M.SC.(COMPUTER SCIENCE) PART –I

Principles of Complier Design I &
Principles of Complier Design II

(DEC - 2017)

Q.P. Code: 23354

(3 hours) **[Total Marks: 75**

N. B.: (1) Attempt any **three** questions from **each section.**
(3) **Figures** to the right indicate full marks.
(4) Assume additional data if necessary but state the same clearly.
(5) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.

Section I

1 a. Consider a string a=b*(c-d)+(c*d-100) **07**
Show the steps which will be followed by compiler to process the statement in each phase.
b. Explain the concept of LEX with respect to following points: **06**
Definition, syntax and example.

2 a. How to minimize DFA? Explain appropriate algorithm with suitable example. **05**
b. Draw DFA for accepting a valid identifier name. Also mention regular expression for the same. **05**
c. Explain the representation of an array in two dimensional using Row major form. **03**

3 a. Compute First and Follow for the following grammars: **06**
1) S -> aB/bA
A-> bAA/aS/a
B-> aBB/bS/b
2) S -> 0A1/0A0
A->0A0/1
3) S -> A*B/*A
A->#B/B#
B->*A/#
b. What is the difference between static storage and dynamic storage allocation? **04**
c. Construct CFG for a language over {0, 1} which accepts a string starting with 0 and ending with 1. **03**

4 a. Consider the following grammar and input string. Parse the string using bottom up parsing technique using the concept of stack. **06**
S→ S+C/B
B → B&C/C
C→*C/a/b
String = *a&*b
b. Discuss the concept of predictive parsing with suitable diagram. Also mention when the grammar is considered as LL(1)? **05**
c. State the advantages of LR parsers. **02**

5 a. Consider the following Production Rules and Parsing Table: **06**

1. S' → S
2. S → aABe
3. A → Abc
4. A → b
5. B → d

state	Action						GOTO		
	a	b	c	d	e	$	S	A	B
0	s2						1		
1						acc			
2		s4						3	
3		s6		s7					5
4		r4		r4					
5					s8				
6			s9						
7					r 5				
8						r2			
9		r3		r3					

For the string "**abbcbcde$"** show LR(0) parsing moves.

b. Check whether following Grammar is in SLR (1) or not? **06**

S→CC

C→cC/d

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Section II

6 a. What is a syntax direct translation? Explain its types with suitable examples. **04**

b. Write syntax direct translations for the following Grammar. The Production Rules are as follows: **04**

S →E$

E →E+E

E →E*E

E →I

I →I digit

I →digit

c. Convert the given infix expression into postfix: **04**

a) a*(b-c)+d*e

b) a+(b*c)/(-b*-c+d)

7 a. Explain the format of symbol table by giving suitable example. **04**

b. Discuss the format of activation records? **04**

c. Write translation rules for following: **04**

Type →struct {fieldlist}
| ptr
|char
| int
| float
| double

Fieldlist →fieldlist field ;
| field

Field →type id | field {integer}]

8 a. Explain machine independent optimization technique. **04**

b. State the need of DAG and explain the concept with suitable example. **04**

c. Convert the following code into flow graph: **04**

1) C=1
2) Goto 5
3) M=1
4) C=B*3
5) B=B+1
6) If C <=20 goto 3

9 a. Define dominators and mention properties of the same. **03**

b. What is directed acyclic graph?(DAG)? Explain algorithm for constructing DAG. **05**

c. Discuss loop unrolling and loop jamming techniques. **04**

10 a. Explain different types of addressing modes. **06**

b. Consider the following Three-Address code statements and write possible code sequence in assemble level language. [Assume suitable machine architecture] **06**

T=A-B
U=A-C
V=T+U
W=V+U

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M.SC.(COMPUTER SCIENCE) PART –I

Digital Signal Processing I &
Digital Signal Processing II

(DEC - 2017)

Q.P. Code: 23718

(3 hours) **[Total marks: 75**

N. B.: (1) Attempt any **three** questions from **each section.**
(2) Answers to the **two sections** must be written in **same answer sheet**.
(3) **Figures** to the **right** indicate **full marks**.
(4) **Assume additional data if necessary** but state the same clearly.
(5) **Symbols** have their **usual meanings** unless stated otherwise.
(6) Use of **simple calculator** and statistical tables are **allowed**.

Section I

1 a. What is twiddle factor? Find the IDFT of sequence with DFT [8, -2, 0,-2] **6**

b. Define a rectangular window and derive the frequency response of the rectangular window. **6**

2 a For each impulse response listed below, determine the corresponding system is **6**
A. Causal B. stable
i. $h(n) = \delta(n) + \sin(\pi n)$
ii. $h(n) = e^{2n}u(n-1)$

b What is pole-zero plot? Why it is necessary? Draw pole-zero diagram for a system having transfer function $H(z) = 1 + z^{-4}$ **6**

3 a. Explain Remez Exchange algorithm used in the design of Optimal FIR filters. **6**

b. What are maximal Ripple filter? How do you obtain maximal ripple filters? **6**

4 a. Using block diagram explain analog to digital conversion process. **6**

b. Differentiate between fixed-point arithmetic and floating-point arithmetic. Find 2's compliment of 0.0101 **6**

5 a. What is purpose of Chirp Z transform algorithm? Explain algorithm in detail. **6**

b. Explain in detail the bilinear transformation technique used for digitizing an analog filter. **6**

Section II

6 a. State and explain general form of a two dimensional difference equation for a realizable filter. **6**

b. Describe two-dimensional z transform and compute two-dimensional z-transform of following sequence: **7**

$$x(n_1, n_2) = \begin{cases} K^{n1}u_0(n_1-n_2) & n_1,n_2 > 0 \\ 0 & \text{otherwise} \end{cases}$$

7 a Give a simple (5 x 4) add-shift multiplier. How this multiplier can be realized? **6**

b Discuss in detail Direct Form FIR filter. **7**

8	a.	Discuss quantization effects in FFT algorithms.	**6**
	b.	Explain in place 16 point, radix 4 DIT FFT with normally ordered input and digit reversed output.	**7**
9	a.	Discuss real time convolution via FFT using a single RAM and one AE.	**6**
	b.	Give and explain structure of a simplified general purpose computer.	**7**
10	a.	Explain Homomorphic Processing of speech.	**6**
	b.	Draw and explain block diagram of a modern RADAR system.	**7**

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M.SC.(COMPUTER SCIENCE) PART –I

Mobile Computing and Computer Simulation Modeling

(DEC - 2017)

Q.P. Code: 22886

(3 Hours) **Max. Marks: 75**

N.B: 1. **Attempt any three** questions from each section
2. Answers to the **two sections must** be written in **same answer sheet**.
3. **Figures** to the **right** indicate **full marks**.
4. Assume additional data if necessary but state the same clearly.
5. **Symbols have their usual meanings**, Use of **Simple calculators** and statistical tables is **allowed**.

Section I

1.	A	Briefly describe the signal propagation ranges.	**06**
	B	Explain different multiplexing techniques.	**06**
2.	A	Write a note on spread spectrum technology.	**06**
	B	Describe the Architecture of the GSM system.	**06**
3.	A	Write a note on types of handover in cellular networks.	**06**
	B	Discuss about architecture of 802.11 infrastructure network.	**06**
4.	A	Write a note on agent advertisement and mobile host registration.	**06**
	B	Explain the influences of mobility on TCP-mechanisms.	**06**
5.	A	Write a note on snooping TCP.	**06**
	B	What is Bluetooth? Explain in detail.	**06**

Section II

6.	A	What is Computer Simulation? State its advantages and disadvantages.	**06**
	B	Write a note on Object oriented simulation.	**07**
7.	A	Briefly explain the concept of Continuous and discrete probability distributions.	**06**
	B	Write a note on queuing theory and queuing model.	**07**
8.	A	State properties of random numbers.	**06**
	B	Write a note on tests for random numbers.	**07**
9.	A	Distinguish between verification and validate used during simulation activities.	**06**
	B	What is meta modeling? Explain.	**07**
10.	A	Briefly describe about Chi-Square goodness of fit test.	**06**
	B	Write a note on convolution method. Give example.	**07**

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M.SC.(COMPUTER SCIENCE) PART –I
Data Warehousing and Mining and
Advanced Database Systems
(DEC - 2017)

Q.P. Code: 22890

(3 Hours) **Max. Marks: 75**

N.B: 1. **Attempt any three** questions from each section
2. Answers to the **two sections must** be written in **same answer sheet**.
3. **Figures** to the **right** indicate **full marks**.
4. Assume additional data if necessary but state the same clearly.
5. **Symbols have their usual meanings**, Use of **Simple calculators** and statistical tables is **allowed**.

Section I

1. A Define Data Warehouse. Explain how Data warehouse is different than Operational DBMS **06**
   B What is Information Package Diagram? Explain importance and structure of the Information Package Diagram **06**

2. A What is star Schema? State Star Schema Keys. Also State advantages of using Star Schema. **06**
   B State and explain types of OLAP Models. **06**

3. A Explain the two step Process of Decision Tree in Classification. **06**
   B Write a short note Classification based on Neural Network **06**

4. A Create Dendrogram for the following matrix used in hierarchical clustering technique. **06**

	A	B	C	D	E
A	0	1	2	2	3
B	1	0	2	4	3
C	2	2	0	1	5
D	2	4	1	0	3
E	3	3	5	3	0

   B Explain in brief Agglomerative Algorithm **06**

5. A Explain Web Mining Taxonomy in detail. **06**
   B State and Explain Topological relationships exist in Spatial Database. **06**

Section II

6. A What is mean by Object Oriented Database? State characteristics of Object Oriented Database. **06**
   B Comment on Similarity and dissimilarity between OODBMS and ORDBMS. **07**

7. A Explain in brief Architecture of Parallel Databases. **06**
   B Explain with Example: **07**
      i. Intra-query parallelism.
      ii. Intra operation Parallelism
      iii. Inter Operation Parallelism

8. A State the advantages and disadvantages of Replication. **06**
   B Define Fragmentation. State and explain different types of Fragmentations. **07**

9. A What is the difference between XML Schema and XML DTD? **06**
   B State and explain difference between structure and unstructured data types. Explain various operations that can be performed on Structured data type. **07**
10. A Explain how GIS data can be describe using vector format by giving suitable example. **06**
   B Write a short not on Temporal databases. **07**

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