(vi) Which statement is used to permanently save the changes made during the current transaction ?

(a) COMMIT

(b) ROLLBACK

(c) SAVEPOINT

(d) TRANSACTION

Section II

2. (a) What are the advantages of Database Approach ? **6**

(b) Define a database system and explain its purpose ? **3**

(c) Define primary key and foreign keys. **3**

3. (a) Explain ANSI/SPARC Architecture of a Database System. **6**

CO-22401

Fourth Semester (Computer Engineering) (Common to IT)

DATABASE MANAGEMENT SYSTEMS

Time : 3 Hours   M. M. : 60

Note : Attempt *Five* questions in all. Section I (Q. No. 1) is compulsory. Select *two* questions each from Section II and Section III.

Section I

(Compulsory Question)

1. Select the approriate Answer :

(i) Which SQL statement is used to create a new table ?

(a) INSERT

(b) UPDATE

(c) CREATE

(d) SELECT

(ii) Which SQL statement is used to add new records to a table ?

(a) INSERT

(b) UPDATE

(c) DELETE

(d) SELECT

(iii) What does the relational database model organize data into ?

(a) Tables

(b) Records

(c) Files

(d) Documents

(iv) Which type of join returns only the rows that have matching values in both tables ?

(a) Inner Join

(b) Left Join

(c) Right Join

(d) Outer Join

(v) Which key uniquely identifies a record in a table ?

(a) Candidate Key

(b) Superkey

(c) Primary Key

(d) Alternate Key

6. (a) Define and explain Arithmetic, Logical operators in MySQL. 6

(b) Define MySQL and list its features. 3

(c) Define View, Index, and Alias in the context of MySQL. 3

7. (a) What is SQL DDL ? Discuss various commands under DDL. 6

(b) Explain the following clauses with example : 3

(i) Group by

(ii) Order by

(iii) Having.

(c) Define Inner, Left, Right, and Outer Joins. 3

(b) Differentiate between logical Data Independence, Physical Data Independence. 3

(c) Define Schema. 3

4. (a) What are database constraints ? Explain in detail. 6

(b) Explain the difference between Strong and Weak Entities. 3

(c) Explain the role of DBA. 3

Section III

5. (a) What is SQL DML ? Discuss various commands under DDL. 6

(b) Explain Second Normal form. 3

(c) Differentiate between trivial and non-trivial dependencies. 3

(b) Explain the advantages of Linked list over Arrays. **3**

(c) List and explain Applications of Trees. **3**

6. (a) What is Sorting ? Write algorithm and draw flowchart to sort the following sequence using BUBBLE sort technique. **6**

DATA

10 –1 3 3 6 – 3 11 13 7 8

(b) Explain the following terms w.r.t. tree : **3**

(i) Degree of tree

(ii) Leaves

(iii) Depth of Tree.

(c) Write a short note on Binary Tree. **3**

7. (a) What is Stack ? Draw flowchart and write algorithm to demonstrate PUSH and POP operation. **6**

CO-22402

Fourth Semester Computer Engineering (N-2022)

DATA STRUCTURE AND ALGORITHMS

Time : 3 Hours   **M. M. : 60**

Note : Attempt *Five* questions in all. Section A (Q. No. 1) is compulsory. Attempt any *two* questions each from Section B and Section C.

Section A

1. (a) State Linear Queue verses Circular Queue.

(b) Why Queue is called FIFO type of Data Structure ? Explain in brief.

(c) Convert the following expression into its equivalent postfix expression :

A + B * C/D.

(d) Write any *two* advantages of Linked List over Array.

(e) Explain the following w.r.t. tree :

(i) Degree of Node

(ii) Height or Depth of Tree

(f) What is time complexity of Selection Sort algorithm ? **6×2=12**
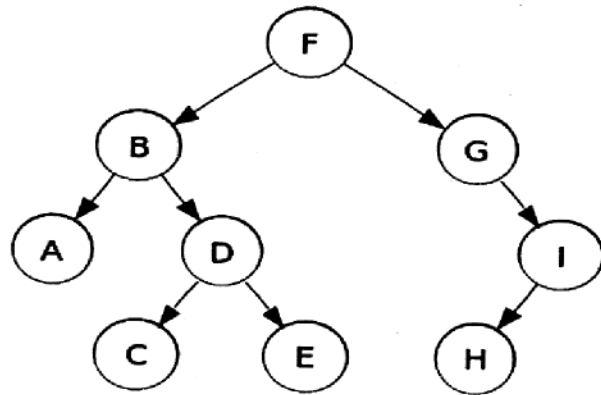
Section B

2. (a) What is Data Structure ? Explain various types of data structures with example. **6**

(b) What is two-Dimensional Array ? State row-major order and column-major order representation of 2D array. **3**

(c) Define Algorithm. Write its properties. **3**

3. (a) Write an algorithm and draw flowchart to insert data element in the middle of one dimensional array. **6**

(b) Explain, how dynamic memory allocation is implemented in 'C' language. **3**

(c) Write a short note on Big O Notation. **3**

4. (a) What is Searching ? Write algorithm and draw flow chart to demonstrate the concept of Binary Search. **6**

(b) Write a short note on self-referencing Structures. **3**

(c) What is Pointer ? Explain its uses. **3**
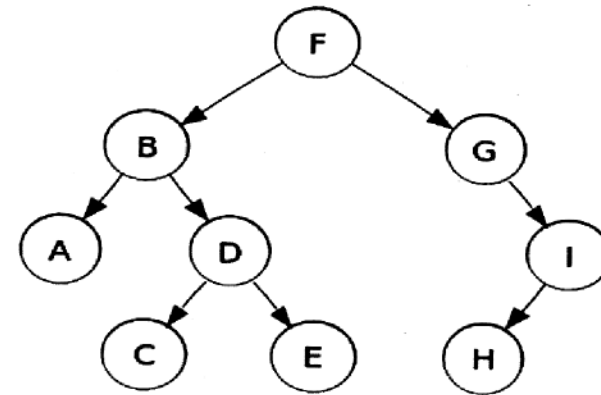
Section C

5. (a) What is Linked List ? Write algorithm to implement the following operations on single Linked list : **6**

(i) Insert node at end

(ii) Delete End node.

(b) Traverse the following tree in INORDER
     and POSTORDER :   3

(c) Compare Selection Sort, Merge sort and
     Quick sort.   3

(b) Traverse the following tree in INORDER
     and POSTORDER :   3

(c) Compare Selection Sort, Merge sort and
     Quick sort.   3

(b) What is inference engine ? Why is it used in artificial intelligence ? 3

(c) Give differences between Temporal and spatial learning. 3

6. (a) What is Machine learning ? Explain different types of machine learning in AI. 6

(b) Differentiate between Supervised and Unsupervised learning. 3

(c) What is artificial neural network ? Explain its components in brief. 3

7. (a) What is uninformed search ? Explain Depth first search with example. 6

(b) Give differences between Artificial intelligence and machine learning. 3

(c) Explain forward and backward chaining in Artificial intelligence. 3

CO-22441

Fourth Semester (Computer Engineering) (N-2022)

FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

Time : 3 Hours **M. M. : 60**

Note : Attempt *Five* questions in all. Section A (Q. No. 1) is compulsory. Select *two* questions each from Section B and Section C.

Section A

1. (a) Explain the need of Artificial Intelligence.

(b) Give the names of four views of Artificial Intelligence.

(c) Give the real world applications of Artificial Intelligence.

(d) How is machine learning related to artificial intelligence ?

(e) Name the features of state space search.

(f) What is fuzzy logic ? 2×6=12

Section B

2. (a) What is artificial intelligence ? Explain its advantages and give 03 real life applications of Al. 6

(b) Give brief descriptions about different domains of Artificial intelligence 3

(c) Explain risks and benefits of Artificial intelligence. 3

3. (a) What are the different agents of Artificial intelligence ? Compare intelligent agent and rational agent. 6

(b) What is Turing test ? Explain its working with suitable example. 3

(c) What is task based environment ? Explain its properties. 3

4. (a) What is State space search ? Explain its use in artificial intelligence with suitable example. 6

(b) Give advantages and disadvantages of Breadth first searching. 3

(c) What is A* search algorithm ? Explain its steps. 3

Section C

5. (a) What are different types of logics used in artificial intelligence ? Explain Propositional and Fuzzy logic with example. 6

7. (a) What do you mean by network security ? Explain VLAN and VPN in detail. **6**

(b) What is Protocol Analyzer ? Explain Wireshark protocol analyzer. **3**

(c) Write a short note on Network Redundancy. **3**

CO-22442

Fourth Semester Computer Engineering (N-2022)

ADVANCED COMPUTER NETWORKS

Time : 3 Hours   **M. M. : 60**

Note : There are three Sections. Section A is compulsory. Attempt any *two* questions each from Section B and Section C.

Section A

1. Answer each of the following in brief (not more than three sentences) :   **6×2=12**

(i) What is a subnet in IPv4 ?

(ii) How IPv6 is different from IPv4 ?

(iii) What is the full form of ATM ?

(iv) What is the use of SNMP protocol ?

(v) What is WAN ?

(vi) What is the primary function of VPN in the context of network security ?

Section B

2. (a) Explain the concept of multicasting in IPv4. Discuss the significance of multicast routing protocols like PIM and IGMP. **6**

(b) Describe the protocol spoofing in TCP. **3**

(c) What is congestion avoidance technique ? **3**

3. (a) Explain the different types of switching techniques in detail. **6**

(b) Compare the 3G and 4G technologies in brief. **3**

(c) Explain the Star architecture in VSAT Communication. **3**

4. (a) What is network monitoring ? Also Explain SNMP and RMON. **6**

(b) Write a short note on flow management in TCP. **3**

(c) Compare the functionality of Wi-Fi and WiMAX in wireless network. **3**

Section C

5. (a) What is Proxy Server ? Explain its working with a diagram. **6**

(b) Explain the role of QoS in Network. **3**

(c) What is a Firewall ? Explain its importance in network security. **3**

6. (a) Explain the various aspect of IP addressing schema. **6**

(b) Write a short note on Network Simulation. **3**

(c) What is the purpose of Load Balancer in networking ? **3**

(c) Write a short note on components of the cyber security framework. **3**

4. (a) What do you mean Transposition technique ? Explain with examples. **6**

(b) How does ransomware work and how to prevent it ? **3**

(c) Differentiate between bot and botnet. **3**

Section C

5. (a) What is the difference between active attack and passive attack ? **6**

(b) How Firewall is used to achieve network security ? **3**

(c) Define Patent law. **3**

6. (a) What are the Major Provisions under Indian Act, 2000 ? **6**

(b) Explain Cross site scripting. **3**

(c) Differentiate between threat and attack. **3**

7. (a) What are the various network attacks ? Explain in detail. **6**

(b) Explain the role of Digital Signatures in network security. **3**

(c) What is DNS spoofing ? **3**

CO-22443

Fourth Semester

Computer Engineering (N-2022)

INFORMATION SECURITY

Time : 3 Hours **M. M. : 60**

Note : Attempt *Five* questions in all. Section A (Q. No. **1**) is compulsory. Select *two* questions each from Section B and Section C.

Section A

1. Choose the correct answer : **1×6=6**

(a) Which one of the following can be considered as the class of computer threats ?

(i) Dos Attack

(ii) Phishing

(iii) Soliciting

(iv) Both (i) and (iii)

(b) The C.I.A. triangle includes :
   (i)   Confidentiality
   (ii) Intrusion
   (iii) Confidentiality, intrusion and attacks
   (iv) None of the above

(c) Among the things that can facilitate unauthorised access to a computer by attackers are :
   (i)   Software
   (ii) Hardware
   (iii) Procedural weakness of a safeguard
   (iv) All of the above

(d) Which of the following is considered as the unsolicited commercial e-Mail ?
   (i)   Virus
   (ii) Malware
   (iii) Spam
   (iv) All of the above

(e) Which one of the following is a type of antivirus program ?
   (i)   Quick heal
   (ii) Mcafee
   (iii) Kaspersky
   (iv) All of the above

(f) Which of the following refers to stealing one's idea or invention of others and using it for their own benefits ?
   (i)   Piracy
   (ii) Plagiarism
   (iii) Intellectual property rights
   (iv) All of the above

(g) Define the following terms :
   (i)   Keylogger
   (ii) Non-repudiation
   (iii) Man-in-Middle
   (iv) CAPTCHA
   (v)   VPN
   (vi) Traceroute

Section B

2. (a) Define NIST Definition of Computer Security and explain CIA Triad. **6**

   (b) What is the difference between Spamming and Phishing ? **3**

   (c) What is Caesar Cipher ? Explain. **3**

3. (a) What are the security features of an operating system ? **6**

   (b) Explain public key cryptography. **3**

CO-22444

Fourth Semester (Computer Engineering)

(N-2022)

DIGITAL MARKETING

Time : 3 Hours   M. M. : 60

Note : Section A (Q. No. **1**) is compulsory. Attempt any *two* questions from Section B. Attempt any *two* questions from Section C.

Section A

1. Define the following :   6×2=12

    (i)   Landing page

    (ii)   Brainstorming

    (iii) Bid Management

    (iv)   ROI

(v) Facebook Ads Manager

(vi) Twitter.

Section B

2. (a) Define digital marketing. What are the various objectives of digital marketing ?   **6**

(b) Briefly explain about Content Marketing and Blogging.   **3**

(c) Briefly explain Google Analytics.   **3**

3. (a) What is SEO ? Why SEO is required ? Explain the essential guidelines for website owner, designer, blogger and content writer.   **6**

(b) Briefly explain about Google Trends. **3**

(c) Briefly explain about Website Speed Testing.   **3**

4. (a) Explain about setting up Google AdWords Campaigns.   **6**

(b) Briefly explain about Remarketing campaigns.   **3**

(c) Briefly explain about SEO-friendly URL structure.   **3**

Section C

5. (a) Explain about the features of Google Analytics Dashboard.   **6**

(b) Briefly explain about tracking Social Media Traffic.   **3**

(c) Briefly explain about Google Tag Manager.   **3**

6. (a) Explain about social media marketing strategy.   **6**

(b) Briefly explain about TweetDeck tool. **3**

(c) Explain about LinkedIn Advertising.   **3**

7. (a) What is UTM ? Also explain about URL Builder and bounce rate.   **6**

(b) How to setup Facebook business page ?   **3**

(c) Briefly explain about Goal Conversion. **3**

7. (a) Explain generations of Cellular networks and their features. **6**

   (b) What is PAN ? Explain. **3**

   (c) Advantage of TDMA and CDMA. **3**

CO-22445

Fourth Semester (Computer Engineering) (N-2022)

WIRELESS COMMUNICATION

Time : 3 Hours **M. M. : 60**

Note : Attempt *Five* questions in all. Section A (Q. No. **1**) is compulsory. Select *two* questions each from Section B and Section C.

Section A

1. (a) Define Cluster.

   (b) Define Sensor Networks.

   (c) What is Paging ?

(d) Abbreviate :

    (i) TDMA

    (ii) GPRS.

(e) ISM band

(f) Cordless Telephony. **2×6=12**

Section B

2. (a) What are the various challenges in wireless communication ? Explain. **6**

   (b) Differentiate between Licensed and Unlicensed spectrum. **3**

   (c) What are Adhoc networks ? Discuss few properties of Adhoc Network. **3**

3. (a) What is Electromagnetic wave propagation ? Explain Ground waves and LOS. **6**

   (b) What is signal Strength and RSSI in wireless communication ? **3**

(c) What is Broadcast ? Explain cordless telephony. **3**

4. (a) Explain *three* types of Transmission Impairments. **6**

   (b) Differentiate between Analog signals and Digital signals. **3**

   (c) What are the features of microwave transmission ? **3**

Section C

5. (a) Explain architecture of GSM in detail with diagram. **6**

   (b) Define Diffraction and Scattering. **3**

   (c) What is Handoff and its types ? **3**

6. (a) What is WLAN ? Explain its advantages. **6**

   (b) What is hidden station problem in WLAN ? **3**

   (c) What is Bluetooth ? Mention its *three* advantages and IEEE Standard. **3**

(vi) Which of the following is a type of wireless communication ?

    (a) LAN

    (b) WAN

    (c) PAN

    (d) All of the mentioned

(vii) Which modulation scheme is used by Bluetooth ?

    (a) GFSK

    (b) DQPSK

    (c) BPSK

    (d) MSK

(viii) The packet mode data transfer service is offered by which of the following protocol ?

    (a) TCP (Transmission Control Protocol)

    (b) GSM (Global System for Mobile Communication)

CO-22446

Fourth Semester (Computer Engineering) (N-2022)
MOBILE COMPUTING
(Common to 5th Sem IOT)

Time : 3 Hours   **M. M. : 60**

Note : Attempt *Five* questions in all. Section A (Q. No. 1) is compulsory. Select *two* questions each from Section B and Section C.

Section A

(Compulsory Question)

1. Do as directed :   1×12=12

    (i) Bluetooth technology operates at............frequency and............bandwidth.

        (a) 2.4 GHZ, Infinite

(b) 2.4 GHz, 2.4 MHz

(c) 2.4 GHz, 1 MHz

(d) 2.4 MHz,1 Ghz

(ii) 4G architecture is technically............
and............network.

(a) UMTS, Fully packet based

(b) LTE, Partially Packet Based

(c) LTE, Fully Packet based

(d) UMTS, Fully circuit based

(iii) For the purpose of encapsulating all packets destined for the UE, which tunnelling protocol is used ?

(a) UMTS tunnelling protocol (Universal Mobile Telecommunications System)

(b) GPRS tunnelling protocol (General Packet Radio Service)

(c) RNS tunnelling protocol (Radio Network Subsystem)

(d) PDCP tunnelling protocol (Packet Data Convergence Protocol)

(iv) The shape of the cellular region for maximum radio coverage is :

(a) Square

(b) Oval

(c) Hexagon

(d) Circular

(v) What is Mobile communication ?

(a) Allows to communicate from different locations without the use of physical medium

(b) Allows to communicate from different locations with the use of physical medium

(c) Allows to communicate from same locations without the use of physical medium

(d) Allows to communicate from same locations with the use of physical medium

6. (a) Briefly explain the GPRS network architecture. 6

(b) Describe tunneling and encapsulation in mobile computing. 3

(c) List out various layouts available in the Android operating system. 3

7. (a) List out and briefly explain various states of Android activity life-cycle. 6

(b) Compare implicit and explicit intents. 3

(c) Describe various features of the Android operating system. 3

(c) GPRS (General Packet Radio Service)

(d) None of the above

(ix) Process of transferring a mobile phone from one channel/BTS to another channel/BTS is known as :

(a) Exchange

(b) Switching

(c) Handoff

(d) Roaming

(x) What does the .apk extension stand for ?

(a) Application Program Kit

(b) Android Package

(c) Application Package

(d) Android Proprietary Kit

(xi) Which file in Android OS determines the layout of our screen ?

(a) Manifest file

(b) Layout file

(c) R file

(d) Strings XML

(xii) Which of the following does not correspond to a state in an Android service's life-cycle ?

    (a)   Paused

    (b)   Destroyed

    (c)   Running

    (d)   Starting

Section B

2. (a) Define Mobile Computing. Classify various types of wireless networks.   6

    (b) Write a note on ad-hoc networks.   3

    (c) What are various challenges in Wireless Communication ?   3

3. (a) Explain the three tier architecture of mobile computing.   6

    (b) Explain the following terms :   3

        (i)   Policy Manager

        (ii) Semantic Web

    (c) What are various design considerations for mobile computing ?   3

4. (a) Briefly explain, how mobile cellular communication has evolved over different generations of technology ?   6

    (b) Explain the various applications of bluetooth technology.   3

    (c) Explain the following terms :   3

        (i)   Client Context Manager

        (ii) GPS.

Section C

5. (a) What are the main differences between the traditional IP and the mobile IP ? Briefly explain the working of mobile IP.   6

    (b) Explain the following terms :   3

        (i)   LTE

        (ii) RFID

    (c) Explain mobile computing over SMS. 3

EIK-22400

Fourth Semester (Common To All Branches) (N-2022)

ESSENCE OF INDIAN KNOWLEDGE AND TRADITION

Time : 3 Hours   **M. M. : 60**

Note : Attempt *Five* questions in all. Section A (Q. No. **1**) is compulsory. Select *two* questions each from Section B and Section C.

Section A

1. Attempt all the questions :   **2×6=12**

    (a)   Write down the names of Vedangs.

    (b)   Write two difference between Modern Science and Indian Knowledge System.

(c) Explain Traditional Knowledge.

(d) What is Yoga ?

(e) Write name of two tourism places in Himachal Pradesh.

(f) Explain Shiksha.

Section B

2. (a) What is Itihasa ? Explain Ramayana. **6**

(b) Explain Rigveda . **3**

(c) Explain chracteristics of Modern Science. **3**

3. (a) Explain Western Knowledge in detail. **6**

(b) Explain Darshan. **3**

(c) Explain three chracteristics of Traditional Knowledge. **3**

4. (a) Explain Indian Knowledge System in detail. **6**

(b) Explain Dharma Shatra. **3**

(c) Write the names of UpVedas and explain any *one* from them. **3**

Section C

5. (a) Explain Regional Knowledge in detail. **6**

(b) Explain First Aid. **3**

(c) Explain Regional Games. **3**

6. (a) What is Wellness ? Explain Health and Physical Fittness. **6**

(b) Explain Active Life Style. **3**

(c) Explain the importance of Yoga. **3**

7. (a) How Traditional Knowledge can be protected ? **6**

(b) Explain Festivals of Himachal Pradesh. **3**

(c) Write the importance of Wellness. **3**