2ND SEM./COMMON TO ALL./2024(S)

TH-1   Computer Application

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10

   a   Define FTP.
   b   What is a recursion function?
   c   Define NIC.
   d   Write the functions of repeater.
   e   Define MICR.
   f   What are the types of software available? Name them with suitable example.
   g   Define WWW.
   h   Write the names of two input and two output devices.
   i   Define file and folder.
   j   Write the names of any two antiviruses.

2.   Answer **Any Six** Questions   6 x 5

   a   Write down the various characteristics of computer.
   b   Write the difference between compiler and interpreter.
   c   What is network? Explain the types of network.
   d   Explain data storage methods of a computer.
   e   Draw a flowchart to calculate average of three numbers.
   f   Compare call by value method and call by reference method with suitable example.
   g   Explain the types of data transmission modes.

3   Write an algorithm to calculate factorial of a number and also write a program for it in C language .   10

4   Explain the types of memory according to speed and size.   10

5   Define operating system. Write the types of operating system.   10

6   Explain the types of file access methods briefly   10

7   Draw the block diagram of a computer and explain how data flow inside the computer.   10

4TH SEM./AI &ML/ CS&E/IT/ 2024(S)

Th-1   Operating System

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a.   Define IPC.
   b.   Difference between multiprogramming and multiprocessing.
   c.   What is turnaround time?
   d.   Define buffering.
   e.   Define file and folder.
   f.   What is the use of valid and invalid bits in paging?
   g.   Define kernel.
   h.   Define dead lock.
   i.   Define tokens, lexeme.
   j.   Define semaphore.

2.   Answer **Any Six** Questions   6 x 5
   a.   Explain monolithic Structure of operating system.
   b.   What is device management? Explain function of dedicated, shared virtual device with example.
   c.   Define Process and explain about different process State.
   d.   Define page. Explain demand paging technique of memory   management.
   e.   write the difference between spooling and buffering
   f.   State and explain Bankers safety algorithm.
   g   Explain different file access methods.

3   Why dead locks occur? Explain how dead lock is recovered and prevented.   10
4   Explain briefly about different phases of compiler.   10

5   Consider the set of 3 processes whose arrival time and burst time are given   10
below- **Process Id   Arrival time   Burst time**

Process Id	Arrival time	Burst time
P1	0	5
P2	1	7
P3	2	3
P4	3	4

 If the CPU scheduling policy is Round Robin, and time quantum is 3 calculate the average waiting time and average turnaround time.

6   Differentiate between contiguous and non-contagious memory allocation.   10
Explain Swapping.
7   Short notes(any 2)   10
   i.   Race condition.
   ii.   Virtual memory.
   iii.   Memory compaction.
   iv.   Types of scheduler.

4TH SEM./ELECTRICAL./EEE/EE(INST. & CON.)/ 2024(S)

TH-2   Analog Electronics and OPAMP

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right-hand margin indicates marks

1.	Answer **All** questions	2 x 10
a.	Define Zener and Avalanche break down voltage.	
b.	Mention the advantages of negative feedback.	
c.	State Barkhausen criterion for sustained oscillation.	
d.	Why FET is called unipolar device and BJT is called bipolar device?	
e.	Define stabilization and stability factor.	
f.	Draw the equivalent circuit of OP-AMP.	
g.	Why CE configuration is most popular in amplifier circuit?	
h.	List the characteristics of ideal OP-AMP.	
i.	Define and classify transistor biasing.	
j.	State the difference between voltage and power amplifier.	

2.	Answer **Any Six** Questions	6 x 5
a.	With a neat sketch explain the working of inverting and non inverting OP-AMP.	
b.	State the function of filter circuit in rectifier? Explain the working of capacitor input filter.	
c.	Explain the working of bridge rectifier and calculate (i) RMS current and voltage (ii) Ripple factor, (iii) Efficiency.	
d.	Derive the relationship between the current amplification factor of transistor.	
e.	Discuss the working of Zener diode and explain V-I characteristics.	
f.	With neat diagram derive the of I_C and V_{CE} using voltage divider biasing method.	
g	Define Oscillator and Explain the working of Wein bridge oscillator.	

3	Describe all types of transistor configuration with input and output characteristics.	10
4	Explain the working of a integrator and differentiator and derive the expression for its output voltage.	10
5	Define DC drain resistance, AC drain resistance and trans-conductance of FET and explain the working of FET.	10
6	With neat diagram explain the working of a class B push pull amplifier with its frequency response curve.	10
7	What is clamping circuit? Explain the function of positive clamper and negative clamper.	10

4TH SEM./AE &IE/AI &ML/CS & E/ ETC & COMM./E & TC/IT/ 2024(S)

Th-3   Microprocessor & Microcontroller

Full Marks: 80   **Time- 3 Hrs**

Answer any Five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a.   Calculate the memory capacity of a microprocessor of 14 bit address line.
   b.   List the 16 bit registers of 8085 microprocessor.
   c.   What do you mean by DMA techniques? Which pins of 8085 belongs to this group?
   d.   Write a program to calculate time delay using one register for 8085.
   e.   Why interfacing is required in microprocessor?
   f.   What is the maximum memory size that can be addressed by 8086?
   g.   Mention the name of flags available in status register of 8086.
   h.   Write the various ports available in 8051.
   i.   What does @ and # signs indicate in 8051 micro controller? Give one example of each.
   j.   Write the no. of machine cycle and addressing mode for the given instruction of 8085 microprocessor.
        MVI B, 10H

2.   Answer **Any Six** Questions   6 x 5
   a.   Draw the different bits of the flag register of 8085 microprocessor and explain the function of each flag.
   b.   State and explain stack, stack top and stack pointer.
   c.   Draw the functional block diagram of 8255 and explain each block.
   d.   Draw a timing diagram of LXI D, 2500H with a neat sketch.
   e.   What are different addressing modes available in 8085? Explain with example.
   f.   Write an assembly language programming for multiplication of 16 bit numbers using 8086 instruction.
   g   Explain the architecture of 8051 with a neat diagram.

3   Draw the pin diagram of 8085 and explain the function of each pin.   10
4   Describe the memory organization of 8051.   10
5   Write an assembly language programming to find the largest number in a given   10
        data array using 8085 instructions.
6   With neat diagram explain the architecture of 8086.   10
7   Develop a traffic light controller program with a neat block diagram.   10

4TH SEM./AI & ML/CS&E/IT/ 2024(S)
Th-4   Database Management System

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions   2 x 10
    a. What do you mean by data redundancy?
    b. Define cardinality.
    c. Define the RENAME operation used in relational algebra.
    d. Define super key. How it is different from primary key?
    e. Define RDBMS.
    f. Write the different data types used in ORACLE.
    g. State the transaction operations.
    h. Define serializability.
    i. What is VIEW?
    j. Define schema and sub schema.

2.   6 x 5
    a. Define transaction. State & explain the various states of transaction.
    b. State & explain about the TEDD CODD's rules. (any five)
    c. Describe the SELECT & PROJECT operation used in relational algebra with example.
    d. Define anomalies. Classify the types of anomalies.
    e. Briefly explain the three level schema architecture of DBMS with a neat and clean diagram.
    f. Differentiate between hierarchical data model & network data model.
    g   Explain the concept of two phase locking.

3   Compare the 1st, 2nd & 3rd normal form with suitable example.   10
4   Briefly explain the components of DBMS.   10
5   Define DEADLOCK. Describe the deadlock avoidance & recovery techniques used in DBMS.   10
6   What is the purpose of ER diagram? What are the different symbols used in ER diagram? Draw & explain the ER diagram for a business transaction involving sales, marketing, production & purchase department.   10
7   Write down the syntax with a suitable example for each of the following SQL commands.   10
    i.   Alter
    ii. Insert
    iii. Update
    iv. Select
    v.   Delete

Th-1 Cryptography and Network Security

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1. Answer **All** questions   2 x 10
   a. Distinguish between passive attack and active attack.
   b. Define Denial of service.
   c. What are the protocols used in IP security?
   d. Convert the Given Text "CRYPTOGRAPHY" into cipher text using Rail fence Technique.
   e. Name three configuration of firewall.
   f. Define active webpage.
   g. Define time stamping protocol.
   h. Define block cipher.
   i. Write the name of participants in the SET system.
   j. Define SEED.

2. Answer **Any Six** Questions   6 x 5
   a. Differentiate between symmetric key and asymmetric key cryptography.
   b. Convert the plain text "ACT" using hill cipher to cipher text using key matrix.

      6   24   1
      13 16   10
      20 17   15

   c. Write the RSA algorithm and explain it with a suitable example.
   d. Define authentication token and illustrate how Challenge/Response Tokens works.
   e. Discuss briefly about Digital Signature.
   f. Define firewall. How application Gateway and Packet filter works.
   g. Why is SSL layer positioned between the application layer and transport layer? Explain the SSL handshake protocol.

3. Define digital certificate and write down the steps required to generate a digital certificate.   10

4. Briefly Discuss about key principles of network security.   10

5. Define Secure Electronic Transaction. Discuss the entire SET process briefly.   10

6. Briefly explain about the architecture of VPN.   10

7. Write short notes on any two.   10
   a) SSL   c) IPSec
   b) Biometric Authentication   d)Encryption and Decryption

Full Marks: 80   Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

| 1. | Answer **All** questions | 2 x 10 |

a. Name the various IOT components.

b. Write down any four characteristics of Sensors.

c. Classify various types of Actuators in IoT.

d. What do you mean by Industry 4.0?

e. Write down any four applications of M2M in IoT.

f. Differentiate between IoT and Web Stack.(any two)

g. In which layers IEEE 802.15.4 is used?

h. What are the types of Nodes in M2M?

i. Classify nodes based on its behaviour in WSN.

j. Define Data Fusion.

| 2. | Answer **Any Six** Questions | 6 x 5 |

a. Compare between Piconet and Scatternet in Bluetooth.(any five)

b. Explain the architecture of CoAP with a neat diagram.

c. Illustrate the working principle of Zigbee with proper diagram.

d. Define Software defined Network. Explain the modes of by which sensors detect the object.

e. Explain about M2M Ecosystem.

f. Differentiate between Software Defined Network and Traditional Network.

g Explain the various components of Arduino UNO Board.

3	Explain the architecture of 6LoWPAN.	10
4	Describe the Pin configuration of Raspberry Pi with a neat diagram.	10
5	Summarise the challenges in Smart Cities. How Smart Parking ecosystem works?	10
6	Differentiate between Consumer IoT and IIoT. Briefly explain about the challenges in IIoT.	10
7	Write a short notes on-	5+5

    i.   MQTT

    ii. WSN in Healthcare

Th-3   Cloud Computing

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a.   Define SSO.
   b.   What is VPN tunnelling?
   c.   What do you mean by resilience?
   d.   How does cloud storage work?
   e.   Name the cloud providers who offer load balancing service.
   f.   State the difference between RTO & RPO.
   g.   Define DaaS. Where can it be used?
   h.   State the difference between SAN & NAS.
   i.   What are deterrent controls?
   j.   Name the cloud provider who offers SaaS, PaaS & IaaS.

2.   Answer **Any Six** Questions   6 x 5
   a.   Differentiate between cloud & data centre.
   b.   Describe the evolution of cloud technologies.
   c.   Explain the cloud computing architecture briefly.
   d.   Differentiate between public cloud & private cloud.
   e.   Why is cloud scalable? Explain the benefits of cloud scalability.
   f.   Classify the types of server virtualization.
   g   Define policy implementation. Classify the types of policy.

3   Briefly describe the Hadoop architecture with suitable diagram.   10
4   Describe the principles of cloud security architecture.   10
5   What are the challenges faced by cloud computing security?   10
        Explain briefly.
6   Define VMM. Explain the benefits of hypervisor. Classify the types   10
        of hypervisor with advantages & disadvantages.
7   Define map reduce. Illustrate the map reduce architecture.   10

6TH SEM./ C S & E/ 2024(S)

TH-4 ARTIFICAL INTELIGENCE & MACHINE LEARNING

Full Marks: 80   **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.   Answer **All** questions   2 x 10
   a. What are the goals of AI?
   b. What is reinforcement learning?
   c. Define machine perception.
   d. Define decision tree.
   e. What is fuzzy logic?
   f. Define NLP.
   g. Define intelligent agent.
   h. Write the names of popular programming languages used in AI.
   i. Write two issues of knowledge representation.
   j.   Define backtracking search.

2.   Answer **Any Six** Questions   6 x 5
   a. What are the different types of machine learning?
   b. Define AI. What are the real life applications of AI?
   c. What is heuristic search? What are the advantages of heuristic search?
   d. Write the components of export system.
   e. Explain BFS algorithm with example.
   f. Describe different types of reasoning.
   g   Differentiate between blind search and heuristic search.

3   Explain AO* algorithm with example.   10
4   Explain with example forward and backward chaining.   10
5   What is export system? Describe the architecture of expert system and also   10
      describe the types of problem solved by expert system.
6   Describe water jug problem with example and also give the solution.   10
7   Explain the design principle of pattern recognition system.   10