M.SC (COMPUTER SCIENCE) PART-I

PRINCIPLES OF COMPLIER DESIGN I &

PRINCIPLES OF COMPLIER DESIGN II

(JUNE - 2018)

Q. P. Code: 39807

Time: 3 Hours **Marks: 75**

Instructions:

1. Attempt any **THREE** questions from each section
2. Answer 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 and tables have their usual standard design unless stated otherwise.
6. Use of Simple calculators and statistical tables is allowed.

Section I

1 A Define Regular Expression and Draw Standard Regular Expressions 6

B Explain the role of Lexical Analysis Phase of compiler. 6

2 A Explain the conversion of NDFA to DFA with an example. 6

B Explain the term Top-Down parsing and Left Recursion. 6

3 A Define SPF and Write down construction of SPF Consider the following Grammar 6

E →ET

E → T

T → F*F

F → (E)

F→i

Find First, First + and First * matrices for above Grammar.

B Consider the following Grammar 6

Z →bMb

M → a

M → (L

L → Ma)

	Z	b	M	L	a	(	)
Z	0	0	0	0	0	0	0
b	0	0	=	0	<	<	0
M	0	=	0	0	=	0	0
L	0	>	0	0	>	0	0
a	0	>	0	0	>	0	=
(	0	0	<	=	<	<	0
)	0	>	0	0	>	0	0

Using the above SPM matrix parse the string b(aa)b.

4	A	Explain the term Left Factoring and Back Tracking	6
	B	Find First and Follow Function for the following grammar: E → TE´ E´ → +TE´ E´ → λ T → FT´ T´ → *FT´ T´ → λ F → (E) F → id	6
5	A	Write down parsing algorithm for Predictive Parser	6
	B	Explain in brief LR (1) parsing technique.	6

Section II

6	A	Convert the following from infix to postfix: (B^2-4*A*C)^(1/2) Convert the following from postfix to infix: 2 10 4 * 5 / + 9 3 - -	6
	B	Create a Quadraple for the given Expression : -(A+B) * (C+D) – (A+B+C) Also find Triple and Indirect Triple for the above expression.	7
7	A	Explain any two Local Optimization Techniques	6
	B	Define Dominator, Write down properties of dominators and Algorithm to find Dominator.	7
8	A	Explain the concept Reducible flow graph and Depth first Spanning Tree	6
	B	Explain the concept of DAG with an example. Write algorithm for the same.	7
9	A	Write a short note on LOOP JAMING and LOOP UNROLLING.	6
	B	Explain Depth First Search with an example.	7
10	A	Explain briefly the concept of Usage Count.	6
	B	Explain the general environment for Machine Architecture.	7

M.SC (COMPUTER SCIENCE) PART-I

DIGITAL SIGNAL PROCESSING I &

DIGITAL SIGNAL PROCESSING II

(JUNE - 2018)

Q.P. Code: 23719

(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. For each impulse response listed below, determine the corresponding system is **6**
   i. Causal ii. Stable
   a. $h(n) = \sin(n\pi/2)$
   b. $h(n) = 2^n u(-n)$

   B. Determine direct form-II realization for following LTI system **6**
   $y(n) = x(n) - x(n-1) + 2x(n-2) - 3x(n-4)$

2. A. Consider second order LTI system. Discuss cascade form realization of FIR systems. **6**

   B. Realize the system given by difference equation, **6**
   $y(n) = -0.1y(n-1) + 0.3y(n-2) + 0.5x(n) - 0.14x(n-2)$
   Use parallel form, Is this system stable? Determine its impulse response.

3. A. Explain impulse invariant transformation technique for digitizing an analog filter. **6**

   B. Compare between impulse invariant and bilinear transformation for Elliptic filters. **6**

4. A. What is the purpose of Bluestein's algorithm? How it is achieved? State the major significance of Bluestein algorithm. **6**

   B. Explain construction of an eight-point DFT from two four-point DFTs. **6**

5. A. Compare between fixed-point arithmetic and floating-point arithmetic. Find 2's compliment of 0.11001 **6**
   Why Radix-2 FFT is better algorithm for calculating DFT of a discrete signal as compared to direct computation of DFT using formula. **6**

Section II

6. A. Design an eight-bit parity tree by generating a logical one for even parity and a logical zero for odd parity. **6**

   B. What is fan-in and fan-out? Design a system to determine smallest of two-3 bit numbers. Assume the number system deals with only positive numbers. **7**

7.	A.	Give a simple (5 x 4) add-shift multiplier. How this multiplier can be realized?	**6**
	B.	Discuss implementation of FIR filter using Booth algorithm.	**7**
8.	A.	Discuss quantization effects in FFT algorithms.	**6**
	B	Discuss any two hardware considerations for Radix 2 Algorithms	**7**
9.	A.	Explain Homomorphic Processing of speech.	**6**
	B	Draw and explain block diagram of a modern RADAR system.	**7**
10.	A.	Explain digital realization of a running sum.	**6**
		What is parallel processing? How it can speed up FFT operation?	**7**

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M.SC (COMPUTER SCIENCE) PART-I

MOBILE COMPUTING & COMPUTER SIMULATION

(JUNE - 2018)

Q.P. Code : 38138

(2½ 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.
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6. Use of Simple calculators and statistical tables is allowed.

Section I

1	A	Write a short note on Multiplexing.	6
	B	Explain the term (i) SDMA (ii) TDMA with proper example.	6
2	A	What do you mean by Cyclic Repetition of Data in broadcasting?	6
	B	How Security is handle in Bluetooth?	6
3	A	What are responsibilities of Mobile Network Layer?	6
	B	What are techniques are using to control the congestion at mobile transport layer?	6
4	A	What is the difference between traditional TCP and Mobile TCP?	6
	B	Explain the process of Tunneling and Encapsulation at mobile network layer.	6
5	A	Write a short note on Wireless transport layer Security.	6
	B	Explain the following term (i) Mobile database (ii) Wireless telephony application.	6

Section II

6	A	Explain steps in simulation study along with the flow chart.	6
	B	Write short note on "Application of simulation".	7
7	A	Explain the concept of discrete event simulation with example.	6
	B	The number of accident in a year to taxi driver in Mumbai follow a Poisson distribution with mean equal to 3. Out of 100 taxi drivers, find approximately the number of driver with: a) No accident in year. b) More than 3 accident in year.	7
8	A	Explain various test for random numbers and State hypothesis for testing property of random number.	6
	B	A Company that manufactures chocolate bars is particularly concerned that the mean weight of a chocolate bar not be greater than 100 gm ounces. Past experience allows you to assume that the standard deviation is 5 gm. A Sample of 60 chocolate bars is selected, and the sample mean is 102 gm. Using the 0.01 level of significance, is there evidence that the population mean weight of the chocolate bars is greater than 100 gm?	7

TURN OVER

9 A Explain Weibull distribution with its three parameters. 6

B Consider the following sequence of numbers: 7

0.12	0.01	0.23	0.28	0.89	0.31	0.64	0.28	0.83	0.93
0.99	0.15	0.33	0.35	0.91	0.41	0.60	0.27	0.75	0.88
0.68	0.49	0.05	0.43	0.95	0.58	0.19	0.36	0.69	0.87

Test whether 3^{rd}, 8^{th}, 13^{th} numbers in the sequence are auto correlated where α=0.05.

10 A How is Pokers test used for testing independence? 6

B Consider the sequence of numbers. 7

0.09	0.42	0.23	0.68	0.89	0.72	0.12	0.45	0.08	0.32
0.53	0.13	0.65	0.97	0.14	0.49	0.55	0.46	0.77	0.28
0.81	0.63	0.40	0.57	0.02	0.16	0.33	0.86	0.99	0.22
0.76	0.48	0.61	0.39	0.43	0.78	0.20	0.35	0.17	0.93

Determine whether there are an excessive number of runs above or below the mean. Use
α = 0.05 and mean = 0.495.

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M.SC (COMPUTER SCIENCE) PART-I

DATA WAREHOUSING AND MINING & ADVANCED DATABASE SYSTEMS

(JUNE - 2018)

Q. P. Code: 10410

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.
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Section I

1	A	What is Data Warehouse? What are the benefits of Data Warehouse? Explain it with the help of example?	6
	B	Explain the different phases of project planning in data warehousing projects.	6
2	A	Define MOLAP and ROLAP, Explain OLTP and how DW supports OLTP?	6
	B	Explain the different types of Dimensional Schemas with the help of diagram?	6
3	A	Discuss different Decision tree-based algorithms.	6
	B	What are outliers? What problems are faced while clustering real life databases?	6
4	A	What is clustering? What are the requirements of clustering?	6
	B	Explain the concept market basket analysis by giving two examples.	6
5	A	What is Descriptive and Predictive data mining?	6
	B	Explain briefly Association Rules. How is association rules mined from large databases?	6

Section II

6	A	Design a generalization-specialization hierarchy 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?	6
	B	Explain the features of Object Oriented Databases?	7
7	A	What do you mean by data fragmentation? Why is fragmentation useful in distributed database? Explain in brief different type of fragmentation.	6

	B	What is Active database? Explain with examples.	7
8	A	Explain spatial databases. What is a geographic information system? Explain	6
	B	What are three main types of XML documents? What is the use of XML DTD?	7
9	A	What do you understand by data partitioning? What are the different types of partitioning techniques?	6
	B	When do you say that **datalog** rule is safe? Consider the following rule set Person(Priya) Person(Sameer) Rich(Priya) ls the rule Likes(X, Y):-Rich(Y) is safe? If unsafe make it safe and vice versa.	7
10	A	Explain how GIS data can be describing using vector format by giving suitable example?	6
	B	Write a short note on speed-up and scale-up curves. Compare the different Parallel database architecture with respect to speed up and scale up.	7

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