4TH SEM / CS&E /IT/ 2023(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 PCB.
   b. What is context switching?
   c. Define external fragmentation.
   d. What is a semaphore?
   e. Write the difference between program and process.
   f. Define Demand Paging.
   g. What do you mean by circular wait.
   h. Define file and directory.
   i. What is Spooling?
   j. What do you mean by Virtual Memory?

2. Answer **Any Six** Questions 6 x 5
   a. Briefly explain about contagious and non-contagious memory management.
   b. Write the difference between spooling and buffering.
   c. Define process and process state. Draw a suitable diagram to explain different states of a process.
   d. What is a Page Fault? How it can be handled.
   e. Define dead lock. Explain Bankers algorithm for deadlock prevention.
   f. Explain the functions of I/O traffic controller and I/O scheduler.
   g Write short notes (any two)
      a) Critical section
      b) Race condition.
      c) Process synchronisation.

3 Discuss about First Come First Serve (FCFS) and Shortest-Job-First (SJF) CPU Scheduling with suitable example. 10

4 Explain different structures of operating system. 10

5 Explain briefly the various File Access Methods. 10

6 Explain briefly different phases of a compiler. 10

7 Explain briefly about the different methods of allocating disk space. 10

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TH-2 Data Communication and Computer Network

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. Classify different types of Computer Networks.
   b. In which layer of OSI Model data can be transmitted from source to destination in the form of Frames?
   c. Compare between Star topology and Ring topology.(any two)
   d. Write down the various causes of transmission impairments.
   e. Differentiate between bit rate & baud rate.(any two)
   f. Write down the formula of Shannon capacity.
   g. Define amplitude shift key technique used for Digital to Analog conversion.
   h. Define checksum error detection scheme. Give an example.
   i. Write down the various types of networking devices used in computer networking.
   j. How many bits are used in IPv6 address?

2. Answer **Any Six** Questions 6 x 5
   a. What do you mean by modes of data transmission? Discuss various data transmission mode
   b. Differentiate between Guided Media and Unguided Media with example.(any five)
   c. Define data encoding. Summarise the various mechanism that are used to convert digital data into digital signal.
   d. Compare circuit switching and packet switching network.(any five)
   e. Define piggybacking. Explain the working principle of piggybacking with an example.
   f. Explain Synchronous and Asynchronous mode of data transmission.
   g Describe Manchester encoding technique.

3 Elaborate the layers of TCP/IP Model with a neat diagram and also mention the role of various protocols in this Model. 10

4 Define Topology. Briefly explain about different types of Topologies in Computer Network. 10

5 Define Flow Control. Describe about the techniques used in flow control. 10

6 Explain the Principles of Internetworking. Briefly Explain about IPv6 with a neat diagram. 10

7 Write the short notes on 5
   i. Stop-and-wait protocol 5
   ii. X.25

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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. Define Microprocessor and mention at least two applications of it.
   b. Mention the function of stack pointer (SP) and Program Counter (PC).
   c. What is subroutine program in 8086?
   d. State the difference between one pass assembler and two pass assembler.
   e. What is the role of ALE signal in 8085 microprocessor?
   f. List different types of interrupt in 8085 microprocessor.
   g. What is the function of USART?
   h. Mention the function of XRL A, direct.
   i. What is the use of EU and BIU of 8086?
   j. Write down the size of DPTR and stack pointer in 8051 microcontroller.

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

   a. Write the difference between SPR and GPR of 8085 microprocessor.
   b. Draw the timing diagram of LXI D instruction of 8085 microprocessor.
   c. What is bus? With neat diagram explain bus structure of 8085 microprocessor.
   d. Explain different addressing modes of 8085 microprocessor with example.
   e. What are different operating modes of 8255? Explain each mode.
   f. Write an assembly language program to find the division of 16 bit nos. using 8086 instructions.
   g What is 7 segment display? Describe the interfacing of 7 segment display.

3 Draw the architecture of 8085 and mention its various function of each block. 10

4 Write an assembly language program to find the smallest number in a given data array. 10

5 Design and explain the traffic light controller program with a neat block diagram. 10

6 Explain the various flags in the PSW register of microcontroller. 10

7 Discuss the register organization of 8086. Explain the function of each register. 10

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TH4 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. Define Entity and Entity set.
b. Compare between primary key and Foreign key.
c. What do you mean by data redundancy?
d. What is concurrency control?
e. Define briefly data independence?
f. Define selection and projection operations of relational algebra.
g. Define tuple.
h. What is schema and sub-schema?
i. What is the need for database system?
j. What are the responsibilities of DBA?

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

a. Explain briefly the basic components of Database.
b. What do you mean by ACID properties in DBMS?
c. Explain different languages present in DBMS.
d. What is a Lock in database? Write the difference between Live Lock & Dead Lock.
e. Explain the 3-Level architecture with a suitable diagram.
f. What do you mean by E-R Model? Draw an E-R Diagram with suitable entities & attributes.
g Explain the concept of mapping constraints with suitable example.

3 What is normalization? Explain 1NF, 2NF, 3NF & BCNF with example 10

4 What is data model? Explain all types of data model briefly. 10

5 Define functional dependency. Explain the loss less join concept with suitable example. 10

6 What is a join in SQL? Classify the different types of joins. Explain with example. 10

7 Write down the syntax & queries of the following SQL Commands 10

i) Create
ii) Insert
iii) Delete
iv) Rename
v) Select