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Roll No. _____ [Total No. of Pages : 2

5E1351

B.Tech. V- Semester (Main) Examination,November - 2019
ESC Computer Sc. and Engineering
5CS3-01 Information Theory And 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 suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

PART - A

All questions are **compulsory** **(5×2=10)**

1. Define viterbi decoding.
2. What is Galoi's Field.
3. Calculate the amount of information if pK = 1/4.
4. Define code efficiency.
5. Write the principle of static Huffman coding.

PART - B

Attempt any **four** questions **(4×10=40)**

1. Define an entropy and show that $H(s)_{max} = \log_2^9$ hits/messages symbols.
2. Consider a source $S = [S_1, S_2]$ with probabilities 3/4 and 1/4 respectively. Obtain shannon Fono code for sources. Its 2nd and 3rd entermious. Calculate efficiency for each case.
3. Design a single error correcting code with a message block of size 11 and show that by an example that it can correct single error.
4. Consider the polynomial.

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

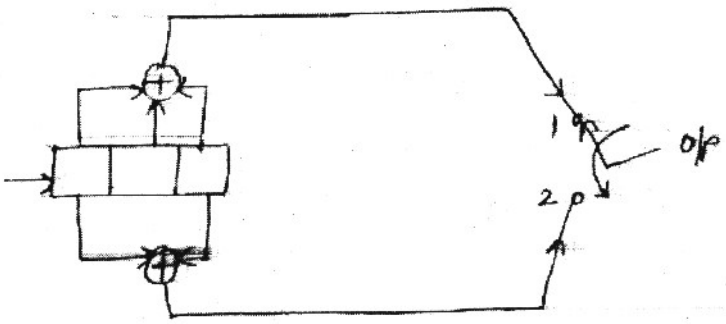
a) Find the parity check matrix H

b) Find code rate of this code

c) Find minimum distance of this code.

5. Design an encoder for (7,4) B_{cc} generator by $g(x)=1+x+x^3$ and verify its operation using message vector 0101.

6. Initially consider that the register contains all zeros. What will be the code sequence if the i/p data sequence is 100110.



PART - C

Attempt any **two** questions **(2×15=30)**

1. Let x be number of tosses required to a coin until the first tail appears.

a) Find entropy $H_p(x)$ if coin is fair.

b) Find entropy $H_U(x)$ if coin is unfair.
with P being probability of getting a tail.

2. Determine the Huffman code for the following message with their.

x_1	x_2	x_3	x_4	x_5	x_6	x_7
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.

3. Consider G (7,4) block code generated by

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

Find out the error vector and suppose that the received vector R is 1001001.

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5E1352

B.Tech V Semester(Main) Examination,November - 2019
PCC/PEC Computer Science And Engineering.
5CS4-02 Compiler Design
Common For CS,IT

Time : 3 Hours **Maximum Marks : 120**

Min. Passing Marks : 42

Instructions to Candidates:

*Attempt **all ten** questions from **Part A**, **five** question out of **Seven** from **Part B** and **Four** questions out of **Five** from **Part C**.*

(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.

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(10×2=20)**

1. Define input Buffering.

2. What do you understand by Lexical Analyzer?

3. Define Finite automation and regular expression.

4. What do you mean by activation record?

5. Give the full form and definition of DAG.

6. Explain different types of errors in compilers.

7. Briefly describe parameter passing.

8. What do you mean by peephole optimization?

9. Eliminate left recursion in following grammar :-

$S \rightarrow (L) | a$

$L \rightarrow L, S | S$

10. Eliminate left factoring in following grammar :

$S \rightarrow bSSaaS | bSSaSb | bSb | a$

PART - B

(Analytical/Problem solving questions)

Attempt any five questions **(5×8=40)**

1. Explain abstract syntax tree. Also create the syntax tree for following :

   i) $(a+b)*(c-d)+((e/f)*(a+b))$ (With post fix notation)

   ii) A + 4 - b + 3 (Also write functions)

2. Explain the phases of compiler and calculate the respective output, after each phase for the input c = a + b*5.

3. Consider the following program segment :

   Begin prod : = 0; i : = 1;

   do begin prod : = prod+ a(i)*b(i);

   i = i + 1; end while (I <=20) end

   Find the basic blocks and construct the flow graph and also optimize the code.

4. Explain type checking, type system, type expression and type conversion.

5. Explain activation record and activation tree. Also calculate the output using activation record for following program :-

```
f1 (int a)
{
int b = 10;
return (a+b);
}
 f2 (int b)
{
 Return (b+f1(b));
}
 main ( )
{
 f2 (4);
}
```

6. What is basic block? Also explain in detail the transformation in basic block.

7. Solve the input id + id*id, using operator precedence parser for the following grammar :

   $T \rightarrow T+T / T*T / id;$

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **Four** questions **(4×15=60)**

1. Consider the following grammar : -

   $S \rightarrow L = RS \rightarrow RL \rightarrow *RL \rightarrow id\ R \rightarrow L$

   Construct the CLR parsing table for this grammar.

2. Given the syntax directed definition below with the synthesized attribute val, draw the annotated parse tree for the expression, specifying moves for the given input string :

   23*5 +4$

$L \rightarrow E$	L.val = E.val
$E \rightarrow T$	E.val = T.val
$E \rightarrow E+T$	E.val = E.val+T.val
$T \rightarrow F$	T.val = F.val
$T \rightarrow T*F$	T.val=T.val*F.val
$F \rightarrow (E)$	F.val = E.val
$F \rightarrow digit$	F.val = digit.lexval

3. Translate the following arithmetic expression

   a+a*(b-c)+(b-c)*d, into : -

   i) Post fix

   ii) Syntax Tree

   iii) 3 Address code

   iv) Quadruples

   v) Triples

   vi) Indirect triples

   vii) DAG

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4. Given the grammar

$E \rightarrow E+T$

$E \rightarrow T$

$T \rightarrow T*F$

$T \rightarrow F$

$F \rightarrow (E)$

$F \rightarrow id$

a) Check whether the grammar is LR(O) and SLR(1) or not.

b) Parse the input string "id*id+id" for SLR and generate the parse tree.

5. Consider the following CFG = (N={S,A,B,C,D},T={a,b,c,d},P,S) where the set of production P is given below :

$S \rightarrow A$

$A \rightarrow BC \mid DBC$

$B \rightarrow Bb \mid \in$

$C \rightarrow c \mid \in$

$D \rightarrow a \mid d$

i) Calculate LL(1) for input string "dbb"

ii) Generate the parse tree for the same.

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5E1353

B.Tech. V semester (Main) Examination,November - 2019
PCC/PEC Computer Sc. & Engg.
5CS4-03 Operating System
Common For 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** from **Part B** and **Four** questions out of **Five** from **Part C**.*

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.

Part - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(10×2=20)**

1. What is semaphore?
2. Briefly explain the two methods of inter process communication.
3. What is starvation? How can we overcome it?
4. Differentiate between kernel and shell?
5. What is TLB? Explain its function.
6. Draw process state diagram.
7. Give the various disk scheduling methods.
8. What are the attributes of files?
9. Why page size is always power of 2?
10. What is a file system? What are various operations performed on a file?

Part - B

(Analytical/Problem solving questions)

Attempt any **five** questions **(5×8=40)**

1. What is paging? Explain with the help of a diagram.

2. Describe multilevel feedback queue scheduling with the help of an example.
3. Explain various strategies to deal with deadlocks? How deadlocks are detected and recovered?
4. Compare the methods by which we can access a file?
5. Explain the need and various services provided by operating system.
6. What do you mean by page - faults? When do page - falts occur? Describe the action taken by the O.S. when page - fault occurs?
7. Discuss the various directory structures.

Part - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **Four** questions **(4×15=60)**

1. Find the number of page faults for the following input string using FIFO and LRU page replacement algorithms :

   1,2,3,2,1,5,2,1,6,2,5,6,3,1,3,6,1,2,4,3. (Consider frame size = 3).

2. Calculate the average waiting time & turnaround time of the system using preemptive SJF and Round Robin ($t_q = 2$) scheduling algorithms :

Process Id	Arrival time	Burst time
P1	0	3
P2	1	5
P3	2	2
P4	3	4
P5	4	1
P6	5	3

3. What are the different mobile operating systems used nowadays? Discuss their features.
4. Find the seek time for the given sequence :

   73, 87, 34, 43, 173, 65, 58, 4, 201 The disk head is at 36 and is moving downward. Total cylinders are 210.

   i) SCAN

   ii) SSTF

   iii) LOOK

5. What are threads? Discuss the advantages and disadvantages of using threads?

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5E1354

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5E1354

B.Tech. V- Semester (Main) Examination, Nov. - 2019
PCC/PEC Computer Sc. and Engg.
5CS4-04 Computer Graphics and Multimedia
(Common With 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** from **Part B** and **Four** questions out of **Five** from **Part C**.*

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 materials is permitted during examination. (No material is required)

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(10×2=20)**

1. What is Pixel made of?
2. What is Scan Conversion?
3. Differentiate Plasma panel display and thin film Electroluminous Display.
4. Define Random Scan/Raster Scan display?
5. List out the merit and demerit of punctration technique.
6. Distinguish between convex and concave palygons.
7. What is translations.
8. Distinguish between uniform scaling and differential scaling.
9. List out the various text clipping.
10. Write all steps involved in 3-D Transformations.

PART - B

Attempt any **five** questions **(5×8=40)**

1. Explain scan conversion, write Bresenham's algorithm of line m >1.

2. Use Cohen sutherland line clipping algorithms to find the visible partion of the line P (40,80) Q(120,30) inside the window. The window is defined as ABCD : A(20,20), B(60,20), C(60,40) and D(20,40).

3. Explain in brief RGB, CMY and HSV colour models.

4. What is the use of compression technique in computer graphics? Explain JPEG.

5. Show Rotation of a 2D - Box represented by (5,5) to (10,15) with respect to (5,5) by 90° in anti clockwise direction.

6. Explain the document architecture and formating of files or documents in the multimedia systems.

7. Produce a sequence of transformation of refer on image in the line y = mx+c.

PART - C

Attempt any **Four** questions **(4×15=60)**

1. Explain the function of display processor in Raster scan display compare the merit and demerit of raster and vector devices.

2. Explain Beizer curve and Determine eleven points on a Beizer curve with equidistant parametric value having central points

$(x_0, y_0) = (50,180), (x_1, y_1) = (250,100), (x_2, y_2) = (600,300), (x_3, y_3) = (500,50)$.

3. Describe different types of Parallel projection used in computer graphics.

4. Describe Z buffer algorithms for visible surface detection. Also explain backface detection method.

5. What is Animation? What are the challenges faced in its implementation? Write the steps in generation of animation.

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5E1355

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5E1355

B.Tech. V- Semester (Main) Examination, Nov. - 2019
PCC/PEC Computer Sc. and Engg.
5CS4-05 Analysis of Algorithms
(Common With 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** from **Part B** and **Four** questions out of **Five** from **Part C**.*

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 materials is permitted during examination. (No material is required)

PART - A

Attempt **All** questions of Part A **(10×2=20)**

1. Define complexity with its Notations.
2. Explain what is Greedy Approach to solve the problems.
3. Difference between Greedy Algorithms and Dynamic Programming Approach.
4. What is minimum spanning tree?
5. What is Cut and Min cut?
6. Define cook's theorem.
7. Define Backtracking.
8. What is P, NP and NP hard problems?
9. Define Assignment Problem.
10. Differentiate between Feasible and Optimal solution.

PART - B

Attempt any **five** questions out of **seven** **(5×8=40)**

1. Using Quick sort algorithm sort the following sequence
   A = {13,19,9,5,12,8,7,4,21,2,6,11}.

2. Given 10 files with lengths of {28,32,12,5,84,53,91,35,3 and 11} Find the optimal merge pattern. Also calculate the total number of moves.
3. What do you understand Dynamic programing approach also illustrate its elements.
4. Using strassen's matrix multiplication algorithm compute the matrix product

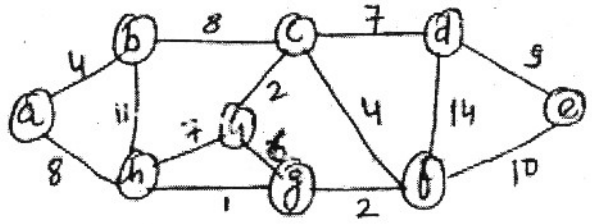
$$A=\begin{bmatrix}1 & 3\\ 7 & 5\end{bmatrix} B=\begin{bmatrix}6 & 8\\ 4 & 2\end{bmatrix}$$

5. Explain the vertex cover and set cover problem.
6. Differentiate between backtracking and branch and bound algorithms.
7. Explain the quadratic assignment problem.

PART - C

Attempt any **Four** questions out of **five** **(4×15=60)**

1. Using Prim's and Kruskal Algorithm. Find out the minimum cost for a given graph.



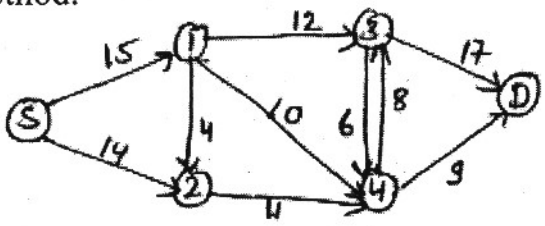
2. Find an optimal paratherization of a matrix chain product whose sequence of dimensions are.

   <5,10,3,12,5,50,6>
3. Given the two sequence of characters

   $X =< ABCBDAB >$

   $Y =< BDCABA >$

   Find out longest common subsequence.
4. Define flow M/w and solve the following flow M/w for maximum flow using ford Fulkers on method.



5. For a given text

   T = <2,3,5,9,0,2,3,1,4,1; 5,2,6,7,3,9,9,2,1>

   P = <3,1,4,1,5> & q = 13. Find the shift s for which pattern P matches the substring of text 7 using Rabin karp algorithm.

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5E1356

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5E1356

B.Tech V - Semester (Main) Examination, Nov. - 2019
PCC/PEC Computer Sc. and Engg.
5CS5-11 Wireless Communication

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 suitably be assumed and stated clearly. Units of quantities used / calculated must be stated clearly.

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory

1. What is fading in wireless channels and its types?
2. Explain frequency reserve concept in brief.
3. Describe principle of offset-QPSK.
4. Explain the concept of macrodiversity.
5. What is beam forming in multiple antenna technique? **[5×2=10]**

PART - B

(Analytical/Problem solving questions)

Attempt any four questions

1. A mobile is moving at 60 m/s in a cellular system with 930 MHz. Find the Dopplar spread, coherence time and appropriate sampling time and distance to predict small-scale fading.
2. Describe the capacity of cellular CDMA system.

3. Consider free space propagation model. Calculate the received power in dBm at a free space distance of 100 meter from the transmitting antenna, if the transmitter produced 50 watt of power and it apply to unity gain antenna with a 900 MHz carrier frequency.

4. Write a short note on digital modulation in frequency selective mobile channel

5. Describe channel state information capacity in fading and non-fading channels.

6. What are cyclic prefix and PAPR. **[4×10=40]**

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any two questions

1. Describe following in details :-
   a) MIMO systems in details.
   b) Spatial multiplexing in detail.
   c) Transmitter and receiver diversity.
2. Explain following in details:-
   a) Adaptive equalization.
   b) Zero forcing and LMS algorithms.
   c) Rake receiver
3. Describe structure of a wireless communication link with the help of suitable diagram. Explain gaussian minimum shift keying and OFDM principle. **[2×15=30]**

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5E1357

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5E1357

B.Tech. V- Semester (Main) Examination, Nov. - 2019
PCC/PEC Computer Sc. And Engg.
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 suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(5×2=10)**

1. What is the Human Computer Interaction?
2. What is sensory memory?
3. State the golden rule of Design.
4. Define Multithreading.
5. Discuss the role of Certifying Authority (CA) in HCI.

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions **(4×10=40)**

1. How do ergonomics affect the interaction between Man and machine? Explain.
2. What are the characteristics of the GUI? Explain.
3. What is One - way Analysis of ANOVA? Explain with an suitable example.
4. Explain the CMN - GOMS model in terms of HCI.
5. State and Explain Norman's seven principles for transforming Difficult Tasks into simple one's.
6. What is Object oriented programming? Discuss the role of object oriented modelling? in user Interface Design.

PART - C

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any **two** questions **(2×15=30)**

1. Explain how can you Implement Shneiderman's eight golden rules to design an efficient Interface.
2. What is Concur Task Tress (CTT)? Explain the use of task models in design cycle.
3. Write short note on :
   a) Finite state machine
   b) Agile methodology.

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5E1399

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5E1399

B.Tech. V- Semester (Main) Examination, Nov. -2019
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 suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.*

PART - A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(5×2=10)**

1. Write instruction to mask RST 7.5 and RST 6.5 interrupt simultaneously. **(2)**
2. Differentiate between maskable and non maskable interrupt. **(2)**
3. Differentiate between memory mapped I/O and peripheral mapped I/O. **(2)**
4. What are tri - state devices and explain the use of them in a bus oriented system. **(2)**
5. Write a program to find 2's complement of a number. **(2)**

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions **(4×10=40)**

1. Draw and explain the interrupt structure of 8085 microprocessor. **(10)**
2. Why are AD_7 - AD_0 lines multiplexed with the help of latching circuit ? Explain how these lines are demultiplexed. **(10)**
3. Explain how subroutines are implemented and executed. Explain call by value and call by reference. **(10)**

4. Draw T states and machine cycle for these instruction set.
   i) LDAX
   ii) STA
   iii) CMP
   iv) MVI **(10)**

5. What is the use of "stack"? Illustrate the PUSH and POP operations with help of suitable example. **(10)**

6. Write an assembly language program in 8085 microprocessor to generate Fibonacci series (count up to 8 steps) **(10)**

PART - C

(Descriptive/Analytical/Problem Solving/Design Question)

Attempt any **two** questions **(2×15=30)**

1. Draw the pin diagram of programmable peripheral interface chip (8255) and explain its various operational modes. **(15)**

2. Explain the Architecture of 8085 microprocessor in detail. **(15)**

3. A [BCD] number between 0 and 99 is stored in an R/W memory location called the "Input Buffer" (INBUF). Write a main program and a conversion subroutine (BCDBIN) to convert the BCD number into its equivalent binary number. Store the result in an memory location defined as the Output Buffer (OUTBUF). **(15)**

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5E1400

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5E1400

B.Tech. V- Semester (Main) Examination, Nov. - 2019

PCC/PEC Information Technology

5IT5-12 Software Testing and Project Management

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 suitably be assumed and stated clearly). Units of quantities used/calculated must be stated clearly.

PART- A

(Answer should be given up to **25** words only)

All questions are **compulsory** **(5×2=10)**

1. What is software testing? Define its importance.
2. What is Regression testing.
3. What is the difference between feasibility study and planning.
4. What is GUI testing.
5. Describe software size estimation.

PART - B

(Analytical/Problem solving questions)

Attempt any **four** questions **(4×10=40)**

1. Describe software project management competencies?
2. Explain Decision table based testing?
3. Describe test care generation using UML diagrams?
4. Explain object oriented testing? Describe scenario based test design.
5. Describe the Integration testing with example.
6. Explain the responsibilities of a software project manager?

PART - C

(Descriptive/Analytical/Problem Solving/Design Questions)

Attempt any **two** questions **(2×15=30)**

1. Differentiate between white box and black box testing? Also explain various types of black box and white box testing.
2. Explain the issues in object oriented testing? Explain various types of object oriented testing in detail.
3. Write the short note on :
   i) Boundary value testing
   ii) Data flow based testing
   iii) Mutation testing
   iv) Performance testing
   v) Branch coverage.

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5E5102

Roll No. _____ [Total No. of Pages : 2

5E5102

B.Tech V - Semester (Back) Examination, Nov. - 2019
Computer Sc. and Engineering
5CS2A Digital Logic Design

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

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.*

UNIT - I

1. a) Explain Basic modelling constructs in VHDL [8]

   b) Write down a behavioral flow style in VHDL for full adder [8]

OR

1. Describe ripple carry adder with its VHDL code. Also draw its simulation waveform. [16]

UNIT- II

2. a) Write short note on - [2×4=8]

   i) Package & Use classes.

   ii) Concurrent statement

   b) Describe the use of VHDL in simulation & Synthesis. [8]

(OR)

2. a) What is aliasing? Explain with suitable example [8]

   b) Explain subprogrammes and generate statements. [8]

UNIT - III

3. a) Explain Moore & Mealy machine with suitable example. [8]

b) What do you mean by state reduction techniques? [8]

(OR)

3. a) Write short note on :-

   i) ROM

   ii) FPGA

   [4×2=8]

   b) What is difference between PLA & PAL explain with suitable example. [8]

UNIT - IV

4. a) Explain the concept of races & races free assignment in detail. [8]

   b) Explain dynamic hazard with diagramme. [8]

(OR)

4. a) What is asynchronous circuit describe the design process. [8]

   b) Write short note on :-

   i) Clock skew

   ii) Setup & hold time

   [2×4=8]

UNIT - V

5. a) What is design process for FPGA [8]

   b) Explain flash memory and antifuse configuration. [8]

(OR)

5. a) What do you mean by logic synthesis? [8]

   b) What is look -up table technology explain? [8]

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5E5101

Roll No. _____ [Total No. of Pages : 2

5E5101

B.Tech. V - Semester (Back) Examination, Nov. - 2019
Computer Sc. and Engineering
5CS1A Computer Architecture
(Common for CS, IT)

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

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.*

Unit - I

1. a) Explain flynn classification. **(8)**

   b) Explain instruction cycle with example. **(8)**

(OR)

1. a) What do you mean by addressing modes? Explain different addressing modes in detail. **(10)**

   b) Explain register transfer language. **(6)**

Unit - II

2. a) Explain all types of micro operations. **(8)**

   b) Explain vector processing with example. **(8)**

(OR)

2. a) Explain RISC and CISC in detail. **(8)**

   b) What do you mean by pipeline? Explain pipe line structure in detail. **(8)**

Unit - III

3. Write short note on :

   i) Floating point representation

   ii) Adder

   iii) Array multiplier

   iv) Arithmetic pipeline **(4×4)**

(OR)

3. a) Explain Instruction pipe line with example. **(8)**

   b) Explain floating point representation in detail. **(8)**

Unit - IV

4. a) What is cache memory? Explain in detail. **(8)**

   b) Explain the function and architecture of RAM and ROM. **(8)**

(OR)

4. a) Explain the paging and swaping method in detail. **(8)**

   b) Explain virtual memory. **(8)**

Unit - V

5. a) What are the different mode of transfer? Explain in detail. **(8)**

   b) What is IOP processor. **(8)**

(OR)

5. Write short note on :

   i) DMA

   ii) Priority Interrupt

   iii) Input output interface

   iv) Interrupt subroutine. **(4×4)**

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5E5103

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5E5103

B.Tech V- Semester (Back) Examination, Nov. - 2019
Computer Sc. And Engineering
5CS3A Telecommunication Fundamentals
(Common For CS,IT)

Time : 3 Hours. **Maximum Marks : 80**

Min. Passing Marks : 26

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.*

UNIT - I

1. a) Suppose a spectrum of a channel is between 3 MHz & 4 MHz and signal to noise ratio is 24 dB, compute how many signalling levels are required to achieve the reachable data rates. Also calculate the channel capacity. **[3]**

   b) What are various transmission impairments? Explain in brief. **[5]**

   c) Explain the stop and wait ARQ protocol and also discuss the piggy backing method. **[8]**

(OR)

1. a) A transmitter is transmitting at 1 Kbps. What will happen if the receiver clock is

      i) Slower and

      ii) Faster by 1% with respect to the transmitter when a 1000 bit frame is transmitted. Also suggest methods to overcome the problem. **[3+3=6]**

   b) An NRZ-L signal is passed through a filter with r = 0.6 and them modulated onto a carrier. The data rate is 2400 bit/sec. Evaluate the bandwidth for ASK and FSK.

      Assume $\Delta f = 5KHz$ For *FSK* **[4]**

   c) Explain difference between OSI model of YCP/IP model. **[6]**

UNIT- II

2. a) What is sliding window protocol? What should be the size of window? Explain. **[8]**

   b) Find the hamming distance between two binary pattern 10101 and 11110. **[2]**

   c) Explain the frame structure of point to point protocol. What is the difference between HDLC and PPP? **[6]**

(OR)

2. a) Generate the CRC code for message 1101010101. Given Generated polynomial. **[8]**

   $g(x) = x^4 + x^2 + 1$

   b) A 1 km, 10 Mbps CSMA/CD CAN has a propagation speed of $20 m/\mu sec$. Data frames are 256 bits long, include 32 bits of header. Check sum & other overhead for the receiver to capture the channel to send a 32 bit acknowledgment frame. What is effective data rate excluding overhead, assuming there are no colloisions? **[8]**

UNIT - III

3. a) What is Hidden node and Exposed Node problem? Explain with example. **[8]**

   b) How 802.11 Architecture works? **[8]**

(OR)

3. a) What is looping problem in switching? Explain spanning. Explain spanning tree protocol in detail. **[10]**

   b) How can virtual LAN's be more efficient than Normal LAN? Explain in detail using suitable diagram? **[6]**

UNIT - IV

4. a) Why do we require switching in communication? Explain signal stage and multistage switches? **[6]**

   b) Explain ADSL, DS1, DS3 Carriers **[10]**

(OR)

4. a) Explain TDMA frame structure. **[4]**

   b) Compare TDM and FDM. **[4]**

   c) Explain time division & space - time-space division multiplexing. **[8]**

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UNIT - V

5. a) Describe following:- **[12]**

   i) M-Sequence.

   ii) IMT-2000

   iii) Walsh codes synchronization.

   b) Describe direct sequence spread spectrum technique. **[4]**

(OR)

5. a) What are various spread spectrum techniques? Explain frequency hopped spread spectrum techniques? **[8]**

   b) Explain CDMA. What is Forward and reverse CDMA channel. **[8]**

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5E5104

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5E5104

B.Tech V- Semester (Back) Examination, Nov. - 2019
Computer Sc. And Engineering
5CS4A Database Management Systems
(Common With CS , IT)

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

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.*

UNIT - I

1. a) What is a Database Management System? List four significance differences between a file processing system and a DBMS. **[2+8=10]**

   b) Consider a two-dimensional integer array of size n × m that is to be used in your favourite programming language. Using the array as an example, illustrate the difference

      i) between the three levels of data abstraction, and

      ii) between a schema and instances. **[6]**

(OR)

1. a) Explain database languages. **[4]**

   b) Draw a neat diagram of DBMS structure. **[6]**

   c) Briefly discuss about all components of storage manager. **[6]**

UNIT- II

2. a) Explain the following concepts:

      i) Primary key and foreign key.

      ii) Disjoint v/s overlapping constraints

      iii) Binary v/s ternary relationship

      iv) Aggregation. **[4×4=16]**

(OR)

2. a) Design a generalization-specialization hierachy for a motor-vehicle sales company. The company sells motorcycles, passenger cars, vans, and buses. Justify your placement of attributes at each level of the hierarchy. Explain why they should not be placed at a higher or lower level. **[4+2+2=8]**

   b) Explain the distinction between condition-defined and user-defined constraints. Which of these constraints can the system check automatically? Explain your answer. **[2+1+2=5]**

   c) Discuss any two design issues in ER model design. **[3]**

UNIT - III

3. a) Differentiate between domain relational calculus and tuple relational calculus. **[4]**

   b) Consider the following schema: **[4×3=12]**

   suppliers(*sid:integer, sname: string, address : string*)

   Parts(*pid: integer, pname: string, color : string*)

   Catalog(*sid : integer, pid : integer, cost : real*)

   The key fields are underlined and the domain of each field is listed after the field name. The Catalog relation lists the prices charged for parts by suppliers. Write the following queries in Relational Algebra:

   i) Find the sids of suppliers who supply some red part or are at '221 packer street'.

   ii) Find the names of suppliers who supply some red part.

   iii) Find the sids of suppliers who supply every red part.

   iv) Find the pids of parts supplied by at least two different suppliers.

(OR)

3. a) Write short notes on following: **[2×4=8]**

   i) Joins

   ii) Selection and Projection

3. b) Consider the following schema: [4×2=8]

Flights(*flno: integer, from : string, to : string, distance : integer, departs : time, arrives : time*)

Aircraft(*aid : integer, aname : string, cruiserange : integer*)

Certified (*eid : integer, aid : integer*)

Employees (*eid : integer, ename : string, salary : integer*)

Note that the employees relation describes pilots and other kinds of employees as well; every pilot is certified for some aircraft and only pilots are certified to fly. Write the following queries in Domain Relational Calculus:

i) Find the eids of pilots certified for some boeing aircraft.

ii) Find the aids of all aircrafts that can be used on non stop flights from Bonn to Madras.

iii) Identify the flights that can be piloted by every pilot whose salary is more than 1Lac rupees.

iv) Find the eids of Employees who make the highest salary.

UNIT - IV

4. Write short notes on: [8+4+4=16]

i) Aggregate Functions

ii) Null Values

iii) Dynamic SQL

(OR)

4. Consider the following INSURANCE schema: [4×4=16]

person (*driver-id, name, address*)

car(license, *model, year*)

accident(*report-number, date, location*)

owns (*driver-id, license*)

participated (*driver-id, car, report-number, damage-amount*)

Construct the following SQL queries for this relational database:

a) Find the number of accidents in which the cars belonging to "John Smith" were involved.

b) Add a new accident to the database; assume any values for required attributes.

c) Delete the Mazda belonging to "John Smith".

d) Update the damage amount for the car with license number "AABB2000" in the accident with report number "AR2197" to $3000

UNIT - V

5. What is Normalization? Explain 1NF, 2NF and 3NF with example. **[16]**

(OR)

5. a) Compute the closure of the following set F of functional dependencies for relation schema R = (A, B, C, D, E) **[8+4+4=16]**

$A \rightarrow BC$
$CD \rightarrow E$
$B \rightarrow D$
$E \rightarrow A$

b) List the candidate keys for R.

c) Using the functional dependencies of Q.5(a), compute the canonical cover F_c

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5E5105

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5E5105

B.Tech. V- Semester(Back) Examination, November - 2019
Computer Sc. And Engineering
5CS5A Operating Systems
(Common for CS,IT)

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

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.*

UNIT - I

1. a) Describe some of the challenges of designing operating systems for mobile devices compared with designing operating systems for traditional PC? **(8)**

b) What are the major activities of an operating system with regard to process management & memory management? **(8)**

(OR)

1. a) Describe the differences between symmetric and asymmetric multiprocessing. What are the advantages and disadvantages of multiprocessor systems? **(6)**

b) What are the advantages of peer - to - peer systems over client - server systems? **(6)**

c) What is the purpose of system calls? Explain in detail? **(4)**

UNIT - II

2. a) Suppose that the following processes arrive for execution at the times indicated. Each process will run for the amount of time listed. Answer the questions, use preemptive scheduling, and base all decisions on the information you have at the time the decision must be made.

Process	Arrival time	Burst time
P_1	0.0	8
P_2	0.4	4
P_3	1.0	1

What is the average turnaround time for these process with the FCFS and SJF? **(10)**

b) Explain the difference b/w preemptive & non - preemptive scheduling in detail? **(6)**

(OR)

2. Consider the following set of processes, with the length of the CPU burst given in milliseconds :

Process	Priority	Burst time
P_1	2	2
P_2	1	1
P_3	4	8
P_4	2	4
P_5	3	5

The process are assumed to have arrived in the order : P_1, P_2, P_3, P_4, P_5 at all time 0.

Find :

a) Draw four gautt charts that illustrates the execution of these processes using the following scheduling algorithms :

i) FCFS ii) SJF

b) What is the turnaround time of each process for each of the scheduling algorithm?

i) FCFS ii) SJF

c) What is the waiting time of each process for FCFS and SJF scheduling algorithm. **(16)**

UNIT - III

3. a) What are the necessary conditions that can arise deadlock situation? Explain in Detail? **(8)**

b) Explain the difference between Paging and Segmentation? **(8)**

(OR)

3. a) Explain the difference between internal and external fragmentation? **(8)**

b) Consider a logical address space of 256 pages with a 4 kB page size, mapped onto a physical memory of 64 frames.

Find :

i) How many bits are required in the logical address?

ii) How many bits are required in the physical address? **(8)**

UNIT - IV

4. a) Explain the concept of Deadlock prevention in detail? **(8)**

b) What is Belady's Anomaly? In which algorithm does it occur? **(8)**

(OR)

4. Consider the following page reference string : 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six and seven frames?

Note : (Remember that all frames are initially empty, so the first unique pages will cost one fault each).

- LRU Replacement
- FIFO Replacement
- Optimal Replacement **(16)**

UNIT - V

5. a) Explain the layered architecture of file system in detail? **(8)**

b) Explain the purpose and use of the following : open ( ) and close ( ) operations with an examples. **(8)**

(OR)

5. a) Explain the classification of Allocation methods? **(8)**

b) Explain the concept of spooling with all its types and its advantages and disadvantages? **(8)**

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5E5106

Roll No. _____ [Total No. of Pages : 2]

5E5106

B.Tech V- Semester (Back) Examination, Nov. - 2019
Computer Sc. and Engg.
5CS6.1A Advanced Data Structure
(Common for CS,IT)

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

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.*

UNIT - I

1. a) Explain the LLr, LRr, LLb, LRb imbalances in a Red-Black tree with example. **[8]**

b) What is dynamic order statistics? Explain the advantages of splay tree in representation of dictionaries. **[8]**

(OR)

1. a) Explain the operations on weighted balanced tree in detail. **[8]**

b) Explain Interval trees with the help of example. **[8]**

UNIT- II

2. a) Explain the implementation of a binomial heap and its operations with suitable example in detail. **[10]**

b) Define Amortization analysis with the help of suitable example. **[6]**

(OR)

2. a) Write short notes on **[8]**

i) 2-3-4 trees

ii) Potential function of Fibonacci Heap.

b) Show that if only the messageable-heap operations are supported, the maximum degree D(n) in an n-node Fibonacci heap is at most [log n]. **[8]**

UNIT - III

3. Explain ford Fulkerson max flow algorithm with the help of example. [16]

(OR)

Define these terms. [16]

3. a) Isomorphic components.

   b) Connected components And Articulation point.

   c) Cut vertices.

   d) Planer And Dual graph.

UNIT - IV

4. What is SORTING NETWORK? Explain zero-one principle and bitonic sorting and merging network sorter in detail. [16]

(OR)

4. a) Explain priority queue and concatenable queue in 2-3 tree in detail. [8]

   b) Explain operation on disjoint sets and its union find problem. [8]

UNIT - V

5. a) Explain notation of elementary number theorem also explain division theorem. [8]

   b) What do you mean by modular Arithmetic? [8]

(OR)

5. a) Which algorithm is used for computing the greatest common divisor of two integers? Prove the supporting recursion theorem. [8]

   b) Write short notes on

      i) Primarily testing.

      ii) Integer Factorization. [8]

5E5107

Roll No. _____ [Total No. of Pages : 3

5E5107

B.Tech V Semester (Main&Back) Examination, Nov. - 2019
Computer Sc. and Engineering
5CS6.2A Digital Signal Processing
(Common For CS And IT)

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 26

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.*

UNIT - I

1. a) Check whether the following systems are linear or non-linear. **[2x4=8]**

   i) $y(n) = ax(n) + b$

   ii) $y(n) = e^{x(n)}$

   b) Check whether the following systems are linear and time invariant. **[2x4=8]**

   i) $y(n) = n[x(n)]^2$

   ii) $y(n) = a[x(n)]^2 + bx(n)$

OR

   a) If the impulse response of a linear time invariant system is $h(n) = \{1, 2, 1, -1\}$, then determine the response of the system to the input signal $x(n) = \{1, 2, 3, 1\}$ **[8]**

   b) Check the stability condition for the DSP system described by the following equation $y(n) = a^n \mu(n)$ **[8]**

UNIT- II

2. a) Explain the various properties of z-transform. [8]

b) Determine the z-transform of the following finite duration signals.

i) $x(n) = \{2, 4, \underset{\uparrow}{5}, 7, 0, 1, 2\}$

ii) $x(n) = \{3, 1, 2, \underset{\uparrow}{5}, 7, 0, 1\}$ [2x4=8]

(OR)

a) Determine the inverse z-transform of $X(Z) = \frac{Z}{3Z^2 - 4Z + 1}$ if the ROC are

i) $|Z| > 1$

ii) $|Z| < 1/3$ and

iii) $1/3 < Z < 1$ [8]

b) Find x(n) if $x(z) = \frac{1 + \frac{1}{2}z^{-1}}{1 - \frac{1}{2}z^{-1}}$ [8]

UNIT - III

3. a) State sampling theorem. What do you mean by Aliasing effect? How can it be eliminated. [8]

b) Explain the interpolation technique for the reconstruction of continuous time signal from its samples. [8]

(OR)

a) Given the continuous time signal $x(t) = 10\ cos 200\pi t$

Determine

i) Minimum sampling rate required to avoid aliasing.

ii) If sampling frequency f_s= 600 Hz, what is the discrete time signal $x(n)$

or $x[nTs]$ obtained after sampling. [8]

b) Determine the Nyquist rate corresponding to each of the following signals. [8]

i) $x(t) = 1 + \cos(1000\pi t) + \sin(2000\pi t)$

ii) $x(t) = \frac{1}{2\pi}\cos(1000\pi t)\cos(4000\pi t)$

UNIT - IV

4. a) Given $x(n) = \{1,2,3,4,4,3,2,1\}$, Determine $X(K)$ using DIT-FFT algorithm. [8]

b) Compute the convolution $y(n) = x(n) \,\&\, h(n)$ of the signals. $x(n) = \{1,1,\underset{\uparrow}{0},1,1\}$ & $h(n) = \{1,-2,-3,\underset{\uparrow}{4}\}$ [8]

(OR)

a) Given $x(n) = \{1,-1,-1,-1,1,1,1,-1\}$. Determine $X(K)$ using DIF FFT algorithm. [8]

b) Define Discrete Fourier transform. Explain its properties. [8]

UNIT - V

5. a) Determine the cascade and parallel realisation of

$$H(Z) = \frac{\left(1 - Z^{-1}\right)^3}{\left(1 - \frac{1}{2}Z^{-1}\right)\left(1 - \frac{1}{8}Z^{-1}\right)}$$ [8]

b) Explain the IIR filter design by bilinear transformation. [8]

(OR)

a) Explain the following

i) Butterworth Filters

ii) Cheyshev Filters. [4×2=8]

b) For the analog transfer function.

$$H(S) = \frac{1}{(S+1)(S+2)}$$

Determine $H(Z)$ using impulse invariant technique. Assume T = 1 sec. [8]
