

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 Define : 6
 1) Ambiguity 2) Finite Automata 3) Parser
- B Define regular expression and draw the transition diagram for the following expressions 6
 1) ab^*cbb 2) $(0^* + 1) . (01^*)$
- 2 A Explain call by reference, call by value and call by Name. 6
- B Explain backtracking with suitable example 6
- 3 A Consider the following grammar. 6
 $S \rightarrow iCtS$
 $S \rightarrow iCtSeS$
 $S \rightarrow a$
 $C \rightarrow b$
 Show the step by step derivation of the string $ibtibtaea$ and also draw the parse tree for the string.
- B What is left recursion? Eliminate the left recursion from the following grammar. 6
 $S \rightarrow Aa \mid b$
 $A \rightarrow Ac \mid Sd \mid \epsilon$
- 4 A Consider the following grammar. 6
 $E \rightarrow TE' \quad E' \rightarrow +TE' \mid \epsilon$
 $T \rightarrow FT' \quad T' \rightarrow *FT' \mid \epsilon$
 $F \rightarrow (E) \mid id$
 Define and compute FIRST and FOLLOW for each non-terminal.
- B Write the method for finding precedence function. Consider the matrix and find the precedence function for the same. 6
- | | | | | |
|----|----|---|---|----|
| | id | + | * | \$ |
| id | | > | > | > |
| + | < | > | < | > |
| * | < | > | > | > |
| \$ | < | < | < | |
- 5 A Explain recursive descent parser with suitable example. 6
- B Consider the operator precedence relation matrix of Q 4(b) and parse the string: $id + id * id$ 6

Section II

- 6 A Illustrate the evaluation of postfix expression using stack. 6
- B Write and explain the quadruple code for following expressions/statement:
P < Q OR T > S OR T < U 7
- 7 A Explain the advantage and disadvantages of self-organizing list 6
- B Explain briefly the symbol table 7
- 8 A Explain loop optimization with suitable example. 6
- B What is code motion? List various conditions imposed to make the code motion legal. 7
- 9 A Write the code sequence for the following expression 6
W:=(A-B) +(A-C) +(A-C)
- B Explain constant folding by giving example. 7
- 10 A What is loop unrolling? Give example 6
- B Differentiate between machine dependant and machine independent optimization? 7

M.Sc (Comp.Sci.) [Part – I]

Digital Signal Processing I & Digital Signal Processing II

(May-2017)

QP Code : 75549

Section Name: I

(3 Hours)

[Total Marks : 75

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Section I

- | | | | |
|---|---|---|---|
| 1 | A | Define twiddle factor. Also Find ...
i. IDFT of a sequence $\{10, -2+2j, -2, -2-2j\}$
ii. DFT of a sequence $\{2, 1, 1, 2\}$ | 6 |
| | B | Define Z-transform. Assume two finite duration sequences $x_1(n)$ and $x_2(n)$ are linearly combined. Let $x_3(n) = a x_1(n) + b x_2(n)$. What is Z-transform of $x_3(n)$? Establish relation between DFT and Z-transform. Explain the relation between the Z-transform and fourier transform | 6 |
| 2 | A | Give advantages and disadvantages of FIR filters. State and explain at least three characteristics of FIR filters | 6 |
| | B | Explain in brief the Remez Exchange Algorithm in the design of optimal FIR filter | 6 |
| 3 | A | Explain the Types of Quantization in digital filter. Explain each. | 6 |
| | B | Explain the forward difference method for mapping of differential | 6 |
| 4 | A | Draw the 4-point DITFFT butterfly diagram Calculate the DFT of $x(n) = [2, 1, 0, 2]$ | 6 |
| | B | Write the short note of the chirp- Z transform algorithm and write its advantage. | 6 |
| 5 | A | Write Short note on Blueinstiens Algorithm | 6 |
| | B | Write the short note of decimation in frequency Algorithm | 6 |

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Section II

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|----|---|---|---|
| 6 | A | Design the 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 largest of two -3 bit numbers. Assume the number system deals with only positive numbers | 7 |
| 7 | A | Discuss implementation of FIR filter using Booth algorithm. | 6 |
| | B | Differentiate between TTL and CMOS logic Family | 7 |
| 8 | A | What are the advantages and disadvantage of FDP structure | 6 |
| | B | Write a note on MOS Chip | 7 |
| 9 | A | Explain how real time convolution is carried by FFT using a Single RAM and One Arithmetic Element | 6 |
| | B | Explain FFT indexing with respect to bit reversal and digital reversal of fixed indices | 7 |
| 10 | A | Write a note on Radar Application: Air Traffic Control(ATC) Radar System | 6 |
| | B | Explain with neat labeled diagram pitch period estimation algorithm. Write a note on Pitch measurements for extreme conditions. | 7 |

M.Sc (Comp.Sci.) [Part – I]
Mobile Computing
And Computer Simulation Modelling
(May-2017)

QP Code : 75603

(3 Hours)

[75 marks]

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Section I

- | | | | |
|---|---|---|---|
| 1 | A | Differentiate between portability and mobility. Give examples of mobile and wireless devices. | 6 |
| | B | Write a short note on code division multiplexing. | 6 |
| 2 | A | What are near and far terminal? And write problems cause by near and far terminals. | 6 |
| | B | Write short note on Functional architecture of GSM system | 6 |
| 3 | A | Write applications of satellite and also explain different handovers in satellite. | 6 |
| | B | Explain digital audio broadcasting. | 6 |
| 4 | A | Write a note on Bluetooth. | 6 |
| | B | Explain Dynamic host configuration protocol. | 6 |
| 5 | A | Explain Indirect TCP. | 6 |
| | B | Write note on wireless datagram protocol. | 6 |

Section II

- | | | | |
|---|---|---|---|
| 6 | A | Write down the pdf, mean, mode and cdf of Triangular distribution | 7 |
| | B | A cola-dispensing machine set of dispensing on average 7.00 ounces of cola per cup. The standard deviation is 0.10 ounces. The distribution amounts dispended follows a normal distribution (Given area under slandered normal curves; from $z = -\infty$ to 2.5 is 0.9938 and from $z = -\infty$ to 1 is 0.8413) | 6 |
| | | i) What is the probability that the machine will dispense between 7.10 And 7.25 ounces of cola? | |
| | | ii) What is the probability that the machine will dispense 7.25 ounces Of cola or more? | |
| 7 | A | A barber shop has two barbers. Assumes that the customer arrive in a Poisson fashion at the rate of 5 per hour. Each barber serves customers according to an exponential distribution with the mean of 15 minutes. | 7 |
| | | i) What is the probability that a customer will not have to wait for hair cut? | |
| | | ii) What is the expected number of customers in the queue? | |
| | B | The time intervals between dial up connation to an Internet service provider are exponentially distributed with a mean of 15 seconds. Find the probability that the | 6 |

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third dial up connection occurs after 30 seconds have elapsed.

- 8 A What is Pseudo-Random Number? What are the properties and considerations of Pseudo-Random Number? 6
- B Test whether the 3rd, 8th 13th and so on, numbers in the following sequencing are auto correlated, use $\alpha = 0.05$ and table value = 1.96 Observations : 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.
- 9 A Write an algorithm to generate a sequence of 2-digit random numbers using Linear Congruential method. Also generate three random numbers between 0 and 1 with $X_0 = 37$, $a=7$, $c=29$ and $m = 100$. 6
- B Discuss the steps in model building. Write an algorithm to generate stationary AR(1) time series model. 7
- 10 A What are discrete and continuous systems? Using examples, write the difference between them. 6
- B Explain Kolmogorov Smirnov test to validate uniformity of generated random numbers. 7
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M.Sc (Comp.Sci.) [Part – I]
Data Warehousing and Mining and
Advanced Database Systems
(May-2017)

Q. P. Code: 10409

Marks: 75

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Section I

- 1 A Identify and describe the phases in KDD process. How does KDD differ from data mining? 6
- B List the functions of data warehouse tools and utilities and describe each one briefly. 6
- 2 A What is a difference between OLAP and OLTP? List the functions of data warehouse tools and utilities. 6
- B Explain ETL process with its components? Explain the common design for ETL system? Explain the ETL Architecture with the help of diagram? 6
- 3 A Discuss distance based classification algorithms. 6
- B What is clustering? Explain k-means method. Discuss its strengths and weaknesses 6
- 4 A Define a star schema. How is it different from a snowflake schema? Consider the following fact table
Market (Market_Id, Product_Id, Time_Id, Sales_Amt)
Draw a cube containing entities with dimensions of your choice and locate Dimension tables. Depict the relation between the fact and dimension tables using star schema and snowflake schema. 6
- B What is Association Rule? Explain the apriori candidate generation and test. 6
- 5 A What is Data Generalization? Explain it with two approaches? 6
- B Explain the concept market basket analysis. Support your answer by giving two examples. 6

Section II

- 6 A What are temporal databases? Compare Valid time and transaction time. Illustrate with example. 6
- B What is object identity? How does it help in referential integrity? Explain with example 7

- 7 A What is Parallel Database? Explain vertical fragmentation for parallel databases? 6
- B How are multimedia sources indexed for content-based retrieval? 7
- 8 A Write a short note on Active Databases .Explain it with the help of example. 6
- B What are characteristics of spatial data? What are the difference between spatial range queries and nearest neighbour queries and spatial join queries? Give example. 7
- 9 A Describe and explain any two architectures supported by distributed DBMS. 6
- B Explain with example dead locks in distributed database? 7
- 10 A Define the terms speed up and scale up. What is the importance of linearity in speed up and scale up? 6
- B Describe how XML data can be stored in relational DBMS. How do we map XML data to relations? Give an example. 7