



FINAL EXAMINATION

MARCH 2024

COURSE TITLE	SYSTEM ADMINISTRATION AND MAINTENANCE
COURSE CODE	RCIT3643
DATE/DAY	22 JUNE 2024 / SATURDAY
TIME/DURATION	09:00 AM - 11:00 AM / 02 Hour(s) 00 Minute(s)

INSTRUCTIONS TO CANDIDATES :

1. Please read the instruction under each section carefully.
2. Candidates are reminded not to bring into examination hall/room any form of written materials or electronic gadget except for stationery that is permitted by the Invigilator.
3. Students who are caught breaching the Examination Rules and Regulation will be charged with an academic dishonesty and if found guilty of the offence, the maximum penalty is expulsion from the University.

(This Question Paper consists of 5 Printed Pages including front page)

DO NOT OPEN THE QUESTION PAPER UNTIL YOU ARE TOLD TO DO SO

This question paper consists of TWO (2) sections. Answer ALL questions in the answer booklet provided. [100 MARKS]

SECTION A

(30 Marks)

There are FIFTEEN (15) questions in this section. Answer ALL questions in the answer booklet provided.

1. What is the main function of a Distributed File System (DFS)?
 - A. To provide a distributed implementation of a file system
 - B. To manage a set of dispersed storage devices.
 - C. To ensure that all files are stored on a single centralized server.
 - D. To provide a redundant backup system for file storage.

2. Which of the following is **NOT** a benefit of using caching in a distributed file system?
 - A. Reduces server load and network traffic.
 - B. Enhances potential for scalability.
 - C. Ensures that files are always up-to-date across all servers.
 - D. Many remote accesses can be handled efficiently by the local cache.

3. In the Andrew File System (AFS), what is the purpose of the FID?
 - A. To identify a specific volume on the server.
 - B. To uniquely identify a file or directory on the server.
 - C. To store the location of the file on the server's disk.
 - D. To ensure that files are cached correctly on the client.

4. Which of the following is a characteristic of a stateless file server?
 - A. It maintains state information about open files and client connections.
 - B. Each request must identify the file and position in the file.
 - C. It requires client machines to have local disks for caching files.
 - D. It uses a recovery protocol based on a dialog with clients in case of a server crash.

5. In the context of network topologies, which of the following is a disadvantage of a ring topology?
 - A. High cost of linking sites.
 - B. Lack of reliability in case of a link or site failure.
 - C. Long communication delays between sites.
 - D. Inability to handle changing load levels efficiently.

6. Which of the following is **NOT** a layer in the ISO network model?
- A. Physical layer
 - B. Data-link layer
 - C. Session layer
 - D. Memory layer
7. Which protocol is responsible for partitioning messages into packets and maintaining packet order in a network communication?
- A. Physical layer
 - B. Data-link layer
 - C. Network layer
 - D. Transport layer
8. What is the primary purpose of the Dynamic Host Configuration Protocol (DHCP)?
- A. To provide a centralized database for IP address assignments.
 - B. To dynamically assign IP addresses to hosts on a network.
 - C. To translate domain names into IP addresses.
 - D. To route packets through a network based on their destination addresses.
9. In the Domain Name System (DNS), what is the role of the root servers?
- A. To store the IP addresses of all hosts on the Internet.
 - B. To provide authoritative name resolution for top-level domains.
 - C. To act as the central authority for managing the entire DNS hierarchy.
 - D. To distribute and maintain the hierarchical structure of the DNS namespace.
10. Which HTTP method is typically used for submitting form data from a client to a web server?
- A. GET
 - B. POST
 - C. HEAD
 - D. OPTIONS
11. What is the purpose of the Time To Live (TTL) field in DNS responses?
- A. To indicate the maximum time a DNS record should be cached.
 - B. To specify the amount of time a DNS server should wait for a response before retrying.
 - C. To determine the priority order in which DNS servers should be queried.
 - D. To define the maximum number of hops a DNS query can take through the hierarchy.

12. In the context of network security, what is the primary benefit of using HTTPS over HTTP?
- A. It provides faster data transfer speeds.
 - B. It ensures data integrity by using digital signatures.
 - C. It encrypts data transmitted between the client and server.
 - D. It prevents unauthorized access to web servers.
13. Which of the following is a characteristic of a Wide-Area Network (WAN)?
- A. It is designed to cover a small geographical area.
 - B. It typically uses a multi-access bus or ring topology.
 - C. It links geographically separated sites using point-to-point connections.
 - D. It has a high percentage of workstations as nodes.
14. In the context of network routing strategies, what is the difference between fixed routing and dynamic routing?
- A. Fixed routing adapts to changing load conditions, while dynamic routing does not.
 - B. Dynamic routing ensures that messages are delivered in the order they were sent, while fixed routing does not.
 - C. Fixed routing determines paths in advance, while dynamic routing determines paths at the time of message transmission.
 - D. Dynamic routing requires a central authority to manage path selection, while fixed routing requires user input for paths.
15. Which protocol is used to map IP addresses to MAC addresses in a local network?
- A. DNS
 - B. DHCP
 - C. ARP
 - D. HTTP

SECTION B

(70 Marks)

There are TWO (2) questions in this section. Answer all questions.

Question 1

(35 marks)

Redundant Array of Independent Disks, or RAID, is a form of storage that allows data to be written across several disks in a single system.

- a) Explain the difference between RAID 5 and RAID 6 with the help of a suitable diagram. (5 marks)
- b) Discuss the advantages and disadvantages of the SCAN and C-SCAN disk scheduling algorithms. Provide examples to illustrate your points. (10 marks)
- c) Tertiary storage devices are often used for backup and archiving purposes. Describe the characteristics and types of tertiary storage devices, including their advantages and disadvantages. Explain the concept of stable storage implementation and its importance in data integrity. (20 marks)

Question 2

(35 marks)

Explain the various components and protocols involved in the Internet email architecture, highlighting the differences between SMTP, IMAP, and POP3 protocols. Address the potential threats associated with email communication and outline the measures taken to ensure authentication and confidentiality.

***** END OF QUESTION PAPER *****