UNIT II			
Mining frequent patterns: Basic concepts Market Basket Analysis, Frequent itemsets, Closed itemsets, Association rules-Introduction, Apriori algorithm-theoretical approach,Apply Apriori algorithm on dataset-1, Apply Apriori algorithm on dataset-2,Generating Association rules from frequent itemsets, Improving efficiency of Apriori, Pattern growth approach, Mining frequent item sets using Vertical data format, Strong rules vs. weak rules, Association analysis to Correlation Analysis, Comparison of pattern evaluation measures.			
PART-A (Multiple Choice Questions)			
Q. No	**Questions**	**Course Outcome**	**Competence BT Level**
1	What does FP growth algorithm do? a. It mines all frequent patterns through pruning rules with lesser support b. It mines all frequent patterns through pruning rules with higher support **c. It mines all frequent patterns by constructing a FP tree** d. remove the minimum support count items	CO1	1
2	_____ is a sequence of patterns that frequently occur is called as: **a. Frequent Subsequence** b. Frequent Substructure c. Frequent Item Set d. Pattern	CO1	2
3	_____refers to the sequence of patterns that occurs frequently. **a. Frequent sub-sequence** b. Frequent substitution c. Closed itemset d. Confidence	CO1	1
4	The issue of Pattern evaluation comes under which of these? a. Performance Issues b. Diverse Data Types Issues **c. User Interaction and Mining Methodology Issues** d. Analysis	CO1	2
5	Patterns that can be discovered from a given database are which type… **a) More than one type** b) Multiple type always c) One type only d) No specific type	CO1	1
6	The class under study in Data Characterization is known as:	CO1	3

	a. Final Class **b. Target Class** c. Initial Class d. Study Class		
7	What is not true about FP growth algorithms? a. It mines frequent itemsets without candidate generation. b. There are chances that FP trees may not fit in the memory c. FP trees are very expensive to build **d. It expands the original database to build FP trees.**	CO1	1
8	When do you consider an association rule interesting? a. If it only satisfies min_support b. If it only satisfies min_confidence **c. If it satisfies both min_support and min_confidence** d. There are other measures to check so	CO1	1
9	What techniques can be used to improve the efficiency of apriori algorithm? **(a) Hash-based techniques** (b) Transaction Increases (c) Sampling (d) Cleaning	CO1	1
10	A collection of one or more items is called as _____ **(a) Itemset** (b) Support (c) Confidence (d) Support Count	CO1	1
11	Frequency of occurrence of an itemset is called as ____ (a) Support (b) Confidence **(c) Support Count** (d) Rules	CO1	1
12	An itemset whose support is greater than or equal to a minimum support threshold is _____	CO1	1

	(a) Itemset **(b) Frequent Itemset** (c) Infrequent items (d) Threshold values		
13	What do you mean by support(A)? a. Total number of transactions containing A b. Total Number of transactions not containing A **c. Number of transactions containing A / Total number of transactions** d. Number of transactions not containing A / Total number of transactions	CO1	1
14	Which technique finds the frequent itemsets in just two database scans? **a. Partitioning** b. Sampling c. Hashing d. Dynamic itemset counting	CO1	2
15	. _____is the most well known association rule algorithm and is used in most commercial products. **a. Apriori algorithm.** b. Partition algorithm. c. Distributed algorithm. d. Pincer-search algorithm.	CO1	2
16	What is the effect of reducing min confidence criteria on the same? a. Number of association rules remains same **b. Some association rules will add to the current set of association rules** c. Some association rules will become invalid while others might become a rule. d. Can not say	CO1	2
17	The apriori algorithm works in _____fashion? a. top-down and depth-first b. top-down and breath-first c. bottom-up and depth-first	CO1	1

	d. bottom-up and breath-first		
18	What is the relation between a candidate and frequent itemsets? (a) A candidate itemset is always a frequent itemset **(b) A frequent itemset must be a candidate itemset** (c) No relation between these two (d) Strong relation with transactions	CO1	1
19	What are closed itemsets? a. An itemset for which at least one proper super-itemset has same support **b. An itemset whose no proper super-itemset has same support** c. An itemset for which at least super-itemset has same confidence d. An itemsetwhose no proper super-itemset has same confidence	CO1	1
20	Which is true about the number of iterations in Apriori? a. increases with the size of the data b. decreases with the increase in size of the data **c. increases with the size of the maximum frequent set** d. decreases with increase in size of the maximum frequent set	CO1	1
	PART B (5 Marks)		
1	What is Market Basket Analysis? Give example.	CO1	BT
2	Describe the following with terms (i)Closed itemsets, (ii) Frequent Itemset, (iii) Support, (iv)Confidence, (v) Frequent Patterns	CO1	2
3	Explain pattern growth approach in mining	CO1	3
4	Comparison between Apriori vs FP Growth Algorithm	CO1	2
5	Explain in detail about Methods to Improve Apriori Efficiency	CO1	2
6	Describe Advantages and Limitations of Apriori Algorithm	CO1	3
7	Explain the steps involved in Apriori Algorithm.	CO1	2
8	Explain in detail about support and Confidence Measures with an example	CO1	3
	PART C (12 Marks)		
1	What is Frequent itemsets in datamining? Explain about frequent pattern in data mining with real-time example.	CO1	1
2	Describe the following with terms (i)Strong rules vs. weak rules (ii)Association analysis to Correlation analysis.	CO1	2

<table>
<tr>
<td>3</td>
<td>Consider the following Transaction dataset, find frequent itemsets using Apriori algorithm.
<table>
<tr><th>TID</th><th>items</th></tr>
<tr><td>T1</td><td>I1, I2 , I5</td></tr>
<tr><td>T2</td><td>I2,I4</td></tr>
<tr><td>T3</td><td>I2,I3</td></tr>
<tr><td>T4</td><td>I1,I2,I4</td></tr>
<tr><td>T5</td><td>I1,I3</td></tr>
<tr><td>T6</td><td>I2,I3</td></tr>
<tr><td>T7</td><td>I1,I3</td></tr>
<tr><td>T8</td><td>I1,I2,I3,I5</td></tr>
<tr><td>T9</td><td>I1,I2,I3</td></tr>
</table>
</td>
<td>CO1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>State and explain Fp Growth Algorithm with an example Consider the following data set to generate Association rules
<table>
<tr><th>Transaction</th><th>List of items</th></tr>
<tr><td>T1</td><td>I1,I2,I3</td></tr>
<tr><td>T2</td><td>I2,I3,I4</td></tr>
<tr><td>T3</td><td>I4,I5</td></tr>
<tr><td>T4</td><td>I1,I2,I4</td></tr>
<tr><td>T5</td><td>I1,I2,I3,I5</td></tr>
<tr><td>T6</td><td>I1,I2,I3,I4</td></tr>
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</td>
<td>CO1</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Describe the following items
(i)Pattern growth approach
(ii) Expalin the join & prune step in apriori algorithm</td>
<td>CO1</td>
<td>2</td>
</tr>
</table>