R7705	Sub. Code
	541101

M.C.A. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Computer Applications

COMPUTER ARCHITECTURE AND ORGANIZATION

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. What is computer organization?

   (a) structure and behaviour of a computer system as observed by the user

   (b) structure of a computer system as observed by the developer

   (c) structure and behaviour of a computer system as observed by the developer

   (d) All of the mentioned

2. What digit is called a bit?

   (a) Decimal

   (b) Binary

   (c) Octal

   (d) Hexadecimal

3. What does CSA stands for?

(a) Computer Service Architecture

(b) Computer Speed Addition

(c) Carry Save Addition

(d) None of the mentioned

4. Which of the operation is not performed by the CPU.

(a) Fetch instruction

(b) Interpret instruction

(c) Fetch data

(d) Input data

5. A bus consists of ———— wires.

(a) Exactly One (b) 0 or 1

(c) 1 or less (d) 1 or more

6. There are ———— kinds of buses.

(a) One (b) Two

(c) Three (d) Four

7. Which of them is a CPU register.

(a) PC (b) MAR

(c) MDR (d) All of the above

8. Most popular computer architecture is:

(a) The stock machine

(b) Accumulator machine

(c) Load/store machine

(d) All of the above

9. Program counter is ————————

(a) User-visible required

(b) Control register

(c) Status register

(d) Data register

10. ———————— can be assigned to a variety of functions by the programmer.

(a) Data register

(b) General-purpose registers

(c) Address registers

(d) Index registers

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

All questions carry equal marks each answer should not exceed 1 page or 250 words.

11. (a) Explain about the functional units of a computer.

Or

(b) Discuss the different secondary storage devices. Elaborate on any one of the devices.

12. (a) Explain about Eight Great Ideas in Computer Architecture.

Or

(b) Explain the multiple bus organization in detail.

13. (a) What are the special registers in a typical computer? Explain their purposes in detail.

Or

(b) Explain different types of computer registers with common bus system with a neat sketch.

14. (a) What are stack and queues? Explain its use and give its differences.

Or

(b) What are addressing modes? Explain the various addressing modes with examples.

15. (a) Discuss the operation of any two input devices.

Or

(b) Explain the concept of memory hierarchy.

Part C $(5 \times 8 = 40)$

Answer any **five** questions.

All questions carry equal marks each answer should not exceed 2 pages.

16. Explain how the virtual address is converted into real address in a paged virtual memory system.

17. Explain the Address Translation in Virtual Memory.

18. Explain about the representation of floating-point numbers with suitable examples.

19. Draw and explain the flowchart of instruction cycle.

20. Explain in detail the different instruction formats with examples.

21. Explain different types of instructions with examples. Compare their relative merits and demerits.

22. Illustrate the characteristics of some common memory technologies.

23. Explain with the block diagram the DMA transfer in a computer system.

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R7706	Sub. Code
	541102

M.C.A. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Computer Applications

OBJECT ORIENTED PROGRAMMING AND C++

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. What happens when an object is passed by reference?
   (a) Destructor is called at end of function
   (b) Destructor is called when called explicitly
   (c) Destructor is not called
   (d) Destructor is called when function is out of scope

2. Which access specifier is usually used for data members of a class?
   (a) Protected (b) Private
   (c) Public (d) Default

3. Which feature of OOP reduces the use of nested classes?
   (a) Inheritance (b) Binding
   (c) Abstraction (d) Encapsulation

4. Which type of members can't be accessed in derived classes of a base class?

(a) All can be accessed

(b) Protected

(c) Private

(d) Public

5. Single level inheritance supports ———— inheritance.

(a) Language independency

(b) Multiple inheritance

(c) Compile time

(d) Runtime

6. Encapsulation and abstraction differ as ————

(a) Hiding and hiding respectively

(b) Binding and Hiding respectively

(c) Hiding and Binding respectively

(d) Can be used any way

7. Which feature of OOP is exhibited by the function overriding?

(a) Polymorphism (b) Encapsulation

(c) Abstraction (d) Inheritance

8. Where is the memory allocated for the objects?

(a) Cache (b) ROM

(c) HDD (d) RAM

9. Which feature can be implemented using encapsulation?

(a) Polymorphism (b) Overloading

(c) Inheritance (d) Abstraction

10. Which feature in OOP is used to allocate additional functions to a predefined operator in any language?

(a) Function Overloading

(b) Function Overriding

(c) Operator Overloading

(d) Operator Overriding

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Give classification of operators available in C++ with the help of neat and clean diagram.

Or

(b) What is the need of data types in C++? Describe different data types along with their representations and size in C++.

12. (a) Compare and contrast the structured programming and object-oriented programming.

Or

(b) Discuss about various features of Object-oriented programming.

13. (a) What are the different ways to define member functions of a class. What is the role of scope resolution operator in the definition of member function?

Or

(b) Define class. Write down the syntax and example to create a class.

14. (a) What is the need of constructor? How it is different from the member function?

Or

(b) Explain the use of destructor in C++.

15. (a) What is the need of inheritance? Draw a diagram to represent the forms of inheritance

Or

(b) How overriding is different from the overloading.

Part C $(5 \times 8 = 40)$

Answer any **five** questions.

All questions carry equal marks and each answer should not exceed 2 pages.

16. Classify the different statements available in C++.

17. Differentiate between nested if-else and switch statement.

18. Compare and contrast for, while and do-while looping statements.

19. Explain the concept of polymorphism by an example in C++.

20. Write a program to add two complex numbers using object as arguments.

21. Discuss the role of access specifiers in inheritance and show their visibility when they are inherited as public, private and protected.

22. Explain different types of inheritance with block diagram and an example for each.

23. What is the use of operator overloading? Write a program to overload post and pre increment operators.

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R7707	Sub. Code
	541103

M.C.A. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Computer Applications

RELATIONAL DATABASE MANAGEMENT SYSTEM

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 1 = 10)

Answer **all** questions.

1. Which category of data integrity states that no duplicate rows should be there in a table?

   (a) User-defined

   (b) Referential

   (c) Entity

   (d) Domain

2. What is TRUE about Referential Integrity?

   (a) It states that rows can't be deleted

   (b) It states that rows can be deleted

   (c) It states that columns can't be deleted

   (d) It states that columns can be deleted

3. RDBMS applications stores data

(a) In tabular form

(b) As file

(c) Both (a) and (b)

(d) None of the above

4. In what format data is stored in DBMS?

(a) Hierarchal form

(b) Navigational form

(c) Both (a) and (b)

(d) None of the above

5. Normalization is not present in ————————

(a) DBMS (b) RDBMS

(c) Both (a) and (b) (d) None of the above

6. How many integrity constraints are there in RDBMS?

(a) 3 (b) 4

(c) 5 (d) 6

7. In DBMS ————————

(a) There is no relation between the tables

(b) There is relation between the tables

(c) There is custom relation between the databases

(d) There is data value relation between the databases

8. Distributed database is supported by ————————

(a) RDBMS

(b) DBMS

(c) Both RDBMS and DBMS

(d) Neither RDBMS nor DBMS

9. RDBMS supports ———— users.

(a) One (b) Two

(c) None (d) Multiple

10. DBMS deals with ———— amount of data.

(a) Large (b) Small

(c) Custom (d) None

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Draw and explain the detailed system architecture of DBMS.

Or

(b) Explain the structure of SQL SELECT statement with suitable example.

12. (a) Define hashing. Explain various types of hashing.

Or

(b) How deadlocks are handled. Explain in detail.

13. (a) What is serializable schedule? (or) Explain conflict and view Serializability.

Or

(b) Explain about various types of attributes in DBMS.

14. (a) Explain the classification of DBMS in detail.

Or

(b) Define Entity? Explain Strong and Weak Entity Set.

15. (a) Explain ACID properties in detail.

Or

(b) Discuss the main characteristics of database approach. How it differs from traditional database?

Part C $(5 \times 8 = 40)$

Answer any **five** questions.

16. Draw the database architecture and explain in detail about each component and Describe different subsystems of a database.

17. Explain the concept of specialization and generalization in E-R model with suitable examples.

18. Write about fundamental relational, additional and extended relational algebra operations in detail.

19. Discuss the following constraints on a single relation.

(a) Not Null, (b) Unique (c) Check, (d) What are Integrity Constraints?

20. What is normalization? Explain types of normalization in detail with examples.

21. What is Transaction? Explain its four important Properties. Discuss about transaction recoverability.

22. Discuss about data redundancy. What are the problems associated with data redundancy?

23. Explain the component modules of DBMS and their interaction, with the help of a diagram.

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R7708	Sub. Code
	541104

M.C.A. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Computer Applications

DISCRETE MATHEMATICS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. $\neg(P \wedge Q)$ which is equivalent to

   (a) $\neg P \wedge \neg Q$ (b) $P \wedge Q$

   (c) $\neg P \vee \neg Q$ (d) $\neg(P \vee Q)$

2. Which rule is used to introduced a premise at any point in the derivation?

   (a) Rule Cp (b) Rule T

   (c) Rule P (d) Rule C

3. The power set of A is a equal to

   (a) $\rho(A) = 2^A$ (b) $\rho(A) = 3^A$

   (c) $\rho(A) = 2^{A-1}$ (d) $\rho(A) = 3^{A-1}$

4. Which one is called Idempotent law?

   (a) $P \vee Q \Leftrightarrow Q$ (b) $P \vee P \Leftrightarrow P$

   (c) $P \wedge Q \Leftrightarrow Q$ (d) None of these

5. Select the semigroup homomorphism condition from below option

(a) $g(a * b) = g(a) * g(b)$

(b) $g(a \Delta b) = g(a) \Delta g(b)$

(c) $g(a * b) = g(a) \Delta\, g(b)$

(d) $g(a * b) = g(b)$

6. Write the condition for left coset of H in G.

(a) $aH = \{a * h / h \in H\}$

(b) $Ha = \{a * h / h \in H\}$

(c) $aH = \{h * a / h \in H\}$

(d) $Ha = \{h * a / h \in H\}$

7. In a graph a node which is not adjacent to any other node is called ————————.

(a) Isolated node (b) Complete node

(c) Zero node (d) None of these

8. In simple digraph, a maximal strongly connected subgraph is called ————————.

(a) weak component

(b) strong component

(c) unilateral component

(d) strongly connected component

9. The conditional probability of A given E is

(a) $P(A / E) = \dfrac{P(A \cup E)}{P(E)}$

(b) $P(A / E) = \dfrac{P(A \cap E)}{P(E)}$

(c) $P(A / E) = \dfrac{P(A \cup E)}{P(A)}$

(d) $P(A / E) = \dfrac{P(A \cap E)}{P(A)}$

10. Write the value of sum of the probabilities.

(a) 2 (b) 1

(c) 0 (d) n

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

11. (a) Show that $\left(\neg P \wedge \left(\neg Q \wedge R\right)\right) \vee (Q \wedge R) \vee (P \wedge R) \Leftrightarrow R$.

Or

(b) Obtain disjunctive normal forms of $\neg(P \vee Q) \underset{\leftarrow}{\rightarrow} (P \wedge Q)$.

12. (a) Let $X = \{2,3,6,12,24,36\}$ and the relative $\leq$ be such that $x \leq y$ if x divides y. Draw Hasse diagram of $\langle X_1 \leq \rangle$.

Or

(b) Let $X = \{1,2,\ldots 7\}$ and $R = \{\langle x, y\rangle \mid x - y\}$ is divisible by 3}. Show that R is an equivalence relation. Draw the graph of R.

13. (a) Prove for any commutative monoid $\langle M,*\rangle$, the set of idempotent elements of M forms a submonoid.

Or

(b) Prove the Kernel of a homomorphism g from a group $\langle G,*\rangle$ to $\langle H,\Delta\rangle$ is a subgraoup of $\langle G,*\rangle$.

14. (a) Prove in a simple digraph, the length of any elementary path is less than or equal to $n-1$, where n is the number of nodes in the graph. Similarly, the length of any elementary cycle does not exceed n.

Or

(b) Draw graph for adjcency matrix $A(G) = \begin{pmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 \\ 1 & 0 & 0 & 0 \end{pmatrix}$.

15. (a) Three fair coins, a penny, a nickel and a dime are tossed. Find the probability p that they are all heads if : (i) the penny is heads; (ii) atleast one of the coins is heads.

Or

(b) A fair coin is tossed 6 times; call heads a success. This a binomial experiment with $n = b$ and $p = q = \frac{1}{2}$.

Part C $(5 \times 8 = 40)$

Answer any **five** questions.

16. Obtain the principal conjunctive normal form of the formula S given by $(\neg P \to R) \wedge (Q \underset{\leftarrow}{\rightarrow} P)$.

17. Show that $R \vee S$ follows logically from the premises $C \vee D$, $(C \vee D) \to \neg H$, $\neg H \to (A \wedge \neg B)$, and $(A \wedge \neg B) \to (R \vee S)$.

18. Show that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

19. State and prove Lagrange's theorem.

20. State and prove Fermat's theorem.

21. Prove let A be the adjacency matrix of a digraph G. The element in the i^{th} row and jth column of A^n (n is non negative integer) is equal to the number of paths of length n from the i^{th} node to the j^{th} node.

22. Prove that in a simple digraph $G = \langle V, E \rangle$, every node of the digraph lies in exactly one strong component.

23. State and prove Bayes theorem.

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R7709	Sub. Code
	541551

M.C.A. DEGREE EXAMINATION, NOVEMBER – 2022

First Semester

Computer Applications

Elective I : COMPUTER NETWORKS

(CBCS – 2022 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 1 = 10)$

Answer **all** questions.

1. Which type of topology is best suited for large businesses which must carefully control and coordinate the operation of distributed branch outlets?

   (a) Ring (b) Local area

   (c) Hierarchical (d) Star

2. "Parity bits" are used for which of the following purposes?

   (a) Encryption of data

   (b) To transmit faster

   (c) To detect errors

   (d) To identify the user

3. What kind of transmission medium is most appropriate to carry data in a computer network that is exposed to electrical interferences?

   (a) Unshielded twisted pair

   (b) Optical fiber

   (c) Coaxial cable

   (d) Microwave

4. A collection of hyperlinked documents on the internet forms the?
   (a) World Wide Web (WWW)
   (b) E-mail system
   (c) Mailing list
   (d) Hypertext markup language

5. The location of a resource on the internet is given by its?
   (a) Protocol (b) URL
   (c) E-mail address (d) ICQ

6. The term HTTP stands for?
   (a) Hyper terminal tracing program
   (b) Hypertext tracing protocol
   (c) Hypertext transfer protocol
   (d) Hypertext transfer program

7. A proxy server is used as the computer?
   (a) with external access
   (b) acting as a backup
   (c) performing file handling
   (d) accessing user permissions

8. Which software prevents the external access to a system?
   (a) Firewall (b) Gateway
   (c) Router (d) Virus checker

9. Which of the following best describes uploading information?
   (a) Sorting data on a disk drive
   (b) Sending information to a host computer
   (c) Receiving information from a host computer
   (d) Sorting data on a hard drive

10. Which one of the following is the most common internet protocol?

(a) HTML (b) NetBEUI

(c) TCP/IP (d) IPX/SPX

Part B $(5 \times 5 = 25)$

Answer **all** questions, choosing either (a) or (b).

All questions carry equal marks and each answer should not exceed 1 page or 250 words.

11. (a) Discuss about the various types of transmission mode with example.

Or

(b) Draw a TCP / IP Protocol suite with neat diagram.

12. (a) Describe the transmission media. What are the types of transmission media?

Or

(b) Discuss any three connecting devices with neat diagram.

13. (a) Distinguish Go Back N ARQ and selective repeat ARQ.

Or

(b) Illustrate the working mechanism of sliding window protocol with suitable example?

14. (a) Explain the various classes of IP addressing in detail.

Or

(b) Explain TCP and UDP with a neat diagram.

15. (a) Explain in detail about domain name system.

Or

(b) Discuss about various aspects of Security fundamentals in detail.

Part C $(5 \times 8 = 40)$

Answer any **five** questions.

All questions carry equal marks and each answer should not exceed 2 pages.

16. Define Topology. Why is it needed? Discuss various network topologies with its merits and demerits.

17. Draw the OSI network architecture and explain the functionalities of every layer in detail.

18. Explain the basic difference between circuit switching techniques, message switching techniques and packet switching techniques.

19. Explain the Intra Domain Routing Algorithm and Inter Domain Routing. Mention the limitations of same.

20. Discuss about the different congestion avoidance mechanisms? Explain in detail.

21. Explain the message transfer using Simple Mail Transfer Protocol in detail.

22. Explain how cyclic redundancy check works while checking errors in data.

23. Explain the functioning of wireless LAN in detail.

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