

2019 (A)

Full Marks : 70

Time : 3 hours

Answer any five questions.

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

1. (a) Describe the functions maintained by system administrator. 7
(b) Explain the unix shell prompt and features provided in it. 7
2. (a) Explain LILO and GRUB loaders. 7
(b) Explain the various use of unix filters for managing files. 7
3. (a) What is Network file system ? Explain in detail. 7
(b) Explain the two important NFS configuration files for using the features of NFSv4. 7

(Turn Over)

(2)

4. (a) What is IP accounting ? How it helps the administrator to analyze the security threats in a network ?
7
- (b) Explain piping and Redirecting with proper example. Write a command to print first three lines of the file.
7
5. (a) What are the advantages of shadow passwords over traditional password system ?
7
- (b) Write steps to set up a Samba server with example.
7
6. (a) Explain setting up the network installation server.
7
- (b) Explain kickstart file to perform an automated installation.
7
7. (a) What is the utility of *umask* command ? Write down its default values for files and directories.
7
- (b) What is daemon ? Write down two daemons and its utility.
7

UL77-1PA

(Continued)

(3)

8. Explain following commands with suitable example :
2x7
- (a) Echo
(b) who | sort
(c) Ps
(d) Cat
(e) grep
(f) ls
(g) Head

UL77-1PA

HZ-800

(4)

8. (a) Explain the application of the data warehousing and data mining in Government. 7

(b) Describe three-tier data warehouse architecture. 7

UL (7)-DWH & DM

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1. (a) Differentiate between OLTP and OLAP systems. 7

(b) Describe star schema, snowflake schema and fact constellation schema with example. 7

2. (a) What are the different ways to handle missing values in data mining? 7

(b) Differentiate between database and data warehouse. 7

3. (a) Define box plot. Draw a box plot for the data given below :

2, 51, 53, 54, 43, 51, 62, 49, 50, 63, 60. 5

(2)

(b) What is min-max normalization? Use the min-max normalization method to normalize the following group of data : 200, 300, 400, 600, 1000 by setting min value = 0 and max value = 1.

5

(c) What is Noisy Data? Remove the noisy data by smoothing techniques for given data
4, 8, 15, 21, 24, 25, 28, 34

4

4. A database has nine transactions. Consider min_support as 22.22% and min_confidence as 70%.

TID	List of Item_IDs
T1	11, 12, 15
T2	12, 14
T3	12, 13
T4	11, 12, 14
T5	11, 13
T6	12, 13
T7	11, 13
T8	11, 12, 13, 15
T9	11, 12, 13

Find all frequent item sets using :

- (a) Apriori algorithm 7
(b) FP-growth algorithm. 7

UL(T)-DWH & DM

(Continued)

(3)

5. (a) Describe major steps for constructing a decision tree from the training dataset. 7

(b) Describe information gain, gain ratio and gini index. 7

6. (a) Describe K-means clustering. 4

(b) Suppose that the data mining task is to cluster points [with (x, y) representing location] into two clusters, where the points are $A_1(2, 10)$, $A_2(2, 5)$, $A_3(8, 4)$, $A_4(5, 8)$, $B_1(7, 5)$, $B_2(6, 4)$, $B_3(1, 2)$, $B_4(4, 9)$. The distance function is Euclidean distance. Suppose initially we assign A_1 and B_1 as the centre of each cluster, respectively. Use the k-means algorithm to find the two cluster centers after the second round of iteration. 10

7. Write the short notes on the following : 14

- (a) Web content mining
(b) Text mining
(c) DBSCAN
(d) BIRCH

UL(T)-DWH & DM

(Turn Over)

(b) What is Artificial Neural Network ? Give two examples of ANN in detail.

7

8. Write short notes on (any two) :

7+7

(i) Bayesian Network

(ii) Fuzzy Logic

(iii) Frames

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1. (a) Explain intelligence and artificial Intelligence. Explain with example how does conventional computing differs from intelligent computing. 7

(b) The water jug problem : You are given two jugs, an 8-litre one and a 6-litre one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with water. Develop a production system to get exactly 4 liters of water into 8-litre jug. 7

2. (a) Discuss local and global heuristics with the help of Hill Climbing search technique algorithm. 7

(b) Solve the following 8-puzzle problem-using Hill climbing algorithm. Generate a heuristic function that makes this work. 7

(2)

1	2	3
8	5	6
4	7	

Start

1	2	3
4	5	6
7	8	

Goal

3. (a) Explain the minimax principle by an example. 7
- (b) Consider the Tic-Tac-Toe game. Starting from the board position below, expand the complete game tree and calculate the value of each board position. 7

o	o	x
	x	
o	x	

4. (a) Explain A* search. Discuss the admissibility and dominance property in context of A* search. 7
- (b) Explain the syntax and semantics of propositional logic. 7
5. (a) Explain the following LISP function with examples. CDR, BUTLAST, APPEND, SETQ, CONS, LAST and OODP. 7

UL7-AI & ES

(Continued)

(3)

- (b) Write a LISP program to calculate the power of a number using recursion and iteration. 7

6. (a) Consider the following sentences :
- (i) John like all kind of food
 - (ii) Apples are food
 - (iii) Chicken is food
 - (iv) Anything anyone eats and is not killed by is food
 - (v) Bill eats peanuts and is still alive
 - (vi) Sue eats everything Bill eats
- (a) Translate the sentences into First Order Predicate Logic (FOPL).
- (b) Prove that *John like peanuts* using resolution.
- (c) Answer the question '*what food does Sue eats*' using resolution. 7
- (b) Explain Forward and Backward Chaining procedures for knowledge manipulation with the help of example. 7
7. (a) Draw and describe the architecture of expert system. 7

UL7-AI & ES

(Turn Over)

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The questions are of equal value.

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- 1. (a) Define the type of security attack with proper reasoning in each of the following cases :**

A student breaks into a professor's office to obtain a copy of the next day's test.

A student gives a check for Rs. 100 to buy a used book. Later he finds that the check was cashed for Rs. 1000.

A student sends hundreds of e-mails per day to another student using a phony return e-mail address.

- (b) What types of security mechanism(s) are provided for the following with proper reasons ? Bank transaction, writing a will.**

(Turn Over)

(2)

2. Explain RSA operation in details. What are the attacks that are possible in RSA ? Proposed Remedy.
3. (a) Explain four protocols defined by secure socket layer.
(b) What is the need of security at transport layer of internet protocol ?
4. (a) Explain working of Kerberos in details.
(b) Explain Diffie Hellman Key Exchange.
5. What is Digital Signature ? Explain any one algorithm of Digital Signature with example.
6. What are the services provided by IP Security ? Describe the architecture of IP Security.
7. (a) Explain the compression function used in secure hash function.
(b) What are the requirements of hash functions?

UL7-C & NS

(Continued)

(3)

8. Write short notes on :
(a) Email Security
(b) SSL Handshake protocol.

UL7-C & NS

HZ-800