractional knapsack problem? Describe how 0/1 knapsack problem can be solved using Branch-and-Bound technique of algorithm design?

SECTION-C

- Describe how an array of elements can be sorted using Quicksort algorithm. Show that the running time of Quicksort is $O(n^2)$ when the array A contains distinct elements and is sorted in decreasing order.
- What is the basic assumption in binary search algorithm? Write binary search algorithm. Using binary search algorithm, find the number of comparisons required to find key value 9 in the given list: -15, -6, 0, 7, 9, 23, 54, 82, 101, 112, 125, 131, 142, 151.
- Describe bubble sort algorithm for sorting. Why is it named "Bubble sort"? Analyze its time complexity.
- Define and describe NP, P, NP-hard and NP-complete problems. Give an example of each class of problem.

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Roll No.

Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem-2)

INFORMATION SECURITY AND CYBER LAW

Subject Code : PGCA-1932

M. Code : 79619

Date of Examination : 17-06-2023

Max. Marks : 70

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

I. Write short notes on :

- a) What is the CIA triad in information security?
- b) What is information security?
- c) What is a vulnerability in information security?
- d) What is a threat in information security?
- e) What is a risk in information security?
- f) What is an exploit in information security?
- g) What is a patch in information security?
- h) What is an encryption in information security?
- i) What is a decryption in information security?
- j) What is a password policy in information security?

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SECTION-B

2. What is the concept of defense in depth in cyber security and how does it help organizations protect against a variety of threats? What are the different layers of defense in depth, and what security technologies are commonly used to implement each layer?
3. What are the different types of user authentication methods used in information security, and what are the advantages and disadvantages of each method? How can multi factor authentication improve the security of user authentication and what are some best practices for implementing multi-factor authentication in an organization?
4. What is access control in information security and what are the different types of access control mechanisms used to restrict user access to resources in an organization?
5. What are some common methods used by malware creators to distribute and infect systems with malware and what are some best practices for preventing malware infections in an organization? How can malware be detected and removed from infected systems?
6. What is the difference between a firewall and an Intrusion Detection System (IDS) in information security, and how do they complement each other to protect against security threats? How does a firewall work to control access to a network and what are the different types of firewalls used in modern information security?
7. What are some best practices for implementing an effective intrusion detection system in an organization and how can the results of IDS analysis be used to improve overall security posture?
8. How do encryption and decryption processes work and what are some best practices for implementing cryptography in an organization? What are some common attacks on cryptographic algorithms and how can they be prevented or mitigated?
9. What is the importance of security policies in information security and how do they help organizations establish clear guidelines and procedures for protecting sensitive information? What are some common elements of security policies, such as access control, incident response and data retention and how do they help organizations comply with relevant laws and regulations?

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Roll No. _____

Total No. of Questions : 09

MCA (Sem-2)
LINUX ADMINISTRATION
Subject Code : PGCA-1956
M.Code : 79618
Date of Examination : 15-06-2023

Total No. of Pages : 02

Max. Marks : 70

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION - B & C have FOUR questions each.
- Attempt any FIVE questions from SECTION - B & C.
- Select atleast TWO questions from SECTION - B & C.

SECTION-A

- Answer briefly :
 - Differentiate Linux and Windows?
 - What is the concept of root in Linux?
 - How do you move or rename a file in Linux?
 - How can you save and exit the vi editor in Linux?
 - What is the purpose of the *chmod* command in Linux?
 - What is Package Manager?
 - Discuss the purpose of DNS records?
 - What is the role of SMTP in email communication?
 - Write a short note on HTTP protocol?
 - Write a short note on SWAT?

SECTION-B

- How do you install Linux in a server configuration?
- Define following :
 - Insert mode in vi editor.
 - Deleting the character in vi editor?
- Discuss the basic file structure and hierarchy in Linux?
- Explain how can you manage users in Linux by creating or deleting user accounts?

SECTION-C

- What is the process for configuring DNS clients to use a specific DNS server?
- Explain the purpose of the Apache HTTP server configuration? How it is used in web?
- Explain the basic differences between POP and IMAP protocols? How they are used in Email accounts?
- What are the advantages of using Samba for remote sharing in Windows and Linux environment?



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MCA (Sem-2)

WEB TECHNOLOGIES

Subject Code : PGCA-1909

M.Code : 79615

Date of Examination : 02-06-2023

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION - B & C. have FOUR questions each.
- Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
- Select atleast TWO questions from SECTION - B & C.

SECTION-A

- I. Answer Briefly :
- Define Internet.
 - How HTML color coding is used?
 - What is `<hr>` tag used for?
 - Define IP address.
 - How to preserve white space in XHTML?
 - Define instance of operator in Javascript.
 - What are `<div>` and `` tags ? 8. What is an internal CSS style?
 - Where can we place Javascript ?
 - Define XML.
 - What is the use of `<noscript>` tag?

SECTION-B

- What are the different levels of heading in HTML?
- Give a brief overview of TGP/IP and services offered.
- How table is created and how COLSPAN AND ROWSPAN is used?
- How ordered and unordered list are created in HTML? Explain with an example.

SECTION-C

- Write a Javascript code which checks the contents entered in a forms text element. If the text entered is in the lower cases convert to upper case.
- Explain pattern matching. What are the different meta characters used in pattern matching?
- a) How FRAMESET is used in CSS? Give example.
b) Write a Java Script code to find factorial of a number.
- Explain any 10 elements used in forms of a website.

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Total No. of Questions : 09

MCA (Sem.-2)
ADVANCED JAVA
Subject Code : PGCA-1918
M.Code : 79617
Date of Examination : 30-05-2023

Max. Marks : 70

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

I. Answer Briefly :

- a) What is a servlet?
- b) What is a session?
- c) Name the directive tags available as per JSP specifications.
- d) What is MVC architecture in struts framework?
- e) List the various components of struts framework.
- f) What is RMI?
- g) Why are stubs used in RMI?
- h) List the CORBA services.
- i) What are the different functionalities supported by Hibernate?
- j) What do you mean by Java Beans?

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SECTION-B

2. a) How is the Get method different from the post method? Write a program in support of your answer.
b) How cookies are used to track a session? Explain in detail.
3. What are the stages of the JSP lifecycle? Explain in detail.
4. How applications are deployed in struts? Explain in detail.
5. How HTTP requests and responses are handled in Servlets? Explain in detail.

SECTION-C

6. Write a program to show the distributed object model using remote method invocation.
7. Explain the architecture of CORB A in detail.
8. What is a Pojo file? Why do we create a Pojo class? Explain in detail.
9. How Java Bean is created? Explain with the help of a program.

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MCA - Dec - 2022

Roll No.
Total No. of Questions : 09

Total No. of Pages : 02

MCA (Sem.-2)
LINUX ADMINISTRATION
Subject Code : PGCA-1956
M.Code : 79618
Date of Examination : 20-12-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :
 - a) What is the difference between LINUX and UNIX?
 - b) What does chmod 777 do in LINUX?
 - c) What is the difference between append mode and edit mode in vi editors?
 - d) How a package is installed in LINUX?
 - e) Write any five commands to set up DNS clients.
 - f) How to start and shut down Apache in LINUX?
 - g) How to install the Postfix server in LINUX?
 - h) How can you use Samba to authenticate against a windows server?
 - i) What are kernel and shell in LINUX?
 - j) Which type of file system is used in LINUX?

SECTION-B

2. a) Explain how to use the grub command line.
b) Name different types of modes used in the VI editor.
3. a) What are file permissions in Linux? Name different types of file systems in Linux.
b) What do you mean by the daemons? Give an example.
4. a) Describe various disk management commands in LINUX with suitable examples.
b) Write a short note on: Managing groups and users in LINUX.
5. Describe the architecture of the LINUX operating system with the functioning of its various shells.

SECTION-C

6. Explain creating a basic website in Apache web server. Explain some of the performance parameters in Apache web server.
7. a) Name default ports used for DNS, SMTP, FTP, SSH, DHCP and squid.
b) Write the difference between Soft and Hard links?
8. What is Samba? Why is it required? Explain its requirement using a real-life example.
9. What is DNS Server? How does it extend to configure DNS clients.



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MCA (Sem.-2)
ADVANCED JAVA
Subject Code : PGCA-1918
M.Code : 79617
Date of Examination : 17-12-2022

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1) Write briefly :

- a) List some of the databases supported by Hibernate.
- b) What is a Java expression?
- c) List the features of the object naming service in CORBA.
- d) What is the role of POJO files in hibernate framework?
- e) How duplicate form submission can be avoided in Struts framework?
- f) What is the difference between a generic servlet and HTTP servlet?
- g) What do you mean by JSP Standard Actions?
- h) What is the role of a JAR file in JavaBeans?
- i) What is the major difference between Socket programming and RMI programming?
- j) List the key applications of EJB container.

SECTION-B

2. Compare and contrast JavaBeans and Enterprise Java Beans (EJB). Discuss the features of any four classes provided by JavaBeans API.
3. Discuss the workflow of Struts framework and illustrate the steps using a simple form design.
4. Explain the concept of Custom Tags and discuss the steps to develop a custom tag with an example.
5. What do you mean by remote method invocation (RMI)? Explain the steps to create an RMI application between client and server.

SECTION-C

6. Discuss various types of session beans in Enterprise JavaBeans. List the advantages and disadvantages of each.
7. What do you mean by session tracking? Explain various mechanisms used for session tracking in servlets.
8. Explain the complete process of JSP development with the help of a suitable example.
9. Write short notes on :
 - a) Model-view-controller architecture
 - b) COBRA architecture.



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MCA - Dec - 2022

MCA June - 2022

Roll No.

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M.C.A. (Sem.-2)
WEB TECHNOLOGIES
Subject Code : PGCA-1909
M.Code : 79615

Date of Examination : 04-07-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1) Write briefly :

- a) What is the form of an IP address?
- b) What is the purpose of the colspan attribute of the <th> tag?
- c) What is the default bullet form for the items in an unordered list?
- d) What is the difference between the cellspacing and cellpadding attributes?
- e) What tag is used to define a link?
- f) Describe the possible values of the rows attribute of <frameset>.
- g) What is internal document reference?
- h) Why JavaScript is called client side scripting language?
- i) What do you mean by user defined object?
- j) What is Math object?

SECTION-B

- 2) Create an HTML document that defines a table with columns for state, state bird, state flower and state tree. There must be at least five states as rows in the table. You must include attribute specifications for cell padding and cell spacing.
- 3) Create an HTML document to describe an unordered list of a typical grocery shopping list you write.
- 4) Write a **short note** on the following :
 - a) TCP/IP protocol
 - b) Transmission control protocol
- 5) Explain five basic formatting tags used to design an HTML document.

SECTION-C

- 6) Write HTML files that include JavaScript scripts for the following problem.
Output : A table of the numbers from 5 to 15 and their squares and cubes, using alert.
- 7) Create an HTML document that has a form with the following widgets :
 - a) A text widget to collect the user's name
 - b) Four checkboxes, one for the following items :
 - i. Four 100-watt light bulbs for \$2.39
 - ii. Eight 100-watt light bulbs for \$4.29
- 8) Write a note on linking documents.
- 9) What is the purpose of cascading style sheets? Explain in detail.

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MCA (Sem.-2)
INFORMATION SECURITY AND CYBER LAW

Subject Code : PGCA-1932

M.Code : 79619

Date of Examination : 14-07-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :

- a) Define any two components of Information Security.
- b) Define CIA triad.
- c) How is Biometric Authentication different from password authentication?
- d) Differentiate between Honeypots and Firewall?
- e) Differentiate between Virus and Trojans?
- f) What is the difference between Law and Ethics?
- g) Define digital signatures.
- h) What is the significance of honeypots?
- i) What is intellectual property?
- j) What is phishing?

SECTION-B

2. a. Differentiate between Password based and Token-based Authentication with suitable examples.
b. Why and how to provide security to Database Management Systems?
3. Discuss and compare various access control policies.
4. What are the types of malicious software? How they harm the network system?
5. What is the need for database security? What are database access controls in Database Management System?

SECTION-C

6. What is Intrusion Detection System? Differentiate between Host based and Network based IDS?
7. Discuss about Indian Cyber Laws.
8. Define firewalls. What are the various types of firewalls?
9. Differentiate between symmetric and asymmetric encryption. Describe transposition techniques by taking suitable examples.

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MCA (Sem.-2)
ADVANCED JAVA
Subject Code : PGCA-1918
M.Code : 79617
Date of Examination : 08-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1) Write briefly :

- a) What are the events that are defined for sessions in servlets?
- b) What do you mean by JSP directive?
- c) What is the need of a Servlet filter?
- d) What are the core interfaces of Hibernate framework?
- e) What are the benefits of Struts framework?
- f) How does COBRA support interoperability?
- g) List the steps to define the remote interface using remote method invocation.
- h) What do you mean by BDK? List its components.
- i) List the advantages of JSP architecture.
- j) What is stateless session bean?

SECTION-B

- 2) Explain the use of Hibernate framework as the persistence layer for retrieving and storing plain old Java objects (POJOs) to a relational database.
- 3) List and explain various implicit objects in JSP with examples. Also, discuss the concept of object scope in JSP.

- 4) Explain the steps to design a small application in struts with database connectivity.
- 5) Discuss the concept of entity beans in Enterprise Java beans. What are the mechanisms used by entity beans to persist business data?

SECTION-C

- 6) Discuss the structure of HTTP request and response. Why is HTTP called a Stateless protocol?
- 7) Explain model-view-controller architecture in detail.
- 8) Explain the life-cycle methods of a servlet and discuss the complete process of servlet development with the help of a sample program.
- 9) Write short notes on :
 - a. COBRA services
 - b. JAR files

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Total No. of Pages : 02

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MCA (Sem.-2)
LINUX ADMINISTRATION
Subject Code : PGCA-1956
M.Code : 79618
Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is **COMPULSORY** consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write short notes on :

- a) What is the difference between LINUX and Windows?
- b) What is the use of VI editor in LINUX?
- c) What file permissions can be given to a user in LINUX?
- d) What is a package and how it is different from a folder in windows?
- e) How HTTP is different from HTTPS?
- f) What is the use of APACHE in the LINUX system?
- g) How a server is different from a normal computer?
- h) What is the meaning of SWAT?
- i) In which scenario, you will prefer windows over LINUX? Give an example.
- j) What is the usage of the SAMBA server?

SECTION-B

2. Explain the following commands with examples: ls, rm, cp, mv, chown, chmod.
3. Which are the different file systems supported by Linux? Which feature of Linux makes this support possible (Virtual File Systems Layer)?
4. a) What are file permissions in Linux? Name different types of file systems in Linux.
b) What do you mean by the Daemons? Give an example.
5. Write a short note on Vi editor and its mode; Users and Groups in Linux; Configuring packages in Linux.

SECTION-B

6. What is DNS? Why is it necessary? What are top level domains? Give 3 examples of TLDs.
7. a) Explain the following terms:
 - (i) Mail user agent
 - (ii) Mail transfer agent
 - (iii) Local delivery agent.
8. State the features of Apache web server .
9. a) What is a POP3 server?
b) What is a secure web server? What are its components? Which packages are needed to create secure web server?

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M.C.A. (Sem.-2)
DESIGN AND ANALYSIS OF ALGORITHMS

Subject Code : PGCA-1920

M.Code : 79616

Date of Examination : 06-07-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

1. Write briefly :

- a) Divide and Conquer
- b) Greedy approach
- c) Recursive algorithms
- d) Branch and Bound
- e) Radix Sort
- f) NP-Hard problem
- g) Graph traversal
- h) Binary search
- i) Sorted Array
- j) Knapsack problem

SECTION-B

2. Define time complexity and space complexity. Write an algorithm for adding n natural numbers and find the space required by that algorithm.
3. Write a note on the mathematical analysis of recursive and non-recursive algorithms using suitable examples.
4. Why is randomization and dynamic programming required? Explain with the help of suitable algorithms.
5. Given a set of cities and the distance between every pair of cities, the problem is to find the shortest possible route that visits every city exactly once and returns to the starting point. What is this problem called? Explain the solution in detail.

SECTION-C

6. Describe how bubble sort works and analyse the running time for the sequence 6 5 3 1 8 7 2 4.
7. Classify Sorting Algorithms and explain how insertion sort works with help of its algorithm.
8. What is string matching problem? Discuss various algorithms used for string matching.
9. What is the difference between Depth first search and Breadth first search? Explain with examples. And what are their applications.

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May-2022

Roll No.

Total No. of Pages : 02

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M.C.A. (Sem.-2)
WEB TECHNOLOGIES
Subject Code : PGCA-1909
M.Code : 79615

Date of Examination : 04-07-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION - B & C have FOUR questions each.
- Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
- Select atleast TWO questions from SECTION - B & C.

SECTION-A

1) Write briefly :

- What is the form of an IP address?
- What is the purpose of the colspan attribute of the <th> tag?
- What is the default bullet form for the items in an unordered list?
- What is the difference between the cellpadding and cellspacing attributes?
- What tag is used to define a link?
- Describe the possible values of the rows attribute of <frameset>.
- What is internal document reference?
- Why JavaScript is called client side scripting language?
- What do you mean by user defined object?
- What is Math object?

SECTION-B

- Create an HTML document that defines a table with columns for state, state bird, state flower and state tree. There must be at least five states as rows in the table. You must include attribute specifications for cell padding and cell spacing.
- Create an HTML document to describe an unordered list of a typical grocery shopping list you write.
- Write a short note on the following :
 - TCP/IP protocol
 - Transmission control protocol
- Explain five basic formatting tags used to design an HTML document.

SECTION-C

- Write HTML files that include JavaScript scripts for the following problem.
Output : A table of the numbers from 5 to 15 and their squares and cubes, using alert.
- Create an HTML document that has a form with the following widgets :
 - A text widget to collect the user's name
 - Four checkboxes, one for the following items :
 - Four 100-watt light bulbs for \$2.39
 - Eight 100-watt light bulbs for \$4.29
- Write a note on linking documents.
- What is the purpose of cascading style sheets? Explain in detail.



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May 1, 2022

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M.C.A. (Sem.-2)
DESIGN AND ANALYSIS OF ALGORITHMS
Subject Code : PGCA-1920
M.Code : 79616
Date of Examination : 06-07-22

Max. Marks : 70

Time : 3 Hrs.

INSTRUCTIONS TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION - B & C. have FOUR questions each.
- Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
- Select atleast TWO questions from SECTION - B & C.

SECTION-A

- Write briefly :
 - Divide and Conquer
 - Greedy approach
 - Recursive algorithms
 - Branch and Bound
 - Radix Sort
 - NP-Hard problem
 - Graph traversal
 - Binary search
 - Sorted Array
 - Knapsack problem

SECTION-B

- Define time complexity and space complexity. Write an algorithm for adding n natural numbers and find the space required by that algorithm.
- Write a note on the mathematical analysis of recursive and non-recursive algorithms using suitable examples.
- Why is randomization and dynamic programming required? Explain with the help of suitable algorithms.
- Given a set of cities and the distance between every pair of cities, the problem is to find the shortest possible route that visits every city exactly once and returns to the starting point. What is this problem called? Explain the solution in detail.

SECTION-C

- Describe how bubble sort works and analyse the running time for the sequence 6 5 3 1 8 7 2 4.
- Classify Sorting Algorithms and explain how insertion sort works with help of its algorithm.
- What is string matching problem? Discuss various algorithms used for string matching.
- What is the difference between Depth first search and Breadth first search? Explain with examples. And what are their applications.



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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (Sem.-2)
LINUX ADMINISTRATION
Subject Code : PGCA-1956
M. Code : 79618
Date of Examination : 12-07-22

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

- SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- SECTION - B & C have FOUR questions each.
- Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
- Select atleast TWO questions from SECTION - B & C.

SECTION-A

I. Write short notes on :

- What is the difference between LINUX and Windows?
- What is the use of VI editor in LINUX?
- What file permissions can be given to a user in LINUX?
- What is a package and how it is different from a folder in windows?
- How HTTP is different from HTTPS?
- What is the use of APACHE in the LINUX system?
- How a server is different from a normal computer?
- What is the meaning of SWAT?
- In which scenario, you will prefer windows over LINUX? Give an example.
- What is the usage of the SAMBA server?



SECTION-B

- Explain the following commands with examples: ls, rm, cp, mv, chown, chmod.
- Which are the different file systems supported by Linux? Which feature of Linux makes this support possible (Virtual File Systems Layer)?
- What are file permissions in Linux? Name different types of file systems in Linux.
- What do you mean by the Daemons? Give an example.
- Write a short note on Vi editor and its mode; Users and Groups in Linux; Configuring packages in Linux.

SECTION-B

- What is DNS? Why is it necessary? What are top level domains? Give 3 examples of TLDs.
- Explain the following terms:
 - Mail user agent
 - Mail transfer agent
 - Local delivery agent.
- State the features of Apache web server .
- What is a POP3 server?
 - What are its components? Which packages are needed to create secure web server?

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Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (Sem.-2)
ADVANCED JAVA
Subject Code : PGCA-1918
M. Code : 79617
Date of Examination : 08-07-22

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying TEN marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A

- 1) Write briefly :
 - a) What are the events that are defined for sessions in servlets?
 - b) What do you mean by JSP directive?
 - c) What is the need of a Servlet filter?
 - d) What are the core interfaces of Hibernate framework?
 - e) What are the benefits of Struts framework?
 - f) How does COBRA support interoperability?
 - g) List the steps to define the remote interface using remote method invocation.
 - h) What do you mean by BDK? List its components.
 - i) List the advantages of JSP architecture.
 - j) What is stateless session bean?

SECTION-B

- 2) Explain the use of Hibernate framework as the persistence layer for retrieving and storing plain old Java objects (POJOs) to a relational database.
- 3) List and explain various implicit objects in JSP with examples. Also, discuss the concept of object scope in JSP.

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- 4) Explain the steps to design a small application in struts with database connectivity.
- 5) Discuss the concept of entity beans in Enterprise Java beans. What are the mechanisms used by entity beans to persist business data?

SECTION-C

- 6) Discuss the structure of HTTP request and response. Why is HTTP called a Stateless protocol?
- 7) Explain model-view-controller architecture in detail.
- 8) Explain the life-cycle methods of a servlet and discuss the complete process of servlet development with the help of a sample program.
- 9) Write short notes on :
 - a. COBRA services
 - b. JAR files

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Roll No.

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Total No. of Pages : 02

Total No. of Questions : 18

MCA (2015 to 2018) (Sem.-2)
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE

Subject Code : MCA-201

M.Code : 72876

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.
3. Use of non-programmable scientific calculator is allowed.

SECTION-A

1. Define Simple and Multi-graph. Prove that an undirected graph possesses an Eulerian path if it is connected and has either zero or two vertices of odd degree.
2. a) State and prove Five color theorem.
b) Explain the shortest path problem and also explain the algorithms used to find shortest path.

SECTION-B

3. a) Show that $A \cap (B \cap C) = (A \cap B) \cap C$.
b) Define intersection and union of sets. Prove that $A \cup B = A \cap B$ if $A = B$.
4. a) Define Minsets. Let B_1, B_2, B_3 are the subsets of a universal set U . Find all minsets generated by B_1, B_2 and B_3 .
b) Define Partitions of sets. Give all the partitions of $\{a, b, c, d, e\}$.

SECTION-C

5. a) Test the validity of: If he works hard then he will be successful. If he is successful then he will be happy. Therefore, hard work leads to happiness.
b) Prove that disjunction distributes over conjunction.
6. a) Use Mathematical induction to show that $1 + 2 + \dots + 2^n = 2^{n+1} - 1$.
b) Define Quantifiers. Explain different types of quantifiers along with examples.

SECTION-D

7. Solve by Gauss Elimination method : $x - 2y - 6z = 12$, $2x + 4y + 12z = -17$, $x - 4y - 12z = 22$.
8. Solve by matrix inversion method : $x - y + 3z = 2$, $2x + y + 2z = 2$, $-2x - 2y + z = 3$.

SECTION-E

Answer briefly :

9. Define Complete Bipartite graph and give one example.
10. Define Euler and Hamilton graphs.
11. Define Complement of set and give example.
12. Can we say that Cartesian product is commutative? Justify.
13. Define Uncountable set.
14. Define tautologies and contradictions.
15. Prove that $p \wedge q = q \wedge p$.
16. Define Symmetric and Skew-Symmetric.
17. If $A = \begin{bmatrix} 1 & -2 \\ 3 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ -3 & 1 \end{bmatrix}$, Find AB .
18. Define inverse of a Square matrix and find the inverse of $\begin{bmatrix} 1 & -1 \\ 3 & 4 \end{bmatrix}$.

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Dec. 2020

Roll No.

Total No. of Pages : 02

Total No. of Questions : 18

MCA (2015 to 2018) (Sem.-2)
LINUX OPERATING SYSTEM
Subject Code : MCA-205
M.code : 72880

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

- Q1) Discuss how to interface a printer through operating systems and the basics of lpd and its clients.
- Q2) Differentiate between editor and Word processor. Discuss the ways of invoking the vi editor. Explain the various modes in it and explain how one can move from one mode to another.

SECTION-B

- Q3) Discuss the concept of troubleshooting Linux in GRUB mode.
- Q4) How we can install multiple operating systems along with Linux? Explain the procedure to install new kernel to boot.

SECTION-C

- Q5) Explain the features of GNOME configuration tool.
- Q6) Write the steps to install a binary package in TAR format.

SECTION-D

- Q7) Explain the Linux system calls and architecture of Linux.
- Q8) Discuss the file structure used in Linux. How diverse directory files are linked with Root Directory? Explain the importance of each.

May-2019

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onwards) (Sem.-2)
RELATIONAL DATABASE MANAGEMENT SYSTEM
Subject Code : MCA-202
M.Code : 72877

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. Explain the three level architecture of DBMS.
2. a. What is weak entity set? Explain with an example.
b. Differentiate between binary and ternary relationships with example using E-R diagrams.

SECTION-B

3. Differentiate between 3NF and Boyce-Codd normal form with examples.
4. a. Explain system recovery.
b. Explain two-phase locking.

SECTION-C

5. What are problems of using Distributed DBMS? Explain.
6. a. Explain client-server architecture.
b. Differentiate between MPSD and MPMD

SECTION-D

7. Explain OLAP architecture in detail.
8. a. What is the difference between operational data and decision support data? Explain
b. Explain decision support system database properties.

SECTION-E

9. Answer briefly :

- a. What is transaction processing monitor?
- b. Define primary key.
- c. Define trivial dependency.
- d. Define 4 normal form.
- e. Define data fragmentation.
- f. Define serializability.
- g. Define ROLAP.
- h. Differentiate between simple and composite attribute.
- i. Differentiate between physical and logical independence.
- j. What is window query?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

May - 2019

Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onward) (Sem.-2)
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Subject Code : MCA-201
Paper ID : [72876]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. a) Describe Euler graph by taking suitable example.
b) If a graph G consists of edges $\{(a,c), (a,a), (b,c), (b,d), (d,c)\}$. Find Chromatic number of G.
2. a) What is the application of Hamiltonian graph in Computer Science?
b) What is undirected graph? Discuss the relation between in-degree and out- degree of a graph.

SECTION-B

3. a) If a set $A = \{a, b, c\}$, then find the power set $P(A)$.
b) What are Uncountable sets? Prove that set of rational numbers between $\{0, 1\}$ is uncountable.
4. a) If relation $R = \{(a,b), (b,b), (b,c), (d,b), (b,d), (d,d)\}$. Check whether R is equivalence relation or not.
b) "Cartesian product of two sets is a complete relation". Comment on the statement.

SECTION-C

5. a) Explain different types of prepositions used in algebra of logic.
b) What is meant by 'Principle of mathematical induction'? Explain.

6. a) Show that $(ab)' = a' + b'$ is a tautology.
b) How universal and existential quantifiers are used in algebra of logic? Explain by taking suitable examples.

SECTION-D

7. a) Define upper triangular matrix. What is the significance of Null matrix in Computer Science? Explain.
b) "*Matrix multiplication is associative*". Justify the statement.
8. a) Discuss different Gauss Jordan method.
b) What is meant by idempotent matrix? Explain.

SECTION-E

9. **Write briefly :**

- a) Define transitive relation.
b) What is the significance of miniset?
c) List two examples of Skew-Hermitian matrix.
d) What is meant by 'Closure property' of a relation?
e) What is the application of matrix in graphs?
f) List two properties of Eulerian graph.
g) Define Range and domain of a set.
h) Show that intersection of any set with universal set is a set itself.
i) Define Symmetric Matrix.
j) Every planar graph is 4-colorable. Comment on the statement.

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May-2019

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onwards) (Sem.-2)
LINUX OPERATING SYSTEM
Subject Code : MCA-205
M.code : 72880

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. Discuss the different issues to be considered before the installation of Linux.
2. What is the importance of X-Windows? Also write a note on GNOME.

SECTION-B

3. Explain the installation and configuration of packages in Fedora.
4. What are the different tools available in Linux for user management? Discuss in detail.

SECTION-C

5. Discuss about different type of shells in Linux.
6. a) How do you set environment variable in Linux? Explain.
b) Explain the File Management and manipulation in Linux.

SECTION-D

7. Explain the Installation and Configuration of printing services in Linux.
8. What is GRUB? Explain the configuration and commands of GRUB.

SECTION-E

9. Write briefly :

- a. What is LILO?
- b. What is Makeup file system?
- c. What is 'Init' service?
- d. What is the purpose of 'Chown' command?
- e. What is SetUID?
- f. What is RPM in Linux?
- g. What is KDE?
- h. What is Swap Space?
- i. What is a Boot Partition?
- j. What is the purpose of Redirection?

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May 2019

Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onward) (Sem.-2)

DATA STRUCTURES

Subject Code : MCA-203

M.Code : 72878

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

- Q1 What is data structure? Explain different linear and non linear data structures.
- Q2 Write notes on the following:
- (a) Memory representation of array
 - (b) Static and dynamic memory management

SECTION-B

- Q3 What is binary tree? Write and explain an algorithm to delete an element from B+ tree.
- Q4 Define heap. Write various steps to create a heap of following elements:
- 16 14 3 4 1 9 10 8 2 7

SECTION-C

- Q5 Write and explain Dijkstra's algorithm for finding shortest path.
- Q6 What is depth first search? Write an algorithm for DFS. Give example to support your answer.

SECTION-D

- Q7 What is hashing? Explain various hashing techniques in detail.
- Q8 What is bubble sort? Discuss its working principle. Sort the following list of numbers using bubble sort:
- 4, 212, 376, 12, 52, 115, 35, 6, 98, 62, 34

SECTION-E

Q9 Answer briefly :

- (a) What is space time trade off?
- (b) What are various advantages of linked list over an array?
- (c) What are merits of priority queues?
- (d) Define LIFO and FIFO.
- (e) What is significance of recursion?
- (f) Differentiate tree and graph.
- (g) List various tree traversal techniques.
- (h) What are different types of trees?
- (i) Write average and worst case complexity of merge sort algorithm.
- (j) What are weighted and non weighted graphs?

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May-2019

Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

MCA (2013 and 2014 Batch) (Sem.-2)
DATA COMMUNICATION AND NETWORKS
Subject Code : MCA-204
M.Code : 26055

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TWENTY marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. What are the various transmission media used in computer networks? Discuss the wireless transmission media in detail.
2. Compare and contrast OSI and TCP reference models. Give areas where each of these is used.

SECTION-B

3. What are the steps in the error control mechanism at the Data Link Layer? Discuss the three techniques for error control in the Data Link Layer.
4. Explain the working of the various CSMA protocols with a flowchart.

SECTION-C

5. Differentiate between interior and exterior gateway routing protocols and explain the Exterior Gateway Routing Protocol in detail.
6. Discuss the various techniques for troubleshooting the network problems.

SECTION-D

7. What do you mean by User Data Protocol (UDP)? How is it different from TCP? Discuss the working of UDP in detail.
8. What do you mean by Domain Name System (DNS)? Explain how DNS works? Discuss in detail about DNS records and DNS messages.

SECTION-E

9. Write briefly :

- a. What do you mean by digital transmission?
- b. How circuit switching is different from packet switching?
- c. Define virtual circuits.
- d. Differentiate between LAN and WAN.
- e. What do you mean by congestion?
- f. Briefly discuss IEEE 802.5.
- g. Write short note on internetworking.
- h. What do you mean by IP protocol?
- i. Write short note on WWW.
- j. Compare Flooding and Broadcast routing

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NOV-2019

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onwards) (Sem.-2)
RELATIONAL DATABASE MANAGEMENT SYSTEM

Subject Code : MCA-202

M.Code : 72877

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. What are the major factors to be considered for the database design? How data abstraction is useful? Explain.
2. Explain the concept of entity relationship model for different types of relationship.

SECTION-B

3. Compare the features of the following :
 - a) Relational and Network model.
 - b) Transitive dependency and Multivalued dependency.
4. What are the properties of transaction? How transaction management is done with SQL? Explain.

SECTION-C

5.
 - a) Differentiate centralized database design and distributed database design.
 - b) Compare the client server with DDBMS.
6. How different levels of Data and Process distribution are implemented? Explain.

SECTION-D

7. How decision support system is useful for data analysis? Illustrate.
8. Write short note on the following :
 - a) Tools for Database administration
 - b) Schemas

SECTION-E

9. Write briefly :
 - a) What is the role of strong entity?
 - b) Define the term degree of relation.
 - c) Compare 2nd and 3rd normal form.
 - d) List the significance of locks.
 - e) What is meant by Integrity constraint?
 - f) List the disadvantages of Distributed databases.
 - g) Define the term domain.
 - h) How business intelligence is employed?
 - i) What is the role of OLAP?
 - j) Write a short note on star schema.

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NgV-2019

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onward) (Sem.-2)
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
Subject Code : MCA-201
M.Code : 72876

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. What is meant by simple graph? Show that degree of a vertex in a simple graph of n -vertices cannot exceed $n-1$.
2. a) What is Euler Graph? State and explain the condition for checking whether a given graph is Eulerian or not.
b) What is meant by Chromatic Number? What are various applications of graph colouring in graph theory?

SECTION-B

3. Prove that set of real numbers in the set $[0, 1]$ is uncountable set. Justify the proof.
4. State and prove the following concepts :
 - a) De-Morgan Laws
 - b) If a relation R on set A is reflexive, so is R^{-1}

SECTION-C

5. If P , Q and R are three prepositions.
Prove that $(P \rightarrow (Q \rightarrow R)) \rightarrow ((P \rightarrow Q) \rightarrow (P \rightarrow R))$

6. Using Principle of Mathematical Induction, prove that :

$$a + (a + d) + (a + 2d) + \dots + (a + (n - 1)d) = \frac{n}{2}(2a + (n - 1)d)$$

SECTION-D

7. Does scalar multiplication of two matrices commutative? (Yes/No), Also justify the result using an appropriate example.
8. Solve the following equations using Gauss Jordan Method :
- $$2x - y + 3z = 9, x + y + z = 6, x - y + z = 2$$

SECTION-E

9. Write briefly :
- Define directed graph.
 - Write a short note on bipartite graph.
 - Discuss briefly the concept of Cartesian product of a set.
 - Define Partition of a set.
 - What is the application of tautology in algebra of logic?
 - Discuss the use universal quantifier by taking an example.
 - Describe the application of transpose of a matrix in Computer Science.
 - What is meant by rank of a square matrix?
 - Why matrix inversion is needed in real world Computer Applications?
 - Define equivalence relation.

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Nov-2019

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 & Onwards) (Sem.-2)
LINUX OPERATING SYSTEM
Subject Code : MCA-205
M.code : 72880

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

1. a) Explain the architecture of Linux Operating System in detail.
b) Discuss the disk management in linux.
2. How do you install Linux operating system with Windows operating system? Explain.

SECTION-B

3. What is the role of fedora package Manager? Explain.
4. Discuss the user management in linux in detail.

SECTION-C

5. Write the purpose and syntax of 'cat', 'mv', 'chown', 'chmod', and 'cd' commands with suitable examples.
6. Discuss file management and manipulation in linux in detail.

SECTION-D

7. What is GRUB? Explain the configuration of GRUB in detail.
8. a) Discuss 'quota management' in Linux.
b) Write a note on Linux Printing.

SECTION-E

9. Write briefly :
 - a) What is system call?
 - b) What is a domain?
 - c) What is boot disk?
 - d) What is a device driver?
 - e) What is a shadow file?
 - f) What is a Shell?
 - g) What is 'su' command?
 - h) What is LILO?
 - i) What is 'init' service?
 - j) What is the 'cron' program?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

SECTION-D

7. Write an algorithm to sort a set of elements using address calculation radix sort. (10)
8. What is Hashing? What are the various hash functions? Discuss each with the help of suitable example. (10)

SECTION-E

9. Write briefly :

- a) Define Omega notation for complexity.
- b) Which linear data structure is not conducive for insertion and deletion?
- c) What is a string? How string is initialized and declared?
- d) Explain the working of simple queue.
- e) Give the node structure of an expression tree.
- f) Define complete b-tree.
- g) Define Heap Sort.
- h) Define Trade-off of Algorithm.
- i) Define Array Pointers.
- j) What are Graph operations?

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

NOV-2019

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

MCA (2014 Batch) (Sem.-2)
DATA COMMUNICATION AND NETWORKS

Subject Code : MCA-204

M.Code : 26055

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTION TO CANDIDATES :

1. SECTIONS-A, B, C & D contains TWO questions each carrying TWENTY marks each and students has to attempt any ONE question from each SECTION.
2. SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.

SECTION-A

- Q1 a) Discuss different switching techniques of data communication.
b) What are wireless networks? Explain the concept of Internetworks.
- Q2 Write a short notes on the following :
- a) Twisted pair
 - b) Transport layer of OSI
 - c) ATM
 - d) Satellite Communication

SECTION-B

- Q3 a) What is meant by error control? Why is it required? Explain.
b) Discuss the services offered by IEEE 802.4 and IEEE 802.5 standards.
- Q4 What are limited contention protocols? Discuss wireless LAN in detail.

SECTION-C

- Q5 a) Differentiate Hierarchical and shortest path routing.
b) What is meant by IP protocol? Explain its working in detail.
- Q6 Explain the following :
- a) ARP
 - b) Token Bucket Algorithm
 - c) Traceroute
 - d) Ping

SECTION-D

- Q7 a) Discuss the concept of flow control at transport layer.
b) Discuss the working of UDP protocol in detail.
- Q8 Explain the following by taking suitable example :
- a) Email
 - b) HTTP and HTTPS

SECTION-E

Q9 Write briefly :

- a) What is World Wide Web?
- b) Name the different layers of TCP/IP model.
- c) Discuss briefly about fiber optics communication.
- d) Why is logical link layer required?
- e) Comment on “*channel allocation*”.
- f) Describe the services offered by MAC layer.
- g) Enlist any two issues of Flooding algorithm.
- h) How is troubleshoot provided by netstat?
- i) Discuss two features of TCP.
- j) Name any two protocols at Application layer of TCP/IP model.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.