CSE V SEM

Techno India NJR Institute of Technology
Plot-SPLT, Bhamashah (RIICO) Industrial Area
Kaladwas, Udaipur-313003 (Rajasthan)

5E1751

Roll No. _____ Total No. of Pages: 3

# 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.

## PART – C

[3×10=30]

**(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,

$$P(X, Y) = \begin{matrix} 0.05 & 0.05 & 0.02 & 0.05 \\ 0.15 & 0.16 & 0.01 & 0.09 \\ 0.12 & 0.03 & 0.02 & 0.05 \\ 0.01 & 0.12 & 0.01 & 0.06 \end{matrix}$$

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

---

5E1752

Roll No. _____ Total No. of Pages: 3

# 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 compliers 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 -

$S \rightarrow TS|\in$

$T \rightarrow U.T|U$

$U \rightarrow x|y|[s]$

(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 –

$E' \rightarrow E$

$E \rightarrow E+T|T$

$T \rightarrow T* F|F$

$F \rightarrow (\in)|id$

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

$s' \rightarrow s$

$s \rightarrow cc$

$c \rightarrow ec/d$

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.

---

5E1753

Roll No. _____ Total No. of Pages: 3

# 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

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

**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

---

5E1754

Roll No. _____ Total No. of Pages: 3

# 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 $1024 \times 1024$ 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?

---

5E1755

Roll No. _____ Total No. of Pages: 3

# 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 -

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

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

| | W | X | Y | Z |
|---|---|---|---|---|
| W | A | 8 | 13 | 18 |
| X | 3 | A | 7 | 8 |
| Y | 4 | 11 | A | 10 |
| Z | 6 | 6 | 7 | A |

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.

---

5E1756

Roll No. _____ Total No. of Pages: 3

# 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.

## PART – C

[3×10=30]

**(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.

---

5E1351

Roll No. _____ Total No. of Pages: 3

# 5E1351

## 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

**(Analytical/Problem solving questions)** **[4×10=40]**

**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 -

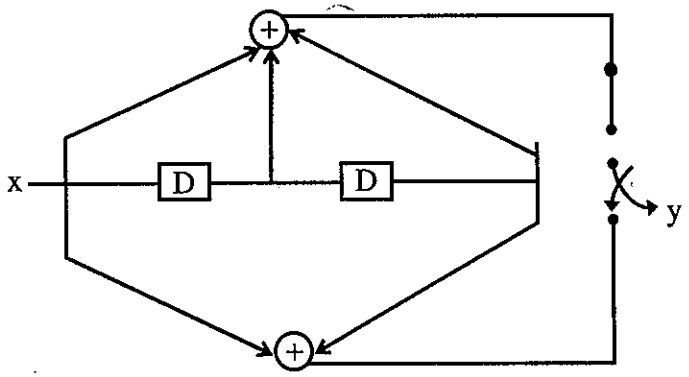
$g(x) = x^6 + 3x^5 + x^4 + x^3 + 2x^2 + 2x + 1$

(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

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

**Attempt any two questions**

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.

---

5E1352

Roll No. _____ Total No. of Pages: 2

# 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

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

**Attempt any five questions**

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

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

**Attempt any four questions**

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.

---

5E1353

Roll No. _____ Total No. of Pages: 3

# 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:*

***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 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.

# PART – C

**(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.

---

5E1354

Roll No. _____ Total No. of Pages: 2

# 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

---

5E1355

Roll No. _____ Total No. of Pages: 3

# 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

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

**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

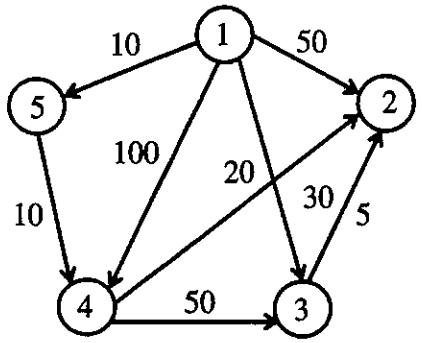
Q.3 Given the two sequence of characters.

X = < PRESIDENT>

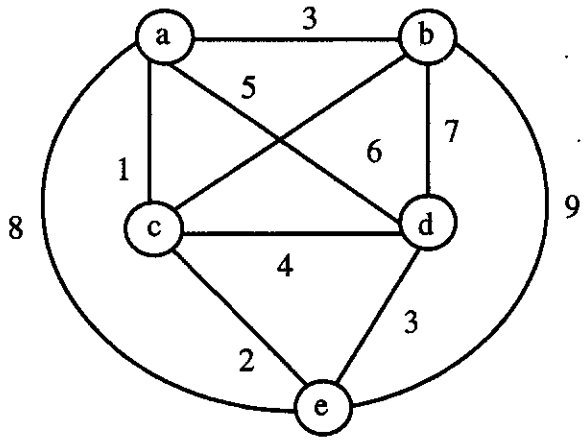
Y = < PROVIDENCE>

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.




---