

Question 1 is compulsory

1.	Answer all questions:	[10x2]
		Cos
(a)	What is pervasive computing. Write some of the limitation of mobile computing.	1
(b)	What is middleware in mobile computing. Name some database middleware used in data tier.	1
(c)	What is IMSI number. What are the various information associated with this number? Which database in GSM is used to store the blacklisted stolen devices?	1,2
(d)	Which algorithms are used for encryption and for generation of cipher key?	1
(e)	What is Hidden node problem in MAC.	1
(f)	What are the two basic reasons of handoff?	1,2
(g)	What is the difference between infrastructure and ad-hoc networks?	1,4
(h)	What is data Caching?	1,3
(i)	What do you mean by prefetching and cost of Cache-misses?	3
(j)	Explain the advantages and disadvantages of stateless Asynchronous cache invalidation.	1,3

(Answer any one question from each unit)

Cos

UNIT-I

2(a)	What is common control channel in GSM. Briefly explain about the various types of common control channels used in GSM.	[4]	1
(b)	Draw and explain the GSM protocol architecture.	[6]	2

3(a)	Draw the GSM network architecture.	[3]	3
(b)	What are the major parts of MS and NSS in GSM? Explain.	[7]	1

UNIT-II

4(a)	What is DHCP. Explain briefly the DHCP based client server model.	[4]	1
(b)	Explain Mobile TCP with its advantage and disadvantage.	[6]	2

5(a)	What is media access control (MAC)? Write the motivation for a specialized MAC.	[3]	1
(b)	Explain the authentication and ciphering process signal flow in GSM security with block diagram.	[7]	1

UNIT-III

6(a)	What is the MESI protocol?	[5]	3
(b)	What is significance cache invalidation mechanism?	[5]	3

7(a)	Differentiate synchronous and asynchronous mode of Transmissions.	[5]	1
(b)	What is data dissemination? explain the Push based model.	[5]	3

UNIT-IV

8(a)	Explain WAP Stack with a suitable diagram.	[5]	2,4
(b)	What is Piconet and Scatternet?	[5]	1,4

9(a)	What is a MANET?	[5]	1,4
(b)	What do you mean by Hybrid Routing Protocol? explain ZRP.	[5]	2,4

Question 1 is compulsory

1.	Answer all questions:	[10x2]
(a)	Define Brightness Discrimination.	COs
(b)	Define spatial resolution. How it is represented quantitatively?	
(c)	What is the memory required to store 512*512 RGB image of 8 bit resolution?	
(d)	What is Euler Number?	
(e)	What is the bit plane slicing? Write anyone application.	
(f)	Define texture of an image.	
(g)	Differentiate between image sharpening and smoothening.	
(h)	Discuss about MPEG standard and compare with JPEG.	
(i)	Differentiate between 8-connectivity and diagonal connectivity.	
(j)	Mention the condition for function to be called as wavelets.	

(Answer any one question from each unit)

COs

UNIT-I

2(a)	Explain the components of image processing system.	[5]	
b)	How image is quantized? What is the effect of image quantization levels if it is reduced?	[5]	
3(a)	Derive 2D sampling theorem and describe proper reconstruction of an image.	[5]	
(b)	With neat diagram explain the image sensing and acquisition.	[5]	

UNIT-II

4	Explain in details the method for smoothening the image in frequency domain.	[10]	
5	Briefly discuss about histogram equalization technique by performing the histogram equalization for the following image	[10]	

$$\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$$

UNIT-III

6(a)	Draw the model of image degradation/restoration process. Discuss the different techniques for estimation of image degradation function.	[5]	
b)	Discuss about Prewitt edge descriptor and its advantages. Derive 3×3 Prewitt mesh.	[5]	

7(a)	Discuss different types of noise model and its noise function.	[5]	
(b)	Explain image restoration in un-constrained method.	[5]	

UNIT-IV

8(a)	What do you mean by morphological image processing? Explain erosion and dilation techniques.	[5]	
b)	Explain about Boundary Extraction and Region Filling Algorithm.	[5]	

9(a)	Why image compression is required? Discuss Compression model with neat diagram.	[5]	
(b)	Discuss segmentation using morphological watersheds.	[5]	

SUIIT/End Sem /DEC, 2022/RG/BP/IM
Data Warehousing and Data Mining
 (Subject Code: CSC471)
 B.Tech CSE (Semester: VII)

Full Marks: 60

Time: 3.00Hrs

Question 1 is compulsory

1.	Answer all questions:	[10x2]
(a)	Distinguish among data, information and knowledge.	COs
(b)	Distinguish between qualitative and quantitative data?	CO-1
(c)	What is max-frequent item set in frequent pattern analysis?	CO-1
(d)	Mention the layers present in a Multilayer Artificial Feed Forward Neural Network?	CO-2
(e)	Write the features of Data warehouse according to William H. Inmon.	CO-3
(f)	What is the requirement of correlation factor like Lift in association rules mining?	CO-3
(g)	What is the importance of measuring Sum of Squared Errors (SSE) in k-mean cluster analysis?	CO-3
(h)	What are "learning step" and "classification" steps of a classifier?	CO-3
(i)	What is an outlier? Explain how it affects the cluster analysis step.	CO-4
(j)	Describe a search criterion which retrieves 70% of documents out of which 90% of retrieved documents are relevant. Assuming text database contains 5000 documents out of which 40% are irrelevant.	CO-4

(Answer any one question from each unit)

COs

UNIT-I

2(a)	Explain the requirement of Data warehouse tool although data base tools are capable to storing, organizing and providing interactive access method to users.	[3]	CO-1
(b)	What are the important components of a data warehouse packages? Explain different components of data warehouse architecture with suitable diagram.	[7]	CO-1

3(a)	What are the roles of data warehouse schemas? Explain Galaxy schema of data warehouse with suitable example.	[6]	CO-1
(b)	Explain different types of metadata stored in a data warehouse. Also, explain their importance in data warehouse.	[4]	CO-1

UNIT-II

4(a)	What is the importance of data pre-processing in building data warehouse schema? Explain different steps may be followed in data pre-processing before loading the data into data warehouse.	[7]	CO-2
(b)	Explain the importance of Concept hierarchy in building a dimension table. Explain a concept hierarchy of a dimension table "AddressOfCostumer" with a suitable diagram.	[3]	

5(a)	Explain the following data warehouse components: Data Landing Layer, Staging Area, ETL Layer, Data Storage Layer, Metadata Layer, Data Presentation Layer.	[6]	CO-2
(b)	Explain following drill-up, drill-down, slice and dice operations in Data Mining Query Language.	[4]	CO-2

UNIT-III

6(a)	A database has five transactions. Let $\min\ sup = 50\%$ and $\min\ conf = 60\%$.	[5]	CO-3												
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;"><i>TID</i></th> <th style="text-align: center;"><i>items bought</i></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">T100</td> <td style="text-align: center;">$\{M, O, N, K, E, Y\}$</td> </tr> <tr> <td style="text-align: center;">T200</td> <td style="text-align: center;">$\{D, O, N, K, E, Y\}$</td> </tr> <tr> <td style="text-align: center;">T300</td> <td style="text-align: center;">$\{M, A, K, E\}$</td> </tr> <tr> <td style="text-align: center;">T400</td> <td style="text-align: center;">$\{M, U, C, K, Y\}$</td> </tr> <tr> <td style="text-align: center;">T500</td> <td style="text-align: center;">$\{C, O, O, K, I, E\}$</td> </tr> </tbody> </table>	<i>TID</i>	<i>items bought</i>	T100	$\{M, O, N, K, E, Y\}$	T200	$\{D, O, N, K, E, Y\}$	T300	$\{M, A, K, E\}$	T400	$\{M, U, C, K, Y\}$	T500	$\{C, O, O, K, I, E\}$		
<i>TID</i>	<i>items bought</i>														
T100	$\{M, O, N, K, E, Y\}$														
T200	$\{D, O, N, K, E, Y\}$														
T300	$\{M, A, K, E\}$														
T400	$\{M, U, C, K, Y\}$														
T500	$\{C, O, O, K, I, E\}$														
(b)	Find all frequent item-sets using Apriori method.	[5]	CO-3												
(b)	Explain how Backpropagation algorithm computes errors at output nodes in a Feed forward ANN.	[5]	CO-3												

7(a)	What are the pros and cons of Appriori algorithm?	[3]	CO-3																																																																											
(b)	Given the following training data set to construct a decision tree. Use ID3 decision tree induction method to find first splitting point / root of the decision tree –	[7]	CO-3																																																																											
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">ID</th> <th style="text-align: center;">Outlook</th> <th style="text-align: center;">Temp.</th> <th style="text-align: center;">Humidity</th> <th style="text-align: center;">Play</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">1</td><td>Sunny</td><td>Hot</td><td>High</td><td>No</td></tr> <tr><td style="text-align: center;">2</td><td>Sunny</td><td>Hot</td><td>High</td><td>No</td></tr> <tr><td style="text-align: center;">3</td><td>Overcast</td><td>Hot</td><td>High</td><td>Yes</td></tr> <tr><td style="text-align: center;">4</td><td>Rainy</td><td>Mild</td><td>High</td><td>Yes</td></tr> <tr><td style="text-align: center;">5</td><td>Rainy</td><td>Cool</td><td>Normal</td><td>Yes</td></tr> <tr><td style="text-align: center;">6</td><td>Rainy</td><td>Cool</td><td>Normal</td><td>No</td></tr> <tr><td style="text-align: center;">7</td><td>Overcast</td><td>Cool</td><td>Normal</td><td>Yes</td></tr> <tr><td style="text-align: center;">8</td><td>Sunny</td><td>Mild</td><td>High</td><td>No</td></tr> <tr><td style="text-align: center;">9</td><td>Sunny</td><td>Cool</td><td>Normal</td><td>Yes</td></tr> <tr><td style="text-align: center;">10</td><td>Rainy</td><td>Mild</td><td>Normal</td><td>Yes</td></tr> <tr><td style="text-align: center;">11</td><td>Sunny</td><td>Mild</td><td>Normal</td><td>Yes</td></tr> <tr><td style="text-align: center;">12</td><td>Overcast</td><td>Mild</td><td>High</td><td>Yes</td></tr> <tr><td style="text-align: center;">13</td><td>Overcast</td><td>Hot</td><td>Normal</td><td>Yes</td></tr> <tr><td style="text-align: center;">14</td><td>Rainy</td><td>Mild</td><td>High</td><td>No</td></tr> </tbody> </table>	ID	Outlook	Temp.	Humidity	Play	1	Sunny	Hot	High	No	2	Sunny	Hot	High	No	3	Overcast	Hot	High	Yes	4	Rainy	Mild	High	Yes	5	Rainy	Cool	Normal	Yes	6	Rainy	Cool	Normal	No	7	Overcast	Cool	Normal	Yes	8	Sunny	Mild	High	No	9	Sunny	Cool	Normal	Yes	10	Rainy	Mild	Normal	Yes	11	Sunny	Mild	Normal	Yes	12	Overcast	Mild	High	Yes	13	Overcast	Hot	Normal	Yes	14	Rainy	Mild	High	No		
ID	Outlook	Temp.	Humidity	Play																																																																										
1	Sunny	Hot	High	No																																																																										
2	Sunny	Hot	High	No																																																																										
3	Overcast	Hot	High	Yes																																																																										
4	Rainy	Mild	High	Yes																																																																										
5	Rainy	Cool	Normal	Yes																																																																										
6	Rainy	Cool	Normal	No																																																																										
7	Overcast	Cool	Normal	Yes																																																																										
8	Sunny	Mild	High	No																																																																										
9	Sunny	Cool	Normal	Yes																																																																										
10	Rainy	Mild	Normal	Yes																																																																										
11	Sunny	Mild	Normal	Yes																																																																										
12	Overcast	Mild	High	Yes																																																																										
13	Overcast	Hot	Normal	Yes																																																																										
14	Rainy	Mild	High	No																																																																										

UNIT-IV

8(a)	With suitable example explain following similarity distance measuring techniques used in Cluster Analysis.	[5]	CO-4
	i. Minosky Similarity disatancs ii. Cosine Similarity Distnace iii. Jaccard Similarity Distance		
(b)	Write a note on different types Web mining.	[5]	CO-4

9(a)	Construct the term document frequency matrix for following tokenized texts. Calculate the Precision, Recall, and F_Score for text1 over text3 – Text 1 = {Mining, Association, Rules, Database, Use, Apriori, Method, Sometime, Give, Wrong, Result} Text 2 = {Mining, Ore, Using, Improper, Method, May, Give, Wrong, Result} Text 3 = {Huge, Volume, Data, sufficient, Data, Mining }	[5]	CO-4
(b)	What is cluster analysis and how it is different from classification/prediction? What are requirements of a good Cluster Analysis Algorithm?	[5]	CO-4

Question I is compulsory

1.	Answer all questions:	[10x2]
(a)	Write the difference between Compiler & Interpreter?	COs
(b)	What are the goals of error handler in a parser?	CO-1
(c)	Define Passes and their types in a Compiler?	CO-1
(d)	State the differentiate between Left Most Derivation (LMD) & Right Most Derivation (RMD) with Example?	CO-2
(e)	Consider the below CFG $S \rightarrow SS^+ SS^* a$ Derive the string aa+a* from the given CFG and construct a parse tree for this string?	CO-2
(f)	Give the role of semantic Analysis?	CO-3
(g)	Write the difference between S-attribute & I-attribute?	CO-3
(h)	Define Syntax directed translation (SDT) in compiler?	CO-3
(i)	What is Dynamic storage allocation technique?	CO-4
(j)	List the Peephole Optimisation technique?	CO-4

COs

(Answer any one question from each unit)

UNIT-I

2(a)	Explain stages of compiler in details with suitable diagram?	[5]	CO-1
(b)	Write short notes on (i) Bootstrapping (ii) LEX?	[5]	CO-1

3(a)	Explain the various errors encountered in different phases of compiler?	[5]	CO-1
(b)	Define regular expression and Regular grammar and give example?	[5]	CO-1

UNIT-II

4(a)	Construct the LR Parsing table for the following grammar: $E \rightarrow E + T \mid T$ $T \rightarrow T * F \mid F$ $F \rightarrow (E) \mid id$	[5]	CO-2
(b)	Construct SLR parse table for $S \rightarrow L=R \mid R$ $R \rightarrow L$ $L \rightarrow *R \mid id$	[5]	CO-2

5(a)	Construct an LALR Parsing table for the following grammar: $E \rightarrow E+T \mid T$ $T \rightarrow T^*F \mid F$ $F \rightarrow id$	[5]	CO-2
(b)	Verify whether the following grammar is LL (1) or not? $E \rightarrow aA \mid (E)$ $A \rightarrow +E \mid *E$ $A \rightarrow \epsilon$	[5]	CO-2

UNIT-III

6(a)	Write the quadruple, triple for the expression $-(a*b) + (c+d)-(a+b+c+d)$	[5]	CO-3
(b)	Construct the syntax tree and postfix notation for the expression $(a+ (b*c)) \uparrow d-e / (f+g)$.	[5]	CO-3
7(a)	Construct the syntax tree and draw the DAG for the expression $(a*b) + (c-d) * (a*b) + b?$	[5]	CO-3
(b)	Write short notes on i) Formats of three address code ii) Construction syntax tree for expressions.	[5]	CO-3

UNIT-IV

8(a)	Discuss storage allocation for block structured languages?	[5]	CO-4
(b)	Explain how an activation record is related with runtime storage organization.	[5]	CO-4
9(a)	What is Peephole optimization? Explain its characteristics.	[5]	CO-4
(b)	Explain the major issues of code generation Phase.	[5]	CO-4

Cryptography and Network Security
(Subject Code: CS 2114)
B. Tech (Semester: 7th)

Question 1 is compulsory

1.	Answer all questions:	[10x2]
		COs
(a)	Write down the name of services provided by digital signature?	1
(b)	What is the major difference between Authentication Header protocol and Encapsulation Security Payload protocol	1
(c)	Define the significance of Avalanche effect in the designing of encryption algorithm	2
(d)	Encrypt the message "DO NOT MOVE" with rail-fence technique of depth 2	1
(e)	Name the five services provided by Pretty-Good-Privacy	2
(f)	What is the need of SSL alert protocol	2
(g)	Why it is preferred to sign the message digest rather signing the original message?	1
(h)	What is the significance of Security Parameter Index (SPI)?	1
(i)	Differentiate between transport mode and tunnel mode. Which one is more secure?	2
(j)	What is TCP session hijacking	1

(Answer any one question from each unit)

COs

UNIT-I

2(a)	Briefly discuss the encryption process of Vignere cipher	[5]	1
(b)	Suppose the sender and receiver decide on a key say "POINT". Encrypt the message "DO NOT MOVE SOUTH" using Vignere cipher	[5]	1
3(a)	What do you mean by symmetric key algorithm?	[2]	1
(b)	Discuss AES algorithm with suitable diagram?	[8]	2

UNIT-II

4(a)	What is man-in-middle attack in Diffie-Hellman key exchange protocol? Briefly discuss with a suitable example	[5]	2
(b)	Calculate the value of symmetric key in Diffie-Hellman key exchange protocol if $g=3, p=7, x=3, y=4$?	[5]	3
5(a)	Differentiate between public key cryptography and secret key cryptography? Write down the steps of RSA algorithm	[5]	2
(b)	Given two prime numbers $P=11, Q=13$. Find out the public key, private key pair. Encrypt msg "23".	[5]	3

UNIT-III

6(a)	What is the purpose of message digest? Briefly discuss SHA-1 algorithm	[6]	1
(b)	What is the difference between conventional signature and digital signature? What are the methods for achieving digital signature?	[4]	2

7(a)	Briefly discuss Kerberos's authentication protocol with the role of authentication server, ticket granting server, real server and a suitable diagram	[5]	3
(b)	What do you mean by key management? What are the various methods of secret key distribution? Discuss any one of them	[5]	1

UNIT-IV

8(a)	Briefly discuss SSL record protocol with suitable diagram	[5]	1
(b)	Briefly discuss Authentication Header Protocol with a suitable diagram.	[5]	2

9(a)	what do you mean by firewall? Briefly discuss about firewall designing principles	[5]	3
(b)	What is the purpose of X.509 certificate? Briefly discuss the certificate structure with a suitable diagram	[5]	2