

(2 Hours)

[Total Marks : 60

- N.B. :** (1) All questions are **compulsory**.
 (2) **Figures** to the right indicate **full marks**.
 (3) Use of **calculators** and **statistical tables** are **allowed**.

1. Attempt any **three** of the following :—

- (a) Explain the Parsing phase of the compiler. 5
 (b) Explain the various parameter passing mechanisms used by the compiler. 5
 (c) Discuss the issues in a programming language design that affects the storage management. 5
 (d) Write a note on various compiler construction tools. 5
 (e) What is bootstrapping technique in a compiler ? 5

2. Attempt any **three** of the following :—

- (a) Explain the process of constructing an NFA from the regular expression. 5
 Find the NFA for the expression $(a/b)^*abb$.
 (b) Write notes on : (i) Regular expressions. 5
 (ii) Context Free Grammar.
 (c) Briefly explain the structure of a Typical Lexical Analyzer. 5
 (d) Minimize the given transition table : 5

States	a	b
A	B	C
B	B	D
C	B	C
D	B	E
E	B	C

Initial State = A Final State = E

- (e) Briefly explain the Table Management phase of a compiler. 5

3. (a) Attempt any **one** of the following :—

- (i) Construct the Parsing table, string and productions of the grammar using the given parser moves. 7

0
 0 id 5
 0 F 3
 0 T 2
 0 T 2 * 7
 0 T 2 * id 5
 0 T 2 * 7 F 10
 0 T 2
 0 E 1
 0 E 1 + 6
 0 E 1 + 6 id 5
 0 E 1 + 6 F 3
 0 E 1 + 6 T 9
 0 E 1

- (ii) Grammar G(s) with production 7

$S \rightarrow aAb/aBbb$

$A \rightarrow aAb/0$

$B \rightarrow aBbb/1$

Check whether given grammar is LL(1) or not.

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- (b) Attempt any **two** of the following :—
- (i) What is Left Recursion ? Write the rules to eliminate left recursion. 4
 - (ii) Compare and contrast between SPG and OPG. 4
 - (iii) What is a Parser ? Write the role of Parser. 4
4. (a) Attempt any **one** of the following :—
- (i) Check whether the following grammar is SLR(1) or not. Explain with reasons. 7
 - $S \rightarrow L = R$
 - $S \rightarrow R$
 - $L \rightarrow *R$
 - $L \rightarrow id$
 - $R \rightarrow L$
 - (ii) Explain LALR Parsing. Justify how it is efficient over SLR Parsing. 7
- (b) Attempt any **two** of the following :—
- (i) Explain shift-reduce parsing with an example. 4
 - (ii) What is ambiguity of grammar ? How do we deal with it ? 4
 - (iii) Briefly describe the various types of LR Parsers. 4

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LS-6212

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1. Attempt any **three** of the following :—

- (a) What is difference equation? How they are useful in realizing LTI system? **5**
 (b) Define linear and circular convolution of two sequences. What are uses of circular convolution? **5**
 (c) Explain any three properties of discrete systems. **5**
 (d) What is pole-zero plot? Why it is necessary? Draw pole-zero diagram for a system having transfer function $H(z) = 5x(n) = 1 + z^{-4}$. **5**
 (e) Compute the linear convolution of: **5**
 $x(n) = [3, 2, 1, 1]$ and $h(n) = u(n) - 3u(n-3) + \delta(n-2)$

2. Attempt any **three** of the following :—

- (a) What is digital filter realization? With a neat diagram explain the Direct Form I realization of a digital filter. Give example. **5**
 (b) Explain characteristics of Twiddle Factor. **5**
 (c) Determine and sketch the magnitude and phase response of:
 $y(n) = \frac{1}{2} [x(n) + x(n-2)]$ **5**
 (d) Explain Remez Exchange algorithm used in the design of Optimal FIR-filters. **5**
 (e) State difference between Overlap-save method and Overlap-add method with neat figures. **5**

3. (a) Attempt any **one** of the following :— **7**

- (i) Define a rectangular window and derive the frequency response of the rectangular window.
 (ii) Differentiate between Fixed-point arithmetic and Floating-point arithmetic. Find 2's complement of 0.1001.

(b) Attempt any **two** of the following :—

- (i) Define all zero system and all pole system which are used in direct Form-I realization of IIR system. **4**
 (ii) Explain Direct Form-I realization of IIR filters. **4**
 (iii) What are maximal Ripple filter? How do you obtain maximal ripple filters? **4**

4. (a) Attempt any **one** of the following :— **7**

- (i) Explain how a sequence is produced from an analog waveform by a analog to digital converter (ADC).
 (ii) What is a Gibb's phenomenon?

(b) Attempt any **two** of the following :—

- (i) Compute DFT of a sequence $x(n) = \{1, -1, 1, -1\}$ using DIT FFT algorithm. Draw flow-graph diagram. **4**
 (ii) What is a block floating point representation of numbers? What are advantages of such a system? **4**
 (iii) What is the purpose of Bluestein's algorithm? How it is achieved? State the major significance of Bluestein algorithm. **4**

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1. Attempt any **three** of the following :- (15)
 - a) Explain any two multiplexing techniques used by cellular systems for mobile communications? 5
 - b) Write down the advantages and disadvantages of Cellular systems 5
 - c) Explain the network and switching subsystem of GSM system 5
 - d) Describe packet reservation multiple access (PRMA) scheme along with the diagram. 5
 - e) Compare GEO and MEO satellites. 5

2. Attempt any **three** of the following :- (15)
 - a) Explain with the help of diagram GSM TDMA frame and the types of handover in GSM system. 5
 - b) Discuss beacon transmission in a busy 802.11 infrastructures and ad hoc network. 5
 - c) What is WATM system? Explain any two services. 5
 - d) Explain the term location management and its requirements with reference to WATM 5
 - e) Explain the model of BRAN wireless access networks 5

3. (a) Attempt any **one** of the following :-
 - (i) Explain the concept of Tunneling and Encapsulation in mobile IP (7)
 - (ii) Explain the routing mechanism in mobile ad hoc networks (7)
 (b) Attempt any **one** of the following :- (8)
 - (i) Explain the concept of snooping TCP with its advantages. 4
 - (ii) Explain the advantages of indirect TCP. 4
 - (iii) What do you understand by mobile ad hoc networks and mobile TCP 4

4. (a) Attempt any **one** of the following :-
 - (i) Explain the goals of File system for the mobile communication (7)
 - (ii) Write a note on Wireless Application Protocol (WAP) with its basic architecture. (7)
 (b) Attempt any **one** of the following :- (8)
 - (i) Explain the features of Wireless Markup Language (WML) 4
 - (ii) Give the benefits of Wireless Telephony Application (WTA) 4
 - (iii) Briefly explain Wireless Application Environment Model 4

- N.B. (1)** All questions are compulsory.
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1. Attempt any *three* of the following:
 - (a) Explain various steps in planning data warehouse. 5.
 - (b) Explain the need of information system. What are the advantages of information system? Explain how it is different from operational system. 5.
 - (c) Explain how data warehouse architecture is different from design. Support your answer by giving suitable example. 5.
 - (d) Write a short note on OLAP and relational OLAP. 5.

2. Attempt any *three* of the following:
 - (a) What is a dimensional modeling? Differentiate between dimensional modeling and Entity Relationship model. 5.
 - (b) Consider single source facts about a retailer (i) returns, (ii) vendor purchase orders. Form a fact table hence identifying at least two dimensions and create snow flake schema. 5.
 - (c) Define data mining. Explain in brief predictive and descriptive models in data mining by giving suitable applications. 5.
 - (d) Explain cleaning process on data after acquiring it from source system. Give suitable example. 5.

3. Attempt any *three* of the following:
 - (a) What is a rule based classification? What do you mean by mutually exclusive and exhaustive rules? Give an example. How PRISM classifier improves the performance over 1R classifier? What is the use of RIPPER method? 5.
 - (b) Define entropy and gain of an attribute from information theory. Consider the following information about customers whose age is given and accordingly decision is taken regarding the purchase of a note book. Compute entropy and gain for an age. 5.

Age	Buy = yes	Buy = no	Total
≤ 30	2	4	6
31 to 40	5	2	7
> 40	4	1	5
Total	11	7	18

- (c) Represent the following distance matrix by dendrogram after clustering using complete linkage criteria of agglomerative method. 5.

	M ₁	M ₂	M ₃	M ₄	M ₅
M ₁	0.00	1.00	5.10	8.94	4.00
M ₂	1.00	0.00	5.39	9.43	3.00
M ₃	5.10	5.39	0.00	4.24	7.07
M ₄	8.94	9.43	4.24	0.00	11.31
M ₅	4.00	3.00	7.07	11.31	0.00

- (d) Explain k-mean clustering method for the set {3, 5, 11, 13, 4, 21, 31, 12, 26} by dividing a set into three clusters. Initially begin with three clusters with mean 4, 5 and 12. 5.
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4. Attempt any *three* of the following:
 - (a) Plot the following points on xy- system and construct k-D tree. 5.
{(2, 4), (4, 7), (6, 2), (9, 9)}.
 - (b) Write a short note on market basket analysis. 5.
 - (c) Consider the following set of frequent item sets: 5.
{1,2,3}, {1,2,4}, {1,2,5}, {1,3,4}, {2,3,4}, {2,3,5}, {3,4,6}.
Assume that there are only six items in datasets. List all candidate 4-item sets obtained by candidate generation procedure using Apriori algorithm by taking minimum support as 30%.
 - (d) Write short note on web structure mining. 5.
