5E1788

5E1788
B. Tech. V - Sem. (Main) Exam., February - 2023
Information Technology
5IT3 – 01 Microprocessor and Interfaces

Time: 3 Hours   Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   **[10×2=20]**

All questions are compulsory

Q.1 Differentiate Microcontroller and Microprocessors.

Q.2 How many Registers 8085 have? Name that all.

Q.3 What do you mean by T-States?

Q.4 Name five logical operation instructions.

Q.5 Differentiate SUB B and CMP B.

Q.6 Draw the waveform of Mode 3 of 8253 PIT.

Q.7 What are the non-maskable interrupts?

Q.8 Explain the PSW of 8085 up.

Q.9 State the function of following 8085 instructions -

   (i)   SPHL

   (ii) PCHL

   (iii) CMP

   (iv) JPO

Q.10 Explain the instruction MVI A, 1OH.

PART – B

(Analytical/Problem solving questions)   [5×4=20]
Attempt any five questions

Q.1 Create an assembly language program to transfer a block of ten data elements from memory location 5000H to 6000H.

Q.2 Explain the control word format of 8255 in IO mode and BSR mode.

Q.3 Draw and justify the timing diagram of MOV M, C.

Q.4 Write a program to initialize 8255 in the configuration given below –

Port A as simple input

Port B as simple output

Port C_L as output

Port C_u as input

Assume address of the control word register of 8255 as 83H.

Q.5 State any three features of 8259 programmable interrupt controller in detail.

Q.6 What is the function of the accumulator? Define bit, byte, word, double word, quad word and instruction.

Q.7 Specify the four control signals commonly used by the 8085 MPU.

PART – C

Q.1 What is stack and stack pointer? List stack related instructions. Explain working of PUSH and POP instruction.

Q.2 What do you understand by the term addressing mode? Explain the addressing modes supported by 8085 by giving suitable examples.

Q.3 Explain the interfacing of 4×4 matrix keyboard.

Q.4 Draw and explain the timing diagram of SUI 52H.

Q.5 Draw and explain the programming model of 8085.

| Roll No. ___ ___ | | Total No. of Pages: | 3 |

5E1399

5E1399

B. Tech. V - Sem. (Back) Exam., February - 2023
ESC Information Technology
5IT3 – 01 Microprocessor and Interfaces

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 What is the need of De – multiplexing the bus AD_7 - AD_0 in 8085?

Q.2 If a microprocessor is "8 bit", what does it specify?

Q.3 Distinguish between 'machine cycle' and 'instruction cycle'

Q.4 Explain what happens in an 8085 microprocessor based system when the microprocessor receives 'HOLD' signal.

Q.5 Mention the hardware interrupts in 8085 microprocessor in the <u>order</u> of their priority?

PART – B

Attempt any four questions

Q.1 Give meaning – operand, number of bytes, machine cycles and T-states for the following Op-codes used in 8085 microprocessor –

    (i)   LDA

    (ii) POP

Q.2 Explain SIM and RIM instructions of 8085 microprocessor.

Q.3 Explain with example, the use of "RST6", 8085 instruction.

Q.4 What are the functions of the following pins of 8085 microprocessor?

    (i)   READY

    (ii) ALE

    (iii) HOLD

    (iv) TRAP

Q.5 Draw the pin diagram of 8255 (PPI). Also write the different operating modes of port-A of 8255.

Q.6 Calculate the "delay" in the following loop when the system clock period is 0.10u sec.

Label	Mnemonics	T states
	LXI B, 12 FFH	10
	DCX B	6
DELAY	XTHL	16
	NOP	4
	MOV A, C	4
	ORA, B	4
	JNZ DELAY	10/7

PART – C

Attempt any two questions

Q.1 A list of 10 integers (both even & odd) are stored in a memory. Write an Assembly

Language program of 8085 to separate even and odd numbers and store them separately.

Q.2 Explain in detail the architecture of 8085 microprocessor.

Q.3 Explain 8259 [PIC] with block diagram. Specify the function of each block.

5E1751

5E1751

B. Tech. V - Sem. (Main) Exam., February - 2023
Computer Science & Engineering
5CS3-01 Information Theory & Coding

Time: 3 Hours   **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL_____   2. NIL_____

PART – A   [10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1   Explain the necessary and sufficient condition for a code to be instantaneous. Give example.

Q.2   Explain the property of mutual information.

Q.3   What is the significance of Shannon-Hartey's Theorem?

Q.4   What is the capacity of a channel of infinite bandwidth?

Q.5   What is a perfect code?

Q.6   What is meant by a symmetric channel?

Q.7 Define the term amount and information.

Q.8 What is the mean of Galois Field?

Q.9 Define standard array.

Q.10 What is the property to be satisfied by a linear block code?

PART – B

[5×4=20]

(Analytical/Problem solving questions)

Attempt any five questions

Q.1 Consider a source with 8 alphabets a to h with respective probabilities 0.2, 0.2, 0.18, 0.15, 0.12, 0.08, 0.05 and 0.02. Construct a minimum redundancy code and determine its efficiency using Shannon-Fano coding procedure.

Q.2 What is the use of standard array in syndrome decoding? Explain with suitable example.

Q.3 The parity matrix for a (6, 3) systematic linear block code is given by-

$$P = \begin{bmatrix} 0 & 1 & 1 \\ 1 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix}$$

(i) Find the code words

(ii) Find generator and parity check matrix

Q.4 A communication system employs a continuous source. The channel noise is white and Gaussian. The bandwidth of the source output is 10MHz and signal to noise power ratio at the receiver is 100. What will be the channel capacity?

Q.5 State and establish Kraft's inequality.

Q.6 Derive the expression for channel capacity when bandwidth become infinite.

Q.7 Define ring and field. Discuss its properties.

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

Q.1 The parity bit of a (7, 4) linear systematic block code are generated by -

$C_5 = d_1 + d_3 + d_4$

$C_6 = d_1 + d_2 + d_3$

$C_7 = d_2 + d_3 + d_4$

(+ sign denotes modulo-2 addition)

Where d_1, d_2, d_3, d_4 are message bits and C_5, C_6, C_7 are parity bits. Find generator matrix G and parity check matrix H for this code. Draw and encoder circuit.

Q.2 A channel encoder uses a (7, 4) linear systematic cyclic code in the systematic form, generator polynomial being $x_3 + x + 1$. Determine the correct code word transmitted, if the received word is -
(i)   1011011   (ii)   1101111

Q.3 Discuss the procedure for generation of a systematic cyclic code. Draw and explain the systematic cyclic encoder circuit for a (15, 9) cyclic code with generator polynomial -
$g(X) = 1 + X_3 + X_4 + X_5 + X_6$

Q.4 Explain decoder for cyclic code with the help of a block diagram.

Q.5 Joint probability matrix of a discrete channel is given by,

P(X, Y) = 0.05 0.05 0.02 0.05

0.15 0.16 0.01 0.09

0.12 0.03 0.02 0.05

0.01 0.12 0.01 0.06

Compute marginal, conditional and joint entropies and verify their relation.

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B. Tech. V - Sem. (Back) Exam., February - 2023
ESC Computer Science & Engineering
5CS3 – 01 Information Theory & Coding

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL_____   2. NIL_____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 Define code efficiency.

Q.2 What is Brust error?

Q.3 What is sequential coding?

Q.4 What are convolution codes?

Q.5 What are the basic properties of Galois Fields (GF).

PART – B

Attempt any four questions

Q.1 Define an entropy and show that H(S) max = $\log_2$ 9 bits/message-symbols.

Q.2 The parity check matrix is given by -

$$H = \begin{bmatrix} 0 & 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

(i) Obtain the Generator Matrix (G)

(ii) List all the code vectors

(iii) What will be the minimum distance between two code vectors?

(iv) How many errors can be detected? How many errors can be corrected?

Q.3 Consider the polynomial -

$g(x) = x^6 + 3x^5 + x^4 + x^3 + 2x^2 + 2x + 1$

(a) Find the parity check matrix H

(b) Find code rate of this code

(c) Find minimum distance of this code

Q.4 Use Viterbi algorithm to decode the received sequence z = [1110 10 1001]
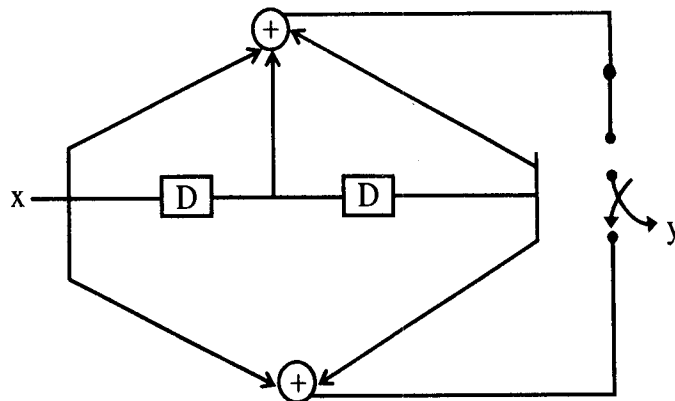
Draw the state diagram and trellis diagram.

Q.5 Explain the types of errors and classification of codes.

Q.6 Design (n,k) hamming code with a minimum distance of dmin = 3 and message length of 4 bits.

PART – C

Q.1   Design a (4, 2) LBC -

   (i)   Find the generator matrix for the code vector set.

   (ii)   Find the parity check matrix.

   (iii) Make an encoding ckt.

   (iv)   Draw the encoding ckt.

   (v)   Draw the syndrome calculation ckt.

Q.2   Consider a source S = [S1, S2] with probabilities ¾ and ¼ respectively. Obtain Shannon-Fano code for source S, its 2nd and 3rd extensions. Calculate efficiency for each case.

Q.3   Determine the Huffman code for the following message with their -

x1	x2	x3	x4	x5	x6	x7
0.05	0.15	0.2	0.05	0.15	0.3	0.1

and also, find the average code word length, entropy, code efficiency, compare the result with entropy.

5E5106
B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS6.1A Advanced Data Structure
CS, IT

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) What is 2-3 tree? Insert the letters of the word ALGORITHMS is an empty 2-3 tree. [8]

(b) What is Red-Black tree? Write its properties. Show the red-black trees that result after successively inserting the keys 41, 38, 31, 12, 19, 8 into an empty red-black tree. [8]

OR

Q.1 (a) What an optimal Huffman code for the following set of frequencies – [10]

a:1   b:1   c:2   d:3   e:5   f:8   g:13   h:21

(b) What are dictionaries? Explain the different operations on dictionaries. [6]

UNIT- II

Q.2 (a) What is Binomial Heap? Write its properties. Draw its memory representation by taking an example. [8]

(b) Show the results of the inserting the following keys in order into an empty 2-3-4 tree. [8]

F, S, Q, K, C, L, H, T, V, W, M, R, N, P, A, B, X, Y, D, Z, E

OR

Q.2 (a) What is Fibonacci heap? Explain its implementation. [8]

(b) Explain amortization analysis and potential function of Fibonacci heap. [8]

UNIT- III

Q.3 (a) What are Kuratowski's two graphs? Write their common properties. [8]

(b) Define the following terms - [8]

(i) Cut-sets

(ii) Cut-vertices

(iii) Planer graphs

(iv) Dual graphs

OR

Q.3 Show all the steps to find the maximum flow in the flow network using Ford-Fulkerson algorithm. [16]
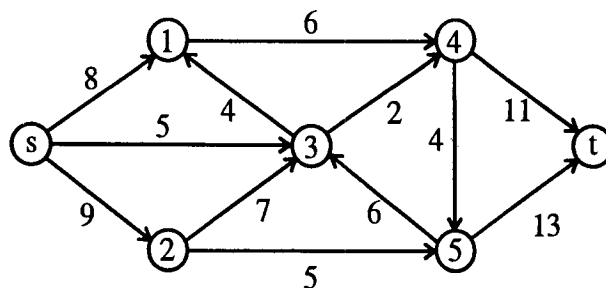
UNIT- IV

Q.4 (a) Sort the sequence <9, 5, 2, 6> using a 4-input, 4-output comparison network. [8]

(b) Explain the zero-one principle. [8]

OR

Q.4 (a) What is disjoint-set data structure? Explain disjoint-set operations. [8]

(b) Explain the linked-list representation of disjoint-set data structure with suitable example. [8]

UNIT- V

Q.5 Find all the solutions to the equation $35x \equiv 10$ (mod 50). [16]

OR

Q.5 Find all the solutions to the equation $x \equiv 4$ (mod 5) and $x \equiv 5$(mod 11) using Chinese remainder theorem. [16]

5E1752

5E1752

B. Tech. V - Sem. (Main) Exam., February - 2023
Artificial Intelligence and Data Science
5AID4-02 Compiler Design
CS, IT, AID, CAI

Time: 3 Hours   Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 Define context free grammar.

Q.2 What is Hashing? Explain it.

Q.3 Define Input Buffering.

Q.4 What do you understand by Lexical Analyzer?

Q.5 Define finite automation and regular expression.

Q.6 Define left recursion. Is the following grammar left recursive - E $\rightarrow$ E + E/E * E/a/b

Q.7 List out different object code forms.

Q.8 Differentiate between compiler and interpreter.

Q.9 Explain different types of errors in compilers with error handling mechanism.

Q.10 What is Bootstrapping?

PART – B

(Analytical/Problem solving questions)   [5×4=20]

Attempt any five questions

Q.1 Explain all the phases of compiler with the help of suitable example.

Q.2 What is the basic task of scanning? What are the difficulties found in delimiter oriented scanning? How can this be removed?

Q.3 Explain the syntax directed translation schemes in detail.

Q.4 What is the process and importance of intermediate code generation?

Q.5 Consider the expression (Left to right scanning) -

(a/b*c) + (a/b) – (b+(a*b)) (a*b)

Draw the DAG of the above expression.

Q.6 What do you mean by LR Parser? What is the model of an LR Parser? Explain.

Q.7 Construct NFA to accept a(a/b)*b.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1 Generate the three address code for the following code fragment -

```
while(a>b)
{
        if(c>d)
        x = y+z;
        else
        x = y−z;
}
```

Q.2 Consider the following LL(1) grammar describing a certain sort of rented lists -

S → TS|∈

T → U.T|U

U → x|y|[s]

(i) Left factor this grammar

(ii) Give the first and follow sets for each non-terminal in the grammar obtain in part(i).

(iii) Using this information construct an LL parsing table for the grammar obtain in part(i).

Q.3 (a) Calculate canonical collection of sets of LR(0). Items of grammar given below –

E′ → E

E → E+T|T

T → T* F|F

F → (∈)|id

(b) Calculate canonical collection of sets of LR(1) items, for the grammar given below –

s′ → s

s → cc

c → ec/d

Q.4 For the assignment statement X = (a + b) * (c + d), construct the translation scheme and an annotated parse tree. Also, differentiate between 'call by value' and 'call by reference' with example.

Q.5 (a) Explain peephole optimization in detail.

(b) Explain the symbol table management system in detail.

5E1352

B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS4 – 02 Compiler Design
CS, IT

Time: 3 Hours

Maximum Marks: 120
Min. Passing Marks: 42

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   **[10×2=20]**

All questions are compulsory

Q.1 What is compiler?

Q.2 What is interpreter?

Q.3 What are the limitations of recursive descent parser?

Q.4 What is an ambiguous grammar? Give example.

Q.5 What is S-Attributed?

Q.6 What is L-Attributed?

Q.7 What is parameter passing?

Q.8 What is activation records?

Q.9 What is DAG?

Q.10 What is peephole optimization?

PART – B

Q.1 Explain all the phases of compiler with the help of suitable example.

Q.2 Explain the transition diagram for recognition of tokens.

Q.3 Show that Bottom – up parsing is right most derivation in reverse order.

Q.4 Generate the three address code for the following C program –

```
Main()
{
Int i=1
Int a[5]
While(i<=5)
A[i]=
}
```

Q.5 Define Symbol table. Explain about the data structures used for Symbol table.

Q.6 What is loop in variant computation? Give an example.

Q.7 What is Dangling Reference in storage allocation? Explain with an example.

PART – C

Q.1 Construct a Finite Automation for the Regular Expression (00+11)*.

Q.2 Differentiate between Top down and bottom – up parsing techniques.

Q.3 Explain the TAC for various control structures.

Q.4 Explain various ways to access non local variables. Then suggest the storage allocation that is suitable to meet the requirement.

Q.5 Explain in brief about different principal sources of optimization techniques with suitable examples.

5E5101

5E5101

B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS1A Computer Architecture
CS, IT

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**.*
*All questions carry **equal** marks. Schematic diagrams must be shown wherever*
necessary. Any data you feel missing suitably be assumed and stated clearly.
Units of quantities used/calculated must be stated clearly.
Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1.   NIL _____   2.   NIL _____

UNIT- I

Q.1 (a)   Write short note on Von Neumann machine architecture. Explain with the help of a
suitable diagram.   [8]

(b)   Define –   [4×2=8]
  (i)   MIPS
  (ii) CPI
  (iii) IPC
  (iv) Speedup

OR

Q.1 (a)   Explain the different type of Micro-operation.   [8]

(b)   A CPU has a 12 – bit address for memory addressing -   [8]
  (i)   What is the Memory address ability of the CPU?
  (ii) If the memory has a total capacity of 16 kB, what is the word length of the
        memory?

UNIT- II

Q.2 (a) A stack is organized such that stack pointer point at the next empty location on the stack let the stack pointer is initialized to address 1000 and the first data in the stack is stored in location 1000. List the micro-operation for the Push and Pop operation.   [8]

   (b) Is there any impact of addressing mode in instruction set designing of a machine? Compare CISC and RISC in this context.   [8]

OR

Q.2 (a) What is pipelining? What is the maximum speed–up that can be attained? Construct an instruction pipeline. Is it possible to attain maximum speed–up in an instruction pipeline?   [8]

   (b) Define –   [4×2=8]

      (i)   Speedup

      (ii) Throughput

      (iii) Efficiency

      (iv) Bottleneck

UNIT- III

Q.3 (a) Explain Booth's algorithm for performing multiplication of binary numbers. What are its advantages over sighed 2's complement multiplication?   [8]

   (b) Explain the algorithm in flow chart form for the non-restoring method of fixed point binary division.   [8]

OR

Q.3 (a) What do you understand by array multiplier? Explain with the suitable example.   [8]

   (b) Explain the Circuit and Algorithm of a BCD adder.   [8]

UNIT- IV

Q.4 (a) The access time of the cache memory is 100 n sec and that of the main memory is 1000 n sec. It is estimated that 90% of the memory requests are for read and remaining 10% for write. The hit ratio is 0.9. [8]

(b) Write short note on – [2×4=8]

(i) Associative Memory

(ii) Cache Memory

OR

Q.4 (a) What is Content Addressable Memory? Describe its design procedure. What is the role of Match Register in it? [8]

(b) Explain memory hierarchy in a computer system. [8]

UNIT- V

Q.5 (a) What is DMA technique? Explain DMA controller and DMA transfer with suitable diagram. [8]

(b) Design an 8–bit priority encoder also design a 16–bit priority encoder using two copies of an 8–bit priority encoder. Additional gates may also be used if needed. [8]

OR

Q.5 (a) Explain CPU–IOP communication with diagram. [8]

(b) Define – [2×4=8]

(i) Priority interrupt

(ii) Polling

5E1753

5E1753
B. Tech. V - Sem. (Main) Exam., February - 2023
Artificial Intelligence and Data Science
5AID4-03 Operating System
CS, IT, AID, CAI

Time: 3 Hours   **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]
All questions are compulsory

Q.1   Define operating system. List the objectives of operating system.

Q.2   Why is Disk Scheduling important?

Q.3   What is Demand Paging?

Q.4   What are the disadvantages of Semaphore?

Q.5   Differentiate between Process and Thread.

Q.6   Define Thrashing. What are the reasons for thrashing?

Q.7   Why are the page sizes always in powers of two?

Q.8   What are the various file accessing methods?

Q.9   Define the term seek time and rotational latency.

Q.10 What is the role of dispatcher?

PART – B

Attempt any five questions

Q.1 Explain different operations performed by the operating system.

Q.2 Define process. How many different states a process has? Explain when a process changes the state using proper diagram.

Q.3 Explain Reader-writer problem and discuss the solution with proper diagram.

Q.4 Write the differences among short term, medium term and long term scheduling.

Q.5 What is deadlock? What are the necessary conditions for a deadlock to occur? Explain each condition briefly?

Q.6 Explain why the "Principle of Locality" is crucial to the use of virtual memory. What is accomplished by page buffering?

Q.7 Explain the architecture of Linux operating system with proper diagram.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1 Consider the following set of process to be executed, with the arrival time and CPU burst time given in milliseconds. Calculate average waiting time and turn-around time using given scheduling algorithm. Draw Gantt chart for each type.

Process	Arrival time	CPU Burst time
P1	0	5
P2	1	3
P3	2	3
P4	3	1

(i)   FCFS

(ii)   SJF

(iii) Round Robin (Quantum = 2)

Q.2 Write short notes for the following –

   (i)   Internal Vs External Fragmentation

   (ii) Paging and segmentation

   (iii) Process control block

   (iv) Absolute and Relative path name of a file

Q.3 On a disk with 1000 cylinders numbers 0 to 999. Compute the number of tracks and disk arms must move to satisfy all the requests in the disk queue. Assume, the latest request received was at track 345 and the head is moving towards track 0. The queue in FIFO order contains requests for the following tracks - 123,874,692,475,105,376. Perform the computation for FIFO, SSTF and SCAN scheduling algorithms.

Q.4 Consider the following page reference string 1,2,3,4,5,3,4,1,6,7,8,7,8,9,7,8,9,5,4,5,4,2 with four frames. How many page faults would occur for the FIFO, Optimal Page Replacement Algorithm. (Assume all Frames are initially empty)

Q.5 Write in short for the following –

   (i)   Virtual machine

   (ii) Device Drivers

   (iii) Time OS

   (iv) Mutual exclusion

5E1353

5E1353
B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS4 – 03 Operating System
CS, IT

Time: 3 Hours   Maximum Marks: 120
                                                          Min. Passing Marks: 42

Instructions to Candidates:

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Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. <u>NIL</u>   2. <u>NIL</u>

PART – A

<u>(Answer should be given up to 25 words only)</u>   [10×2=20]

<u>All questions are compulsory</u>

Q.1 Define Microkernels for operating system.

Q.2 What is Lock variables?

Q.3 Discuss physical organization of memory.

Q.4 What do you mean by virtual memory addressing?

Q.5 Explain mutual exclusion condition.

Q.6 Define safe state in dead lock avoidance.

Q.7 Explain seek time and transfer time.

Q.8 Write attributes of files.

Q.9 What do you mean by user authentication? Explain.

Q.10 What is the difference between UNIX and Linux?

PART – B

(Analytical/Problem solving questions) [5×8=40]
Attempt any five questions

Q.1 What are the different services provided by the operating system? Explain in detail.

Q.2 Explain the classification of I/O devices.

Q.3 Explain Banker's Algorithm for dead lock avoidance with an example.

Q.4 What are the benefits of threads? Explains context switching of process and threads.

Q.5 What are the various access methods for files system? Explain.

Q.6 What is paging? How it is different from segmentation?

Q.7 Compute number of page faults for LRU, FIFO and optimal page replacement algorithm.

The given page trace is 7, 5, 1, 2, 7, 4, 5, 4, 5, 4, 5, 7 (12 pages). The job is allowed 3 blocks in primary memory.

(Descriptive/Analytical/Problem Solving/Design Questions)   [4×15=60]

Attempt any four questions

Q.1 Explain the various directory structure in detail.

Q.2 Discuss the different types of mobile operating system with example.

Q.3 The disk queue in the request for I/O to block on cylinders are 99, 184, 38, 123, 15, 125, 66, 68. If the disk head initially at 54, then compute the total head movement for the following algorithms.

(a) FCFS scheduling

(b) SSTF scheduling

(c) SCAN scheduling

Q.4 Consider the following four processes with length of the CPU burst time in milliseconds:

Process	Arrival time	Burst time
P_1	0	8
P_2	1	4
P_3	2	9
P_4	3	5

Find out which of the following algorithm gives the least average waiting time for the above work load:

(i) FCFS

(ii) RR (slice = 4ms)

(iii) SRTF

Q.5 Write short note on virtual memory and demand paging.

5E5102

B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS2A Digital Logic Desgin

Time: 3 Hours   **Maximum Marks: 80**
                                                   Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions**, selecting **one question** from **each unit**.
All questions carry **equal** marks. Schematic diagrams must be shown wherever
necessary. Any data you feel missing suitably be assumed and stated clearly.
Units of quantities used/calculated must be stated clearly.
Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)*

1.   NIL _____   2.   NIL _____

UNIT- I

Q.1 (a) Explain and represent graphically the VLSI design flow using top

down design. What's the role of simulation?   [8]

(b) Discuss the requirement that led to the design of the VHDL language,

which of these requirements where a software language would fall

short in describing hardware.   [8]

OR

Q.1 (a) Show the sequence of events in the following description when (S='1' and R = '1'); also show circuit diagram : [8]

> Entity RS Latch is
>
>> Port (R, S: in Bit; Q, QBAR: buffer Bit);
>
> End RS latch;
>
> Architecture Delta of RS Latch is
>
> Begin
>
>> QBAR ‹ = R nand Q;
>>
>> Q ‹= S nand QBAR;
>
> End Delta;

(b) Use guarded block statement to describe a rising edge trigging D flip-flop. [8]

UNIT- II

Q.2 (a) The function is defined as F (A B C D) = Σ (1 3 5 7 10 11) Show, how the function can be implemented on a PLA having an 8× 8 AND array and a 4× 8 OR array? [8]

(b) Implement following Boolean function by a hazard free OR AND network - [8]

f = Σ (0, 2, 6, 7)

OR

Q.2 (a) Discuss various techniques for programming the interconnection etc., with focus on anti-fuse, SRAM, EROM and EEPROM based approaches. [8]

(b) How is simulation delta time point used to order events in times? Explain. [8]

UNIT- III

Q.3 Design an asynchronous circuit which can be used in an automatic toll-collection machine. Suppose the toll is 35 cents and the machine accepts nickels, dims, and quarters. An electro-mechanical system, already available, accepts the coins sequentially (even if they are all dropped in simultaneously) and generate one of the three pulse X_5, X_{10} or X_{25} whenever a nickel, dime or quarter, respectively is accepted. The technical circuit should produce a level output which would turn on a green whenever the amount received by the machine is 35 cents or over. After a car has passed, a reset pulse X_r is automatically produced, which turns the green light off and reset the sequential circuit to its initial sate.   [16]

OR

Q.3 What are the capabilities and limitations of finite state machines?   [16]

UNIT- IV

Q.4 (a) Draw and discuss FPGA based design. What is technology mapping for FPGAs?   [8]

(b) How is LUT used to program an FPGA? Explain with example.   [8]

OR

Q.4 A sequential network has two inputs X and Clock and one output Z. In coming data are examined in consecutive groups of four digits and the output Z = 1 if any of the three input sequence 1010, 0110 or 0010 should occur. Develop a state diagram and implement the circuit using JK flip-flop and NOR gates. [16]

UNIT- V

Q.5 Write short notes on the following - [16]

(1) Clock Skew, Setup Time and Holdup Time

(2) Algorithm State Chart

(3) Look Ahead Carry Adders

5E1754

5E1754
B. Tech. V - Sem. (Main) Exam., February - 2023
Artificial Intelligence and Data Science
5AID4-04 Computer Graphics & Multimedia
CS, IT, AID, CAI

Time: 3 Hours   Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   **[10×2=20]**

All questions are compulsory

Q.1 What is resolution?

Q.2 Write applications of computer graphics.

Q.3 Differentiate random and raster scan system.

Q.4 What is inside-outside test in filling algorithm?

Q.5 What are homogeneous coordinates?

Q.6 Write advantages and disadvantages of DDA algorithm.

Q.7 What do you understand by composite transformations?

Q.8 Compare RGB colour model with CMY colour model.

Q.9 What is morphing?

Q.10 What is ray tracing? Give an example.

PART – B

(Analytical/Problem solving questions)   [5×4=20]

Attempt any five questions

Q.1 Scan convert a straight line using DDA Algorithm, where end points of line are (5, 10) and (15, 35).

Q.2 What is Aliasing? Explain any two Anti-Aliasing techniques.

Q.3 What is viewing pipeline? Explain window - to - viewport transformation.

Q.4 Prove that two successive translations are additive.

Q.5 Explain parametric function. Discuss properties of Bezier curves.

Q.6 What are halftone patterns? Explain dithering techniques.

Q.7 What are key frames? Explain Tweening.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1 What is frame buffer? Calculate size of frame buffer for a display device (CRT) supporting true colors and has 1024×1024 pixels on the screen, if size of screen is 9" $\times$ 12", calculate resolution and aspect ratio also.

Q.2 What is projection? Explain parallel and perspective projection in detail.

Q.3 Explain Cohen-Sutherland line clipping algorithm.

Q.4 Show rotation of a 2D box represented by (5, 5) to (10, 15) with respect to (5, 5) by 90° in anticlockwise direction.

Q.5 Write the limitations of 4-connected fill method. How it is removed in 8-connected fill method? Why these methods are called seed-fill methods?

5E1354

5E1354
B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS4 – 04 Computer Graphics & Multimedia
CS, IT

Time: 3 Hours

Maximum Marks: 120
Min. Passing Marks: 42

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 What is pixel addressing?

Q.2 What are the data elements of multimedia?

Q.3 How rotation is done in 2D transformation?

Q.4 What is the purpose of Direct-view storage pipes?

Q.5 What are the purpose of splines?

Q.6 List the classification schemes of animation.

Q.7 Differentiate line clipping with text clipping.

Q.8 List the use of virtual reality.

Q.9 Define synchronization in multimedia system.

Q.10 What is collaborative computing?

PART – B

(Analytical/Problem solving questions)   [5×8=40]

Attempt any five questions

Q.1 Briefly explain RGB and YIQ color models in detail.

Q.2 Explain the Cohen-Sutherland line clipping algorithm with an example.

Q.3 Differentiate between Digital Audio and MIDI.

Q.4 Discuss Random and Raster Scon system.

Q.5 Differentiate between Aliasing and Anti-Aliasing.

Q.6 Explain cubic spline interpolation method.

Q.7 What is Dithering techniques? Explain with a suitable example.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [4×15=60]

Attempt any four questions

Q.1 Explain the different components of multimedia system in detail.

Q.2 What is parallel and perspective projections? Also derive their projection matrices.

Q.3 Write short note on "Animations and Realism".

Q.4 How Beizer splines approximation method helps in curve and surface design? Explain.

Q.5 Explain the followings -

(a) Koch and C-curves

(b) Boundary and flood fill

5E5103

5E5103

B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS3A Telecommunication Fundamentals
CS, IT

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

*Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Units of quantities used/calculated must be stated clearly.
Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

UNIT- I

Q.1 (a) What is the position of the transmission media in the OSI or the Internet model? Explain the two major categories of transmission media.   [8]

(b) The loss in a cable is usually defined in decibels per kilometer (dB/km). If the signal at the beginning of a cable with -0.3 dB/km has a power of 2 mW, what is the power of the signal at 5 km?   [8]

OR

Q.1 (a) Explain the Go-Back-N ARQ Protocol. What are the reasons of moving from the Stop-and-Wait ARQ Protocol to the Go-Back-N ARQ Protocol?   [8]

(b) Compare and contrast byte-stuffing and bit-stuffing. Which technique is used in byte-oriented protocols? Which technique is used in bit-oriented protocols?   [8]

UNIT- II

Q.2 (a) Explain, why collision is an issue in a random access protocol? Compare the working of ALOHA and CSMA protocol. [8]

(b) A slotted ALOHA network transmits 200-bit frames using a shared channel with a 200-kbps bandwidth. Find the throughput if the system (all stations together) produces 1000 frames per second. [8]

OR

Q2 (a) How does a single-bit error differ from a burst error? Discuss the concept of redundancy in error detection and correction. [8]

(b) Compare and contrast HDLC with PPP. Which one is byte-oriented; which one is bit-oriented? [8]

UNIT- III

Q.3 (a) When using RTS/CTS, how does an exposed terminal decide it is safe to send? [8]

(b) Why does TCP perform badly on wireless links? What can be done to improve performance without requiring all wired hosts to upgrade to a new protocol? [8]

OR

Q3 (a) What are the two types of links between a Bluetooth primary and a Bluetooth secondary? [8]

(b) What is the difference between a forwarding port and a blocking port? How does a VLAN provide extra security for a network? [8]

UNIT- IV

Q.4 (a) Describe the goals of multiplexing. Distinguish between multilevel TDM, multiple slot TDM and pulse-stuffed TDM. [8]

(b) What is DSL technology? What are the services provided by the telephone companies using DSL? Distinguish between a DSL modem and a DSLAM. [8]

OR

Q.4 (a) Explain the TDMA Superframe structure with the help of diagram. [8]

(b) Compare and contrast Space division and Time division switching. [8]

UNIT- V

Q.5 (a) Explain handoff strategies in CDMA systems. [8]

(b) Describe the working of direct sequence spread spectrum systems. [8]

OR

Q.5 (a) Demonstrate that codes in a 8×8 Walsh matrix are orthogonal to each other. What are the advantages and limitations of using Walsh codes in spread spectrum applications? [8]

(b) Explain, how a PN sequence is generated using ML linear shift register. [8]

5E1755

5E1755

B. Tech. V - Sem. (Main) Exam., February - 2023
Artificial Intelligence and Data Science
5AID4-05 Analysis of Algorithm
CS, IT, AID, CAI

Time: 3 Hours   **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1 Find out the Time Complexity of given algorithm -

```
Sum(a, n)
{ if(n <= 0)
        return 0;
else
        return sum (a, n-1) + a [n];
}
```

Q.2 Discuss space complexity.

Q.3 Distinguish Greedy Method and Dynamic Programming.

Q.4 Define 0/1 knapsack problem.

Q.5 Recognize Lower Bound Theory.

Q.6 Identify Pattern Matching Algorithms.

Q.7 State about assignment problem.

Q.8 Describe Randomized Algorithms.

Q.9 Explain set cover problem.

Q.10 Define Cook's Theorem.

PART – B

(Analytical/Problem solving questions)   [5×4=20]

Attempt any five questions

Q.1 Contrast between 3 asymptotic notations & define the use & objective of asymptotic notations.

Q.2 Sort the following sequence using Quick Sort Method. Consider first element as the Pivot element.

15, 56, 62, 2, 9, 16, 21, 17, 23, 3, 10

Q.3 Find out the solution generated by the job sequencing. When n = 7 with following profit & deadline -

$$\begin{bmatrix} \text{Profit } (P_1, P_2 \ldots P_7) & = & (3, 5, 20, 18, 1, 6, 30) \\ \text{Deadline } (d_1, d_2 \ldots d_7) & = & (1, 3, 4, 3, 2, 1, 2) \end{bmatrix}$$

Q.4 Solve the TSP problem for the following Cost Matrix -

$$\begin{array}{c c} & \begin{array}{cccc} W & X & Y & Z \end{array} \\ \begin{array}{c} W \\ X \\ Y \\ Z \end{array} & \begin{bmatrix} A & 8 & 13 & 18 \\ 3 & A & 7 & 8 \\ 4 & 11 & A & 10 \\ 6 & 6 & 7 & A \end{bmatrix} \end{array}$$

Q.5 Discuss Quadratic Assignment Problem using a suitable example.

Q.6 Differentiate between Las Vegas and Monte-Carlo Algorithm with example.

Q.7 Prove that the Hamilton Cycle Problem is NP-Complete.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions) [3×10=30]

Attempt any three questions

Q.1 Solve the recurrence using Master theorem -

(a) $T(n) = T(\sqrt{n}) + C$

(b) $T(n) = 8T(n/2) + n^2$

Q.2 Discuss matrix chain multiplication with reference to dynamic programming technique. Explain 0/1 Knapsack Problem with suitable example.

Q.3 (a) Find the pattern ABCBC in the test ACABABCABCBCA using KMP Matcher.

(b) Discuss Naive String Matching Algorithm in detail.

Q.4 (a) Define the terms flow networks and flow. Explain the essential properties of flow.

(b) Discuss the terms -

(i) Residual Network

(ii) Augmenting Path

Q.5 (a) Describe the terms P, NP, NP-Hard, NP-Complete with suitable example. Also, give relationship between them.

(b) Write algorithm for approximation for vertex cover problem with example.

5E1355

5E1355
B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS4 – 05 Analysis of Algorithms
CS, IT

Time: 3 Hours   Maximum Marks: 120
                                                 Min. Passing Marks: 42

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]
All questions are compulsory

Q.1 Differentiate between Divide & Conquer & Dynamic Programming approach.
Q.2 What do you mean by bad character heuristic?
Q.3 Define Assignment Problem.
Q.4 Write the advantages of randomized algorithms.
Q.5 Explain optimal substructure in Greedy Approach.
Q.6 Define Optimization Problem.
Q.7 What are the restrictions of Binary Algorithms?
Q.8 Define the concept of Backtracking algorithms.
Q.9 What is Network flow problem?
Q.10 Explain Cook's Theorem.

PART – B

Attempt any five questions

Q.1 Given 2 matrices A and B of sizes 2×2 each.

$$A = \begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}, B = \begin{bmatrix} 2 & 7 \\ 8 & 3 \end{bmatrix}$$

Multiply the two matrices using Strassen's Matrix Multiplication.

Q.2 Illustrate all the possible greedy choices for the Fractional Knapsack and which one work well for it. Explain.

Q.3 Given 3 files with sizes 2, 3, 4, 5, 6, 7 units. Find the optimal way to combine these files.

Q.4 Explain 4 × 4 Queen's Problem.

Q.5 Apply the concept of Binary Search Algorithm and Search the location of element 23 in the array 12, 18, 23, 25, 29, 32, 35, 40, 58, 66

Q.6 Explain the concept of P, NP and NP hard problems.

Q.7 Implement the concept of Merge Sort to Sort the series of the given number in the Array 32, 14, 15, 27, 31, 7, 23, 26

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [4×15=60]

Attempt any four questions

Q.1 Find the optimal solution for the Fractional Knapsack problem making use of Greedy approach. Consider m = 5, W = 60 kg

$(\omega_1, \omega_2, \omega_3, \omega_4, \omega_5) = (5, 10, 15, 22, 25)$

$(v_1, v_2, v_3, v_4, v_5) = (30, 40, 45, 77, 90)$

Q.2 For a given String S and Pattern P use KMP algorithm to find whether P occurs in S out not. S = b, a, c, b, a, b, a, b, a, b, a, c, a, c, a

   P = a, b, a, b, a, c, a
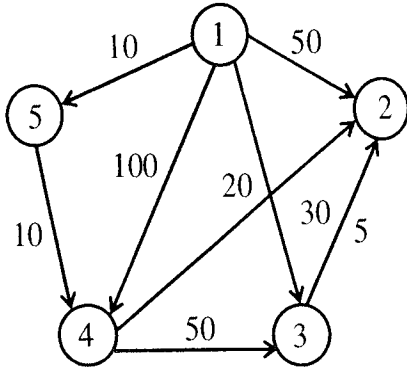
Q.3 Given the two sequence of characters.
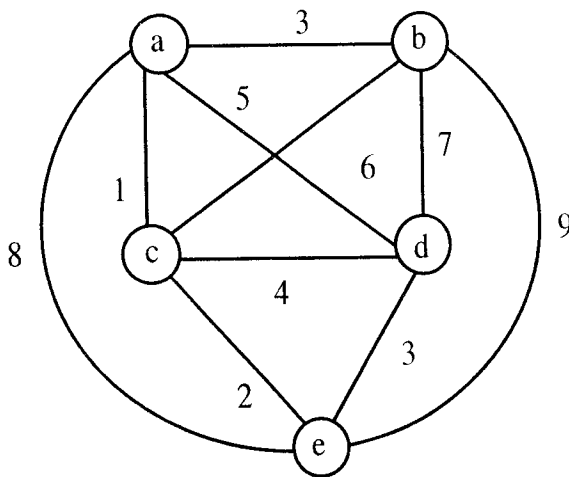
X = < PRESIDENT>

Y = < PROVIDENCE>

Find out the longest common subsequence.

Q.4 Using Prim's and Kruskal Algorithm. Find out the Minimum cost for a given graph.

Q.5 What do you understand by Branch and Bound problems? Find out the Minimum cost for a salesperson using Travelling salesmen problem for the following graph.

5E5104

5E5104

B. Tech. V - Sem. (Back) Exam., February - 2023
Computer Science & Engineering
5CS4A Database Management Systems
CS, IT

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

Instructions to Candidates:

   *Attempt any **five questions,** selecting **one question** from **each unit.** All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

   Units of quantities used/calculated must be stated clearly.

   Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2.   NIL _____

UNIT- I

Q.1 (a) Explain the overall system structure of Database Management System.   [8]

   (b) Explain the various goals of Database Management System.   [8]

OR

Q.1 (a) Explain network and object oriented model. What are the roles of these model in database design?   [8]

   (b) Define DBA? Explain various functions of DBA.   [8]

UNIT- II

Q.2 (a) Define Entity set? Explain various types of attributes with example.   [8]

   (b) Explain specialization and generalization with suitable example.   [8]

OR

Q.2 What is Entity-Relationship model? Draw an E-R diagram of Bank management system.   [16]

UNIT- III

Q.3 (a) How does Tuple Relational Calculus differ from Domain Relational Calculus? [8]

(b) Explain set operations with example. [8]

OR

Q.3 Discuss the various fundamental operations in relational algebra with suitable example. [16]

UNIT- IV

Q.4 (a) Explain DDL and DML with example. [8]

(b) Explain Aggregate operators with suitable example. [8]

OR

Q.4 (a) Explain the following –

(i) Embedded SQL and Dynamic SQL [4]

(ii) ODBC and JDBC [4]

(b) What do you mean by trigger in database? Explain with suitable example. [8]

UNIT- V

Q.5 (a) Why BCNF to be considered stricter than 3 NF? Explain. [8]

(b) What is decomposition? Explain lossy and lossless join decomposition. [8]

OR

Q.5 (a) Describe the concept of Full Functional Dependency (FFD). [8]

(b) Define Normalization. Explain all the normal forms with the help of example. [8]

5E1756

5E1756
B. Tech. V - Sem. (Main) Exam., February - 2023
Computer Science Engineering
5CS5-11 Wireless Communication (Elective - I)
CS,IT

Time: 3 Hours   **Maximum Marks: 70**

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A   [10×2=20]

(Answer should be given up to 25 words only)

All questions are compulsory

Q.1   List the names of different path loss models.

Q.2   Explain the concept of coherence bandwidth.

Q.3   Describe the four applications of wireless communication.

Q.4   Explain the PAPR technique for wireless communication.

Q.5   List the name of the channel assignment techniques used in wireless communication.

Q.6   Which shapes of cells is used in cellular communication? Define.

Q.7 Compare BPSK and QPSK modulation techniques used in wireless communication.

Q.8 List the name of different fading channels used in wireless communication.

Q.9 Describe name of diversity techniques used in wireless communication.

Q.10 List the name of the structure of basic MIMO antennas.

PART – B [5×4=20]

(Analytical/Problem solving questions)
Attempt any five questions

Q.1 What is fading? Explain the multipath propagation phenomena with the help of fading and diagram.

Q.2 Describe and explain the different types of Handoff techniques used in wireless communication with neat diagram.

Q.3 If total spectrum allocation to mobile services provider using FDMA is 12.5 MHz, the guard band allocated at each edge of the spectrum is 10 KHz. If each channel has a bandwidth of 30 KHz, calculate the total number of channel available for transmission.

Q.4 What is the need of diversity? Explain different types of diversity techniques used in wireless communication networks.

Q.5 Describe and explain the technique of OFDM and its characteristics.

Q.6 Explain the concept of Rake receiver used in wireless communication with neat diagram.

Q.7 What is the importance of Equalization? Describe different types of equalization techniques used in wireless communication with mathematical explanation.

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any three questions

Q.1   Explain for a Cellular network following with the proper diagram –

     (i) Grade of service

     (ii) Trunking capacity

Q.2   Compare the FDMA, TDMA and CDMA with respect to different technical parameters.

Q.3   What is the principle of frequency reuse concept in cellular communication? Explain the five ways of increasing the capacity of cellular system.

Q.4   A user (Receiver) is moving with a velocity of 60 km/hr. The signal of 900 MHz frequency arrives at an angle of 30 degrees. Assuming no reflected wave arriving at receiver, calculate the received frequency and Doppler shift frequency. What would be the Doppler shift frequency and received frequency if the user moves the same speed but in exactly opposite direction?

Q.5   Identify and explain the objectives of MIMO. Also, describe different types of MIMO structures.

5E1757

B. Tech. V - Sem. (Main) Exam., February - 2023
Computer Science & Engineering
5CS5 – 12 Human-Computer Interaction (Elective-I)

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. <u>NIL</u>_____   2. <u>NIL</u>_____

PART – A

<u>(Answer should be given up to 25 words only)</u>   [10×2=20]

<u>All questions are compulsory</u>

Q.1 What is human-computer interaction?

Q.2 Define basic and long-term goal of HCL.

Q.3 What is Ergonomics?

Q.4 What are the three main components of HCL?

Q.5 What is heuristic evaluation?

Q.6 What is usability engineering?

Q.7 Define concur task tree.

Q.8 Differentiate cognitive walkthrough with heuristic evaluation.

Q.9 Define Fitt's law.

Q.10 Elaborate major applications of Fitt's law.

PART – B

(Analytical/Problem solving questions)   [5×4=20]

Attempt any five questions

Q.1 Write advantages and disadvantages of GOMS.

Q.2 Explain Shneiderman's eight golden rules.

Q.3 What are KLM and CMN GOMS?

Q.4 Explain Nielsen's Ten Heuristics with example of its use in heuristic evaluation.

Q.5 What is task analysis? Give brief about HTT and its techniques.

Q.6 Elaborate four principles of Object-Oriented Programming. Give the significance of object oriented modeling for UI design.

Q.7 What are the consequences of a poor UI design?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1 What is one-way ANOVA? Discuss its hypothesis and limitations.

Q.2 (a)   What is a GUI Design? Give advantages and disadvantages of GUIs.

   (b)   What is aesthetics in UI design? State its impact.

Q.3 What is formalism in dialog design? Explain state charts and Petri Nets with diagrams.

Q.4 (a)   What is prototyping? Explain its techniques.

   (b)   Differentiate throw away prototyping and incremental prototyping.

Q.5 (a)   Why it is a good practice to use standards and guidelines when designing interfaces?

   (b)   Design the user interface for web based address book application.

5E1356

5E1356
B. Tech. V - Sem. (Back) Exam., February - 2023
PCC / PEC Computer Science & Engineering
5CS5 – 11 Wireless Communication
CS, IT

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1 What do you mean by multipath propagation?

Q.2 Define effects of fading in wireless network performance.

Q.3 What do you mean by PAPR?

Q.4 Define spatial multiplexing.

Q.5 What do you mean by beam forming?

PART – B

Attempt any four questions

Q.1 Explain various techniques of multipath propagation. Define various parameters of mobile multipath channels.

Q.2 Explain fading with all its types with schematic. Also define its advantage and disadvantages.

Q.3 What do you mean by Trunking and grade of service in context to cellular architectures? Explain in detail.

Q.4 Describe Principle of P/4 – DQPSK. Comment on Error performance in fading channels.

Q.5 Explain diversity with its types. Define diversity combining techniques.

Q.6 Explain spatial multiplexing with its system model & pre-coding.

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [2×15=30]

Attempt any two questions

Q.1 Describe following in detail –

   (a)   Link budget design

   (b)   Frequency reuse & hand-off

   (c)   MIMO systems with schematic diagram.

Q.2 Explain OFDM principle in detail with focus on cyclic prefix. Define windowing.

Q.3 Explain following in detail –

   (a)   Error probability in fading channels with diversity reception.

   (b)   Beam forming.

   (c)   Differences between TDMA, FDMA and CDMA.

5E1357

5E1357

B. Tech. V - Sem. (Back) Exam., February - 2023
PCC/PEC Computer Science & Engineering
5CS5 – 12 Human-Computer Interaction

Time: 2 Hours

Maximum Marks: 80
Min. Passing Marks: 28

Instructions to Candidates:

Attempt all five questions from Part A, four questions out of six questions from Part B and two questions out of three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [5×2=10]

All questions are compulsory

Q.1   Relate the terms Human Computer Interaction and User Interface Design.

Q.2   What is Contextual inquiry?

Q.3   What is empirical research in HCI?

Q.4   What is Concur Task Tree?

Q.5   Why is model human processor useful in HCI?

PART – B

Q.1 What is the difference between software engineering and Human-Computer Interaction? Explain.

Q.2 What is Fitts' Law? Explain.

Q.3 Explain the Norman's seven principles.

Q.4. Define the experiment design and data analysis (with explanation of one-way ANOVA).

Q.5 Explain State charts and (classical) Petri Nets in dialog design.

Q.6 Explain different types of CA.

PART – C

Q.1 Explain the GOMS family of models.

Q.2 Explain Schneiderman's Eight Golden Rules.

Q.3 Explain Object Oriented Modeling of User Interface Design.

5E1789

5E1789

B. Tech. V - Sem. (Main) Exam., February - 2023
Information Technology
5IT5-12 Software Testing and Project Management (Elective-I)

Time: 3 Hours

Maximum Marks: 70

Instructions to Candidates:

Attempt all ten questions from Part A, five questions out of seven questions from Part B and three questions out of five from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL _____   2. NIL _____

PART – A

(Answer should be given up to 25 words only)   [10×2=20]

All questions are compulsory

Q.1   What is Software Project Management?

Q.2   Define estimation techniques.

Q.3   What is mutation testing?

Q.4   Define fault Based testing.

Q.5   Write Cost Monitoring.

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Q.6   What is a project?

Q.7   What are the estimation techniques?

Q.8   Define a software quality.

Q.9   What is risk management?

Q.10 Define Project Planning.

PART – B

(Analytical/Problem solving questions)   [5×4=20]

Attempt any five questions

Q.1   Explain the types of plan which is to be considered during the software project planning.

Q.2   Explain the various activities covered by software project management.

Q.3   Differentiate white box testing and black box testing.

Q.4. Explain in detail about software testing principles.

Q.5   Explain McCabe' Scyclomatic complexity.

Q.6   Elaborate different tools and techniques used for testing a software.

Q.7   What are the project planning objectives? How can they be achieved?

PART – C

(Descriptive/Analytical/Problem Solving/Design Questions)   [3×10=30]

Attempt any three questions

Q.1   Describe the reactive Vs proactive strategies in detail.

Q.2   Discuss different steps in project review process.

Q.3 Discuss in detail Test case generation using UML diagrams.

Q.4 Differentiate end to end testing and functional testing. When to apply end to end testing and detail various methods of end to end testing.

Q.5 Explain Software Project Estimation in brief.