RAJALAKSHMI INSTITUTE OF TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

**QUESTION BANK**

**SUBJECT: CS8080 INFORMATION RETRIEVAL TECHNIQUES SEM/YEAR: VIII/IV**

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| **UNIT I -INTRODUCTION** | | | | |
| Information Retrieval – Early Developments – The IR Problem – The User’s Task – Information versus Data Retrieval - The IR System – The Software Architecture of the IR System – The Retrieval and Ranking Processes  - The Web – The e-Publishing Era – How the web changed Search – Practical Issues on the Web – How People Search – Search Interfaces Today – Visualization in Search Interfaces. | | | | |
| **PART-A** | | | | |
| **Q. No** | **Questions** | | **BT**  **Level** | **Competence** |
| **1** | **Define** information retrieval | | BTL 1 | Remember |
| **2** | **Identify** the need of Information Retrieval | | BTL 3 | Apply |
| **3** | **List** and explain the components of IR block diagram. | | BTL 1 | Remember |
| **4** | **List** the fundamental concepts in IR. | | BTL 1 | Remember |
| **5** | **Express** the need of tiered indexes. | | BTL 2 | Understand |
| **6** | **Interpret** the role of Artificial Intelligence (AI) in IR. | | BTL 2 | Understand |
| **7** | **Differentiate** data retrieval and information retrieval. | | BTL 4 | Analyze |
| **8** | **Give** the components of Search Engine and the performance measures. | | BTL 2 | Understand |
| **9** | **What** is an extractor? | | BTL 1 | Remember |
| **10** | **Show** the issues that affects IR. | | BTL 3 | Apply |
| **11** | **Give** the purpose of Query Interface. | | BTL 6 | Create |
| **12** | **Summarize** the queries of IR. | | BTL 5 | Evaluate |
| **13** | **Design** the IR architecture diagram. | | BTL 6 | Create |
| **14** | **State** the impact of WEB on IR. | | BTL 2 | Understand |
| **15** | **Show** the type of natural language technology used in information  retrieval. | | BTL 3 | Apply |
| **16** | **Compare** Information vs Data Retrieval | | BTL 1 | Remember |
| **17** | **What** is search engine**?** | | BTL 1 | Remember |
| **18** | **Compare** IR vs Web Search. | | BTL 4 | Analyze |
| **19** | **Construct** the function of Information Retrieval System. | | BTL 3 | Apply |
| **20** | **Summarize** on text acquisition. | | BTL 5 | Evaluate |
| **PART B** | | | | |
| **1** | 1. **Summarize** the history of IR. (7) 2. **Explain** the purpose of Information Retrieval System.(6) | BTL 5 | | Evaluate |
| **2** | **Describe** the various components of Information Retrieval System with | BTL 1 | | Remember |

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|  | neat diagram. (13) |  |  |
| **3** | 1. **Define** Information Retrieval system and its features. (4) 2. **Formulate** the working of Search Engine. (9) | BTL 1 | Remember |
| **4.** | 1. **Identify** the various issues in IR system. (7) 2. **Examine** the various impact of WEB on IR (6) | BTL 1 | Remember |
| **5** | **Demonstrate** the framework of Open Source Search engine with  necessary diagrams. (13) | BTL 2 | Understand |
| **6** | 1. **Compare** in detail Information Retrieval and Web Search with examples. (8) 2. **Analyze** the fundamental concepts involved in IR system. (5) | BTL 4 | Analyze |
| **7** | **Develop** the role of Artificial Intelligence in Information Retrieval Systems. (13) | BTL 3 | Apply |
| **8** | 1. **Describe** the various components of a Search Engine. (8) 2. **Summarize** the functions and features of Information Retrieval Systems (5) | BTL 2 | Understand |
| **9** | 1. **Describe** the different stages of IR system. (8) 2. **Estimate** the various Search Engine available in current world. (5) | BTL 6 | Create |
| **10** | 1. **Demonstrate** the working of IR architecture with a diagram. (6) 2. **Infer** How Designing Parsing and Scoring functions works in detail. (7) | BTL 3  BTL 4 | Apply Analyze |
| **11** | 1. **Define** Information Retrieval. (2) 2. **Describe** in detail the IR system, Fundamental concepts, need and purpose of the system.(4+4+3) | BTL 1 | Remember |
| **12** | **Explain** how to characterize the web in detail. (13) | BTL 4 | Analyze |
| **13** | **Explain** the different types of computer software used in computer architecture.(13) | BTL 4 | Analyze |
| **14** | 1. **Demonstrate** database and Information Retrieval with example (4) 2. **Generalize** the Process of Search Engine in detail..( 9) | BTL 2 | Understand |
| **PART-C** | | | |
| **Q.No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Create** an open source search engine like Google with suitable  functionalities. (15) | BTL 6 | Create |
| **2** | **Evaluate** the best search engines other than Google and explain any five of them in detail. (15) | BTL 5 | Evaluate |
| **3** | **Justify** how the AI impact Search and Search Engine optimization. (15) | BTL 5 | Evaluate |
| **4** | **Generalize** the Deep Learning and Human Learning capabilities in  Future of Search Engine Optimization. (15) | BTL 6 | Create |
| **UNIT II MODELING AND RETRIEVAL EVALUATION** | | | |
| Basic IR Models - Boolean Model - TF-IDF (Term Frequency/Inverse Document Frequency) Weighting - Vector Model – Probabilistic Model – Latent Semantic Indexing Model – Neural Network Model – Retrieval Evaluation – Retrieval Metrics – Precision and Recall – Reference Collection – User-based Evaluation –  Relevance Feedback and Query Expansion – Explicit Relevance Feedback. | | | |
| **PART-A** | | | |

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| **Q.No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Identify** probabilistic Information Retrieval. | BTL 3 | Apply |
| **2** | **Analyze** the Boolean model. | BTL 4 | Analyze |
| **3** | **Construct** the Vector space model representation. | BTL 3 | Apply |
| **4** | **List** the classes of retrieval model. | BTL 1 | Remember |
| **5** | **Define** Retrieval model. | BTL 1 | Remember |
| **6** | **Explain** language modelling with example. | BTL 2 | Understand |
| **7** | **Illustrate** similarity measure. | BTL 3 | Apply |
| **8** | **Analyze** the problems in lexical semantics. | BTL 4 | Analyze |
| **9** | **Demonstrate** language model and Naïve Bayes. | BTL 2 | Understand |
| **10** | **Formulate** the Bayesian rule. | BTL 6 | Create |
| **11** | **What** is meant by sparse vector? | BTL 1 | Remember |
| **12** | **Design** an Inverted file with an example. | BTL 6 | Create |
| **13** | **Evaluate** the goals of LSI. | BTL 5 | Evaluate |
| **14** | **What** is smoothing and stemming? | BTL 1 | Remember |
| **15** | **List** probabilistic approaches of vector model. | BTL 2 | Understand |
| **16** | **What** is meant Zone Index? | BTL 1 | Remember |
| **17** | **Interpret** cosine similarity measure. | BTL 2 | Understand |
| **18** | **Analyze** relevance feedback and pseudo relevance feedback. | BTL 4 | Analyze |
| **19** | **List** the steps involved in preprocessing. | BTL 1 | Remember |
| **20** | **Generalize** on why distance is not preferred compared to angle. | BTL 5 | Evaluate |
| **PART-B** | | | |
| **1** | 1. **Express** what is Boolean retrieval model. (4) 2. **Describe** the document preprocessing steps in detail (9) | BTL 2 | Understand |
| **2** | **Illustrate** the Vector space retrieval model with example (13) | BTL 3 | Apply |
| **3** | **Describe** about basic concepts of Cosine similarity. (13) | BTL 1 | Remember |
| **4** | **Develop** on example to implement term weighting .(min docs = 5) (13) | BTL 6 | Create |
| **5** | 1. **Tabulate** the common preprocessing steps. (4) 2. **Discuss** the Boolean retrieval in detail with diagram..(9) | BTL 1 | Remember |
| **6** | 1. **Discuss** in detail about term frequency and Inverse Document Frequency. (7) 2. **Compute** TF-IDF .given a document containing terms with the given frequencies A(3) ,B(2), C(1).Assume document collections 10,000 and document frequencies of these terms are A(50), B(1300), C(250) (6) | BTL 2 | Understand |
| **7** | 1. **Explain** Latent Semantic Indexing and latent semantic space with an illustration. (9) 2. **Analyze** the use of LSI in Information Retrieval. What is its need in synonyms and semantic relatedness.(4) | BTL 4 | Analyze |
| **8** | 1. **Examine**, how to form a binary term - document incidence matrix (7) 2. **Give** an example for the above. (6) | BTL 1 | Remember |
| **9** | **Describe** document preprocessing and its stages in detail. (13) | BTL 1 | Remember |
| **10** | 1. **Discuss** the structure of inverted indices and the basic Boolean Retrieval model **(**7) 2. **Discuss** the searching process in inverted file (6) | BTL 2 | Understand |

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| **11** | 1. **Why** do we need sparse vectors? (4) 2. **Estimate** sparse vectors and its efficiency with diagram.(9) | BTL 5 | Evaluate |
| **12** | 1. **Analyze** the language model based IR and its probabilistic representation. (7) 2. **Compare** Language model vs Naive Bayes and Language model vs Vector space model (6) | BTL 4 | Analyze |
| **13** | 1. **Explain** in detail about binary independence model for Probability Ranking Principle(PRP). (7) 2. **Analyze how** the query generation probability for query likelihood model can be estimated.(6) | BTL 4 | Analyze |
| **14** | 1. **Apply** how Probabilistic approaches to Information Retrieval are done. (7) 2. **Illustrate** the following 3. Probabilistic relevance feedback. (2) 4. Pseudo relevance feedback. (2) 5. Indirect relevance feedback (2) | BTL 3 | Apply |
| **PART-C** | | | |
| **Q. No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Compose** the information Retrieval services of the internet with suitable  design. (15) | BTL 6 | Create |
| **2** | **Assess** the best Language model to computational linguistics for investigating the use of software to translate text or speech from one language to another. (15) | BTL 5 | Evaluate |
| **3** | **Contrast** the uses of probabilistic IR in indexing the search in the internet. (15) | BTL 4 | Analyze |
| **4** | **Create** a Relevance feedback mechanism for your college website search in the internet. (15) | BTL 6 | Create |
| **UNIT III TEXT CLASSIFICATION AND CLUSTERING** | | | |
| A Characterization of Text Classification – Unsupervised Algorithms: Clustering – Naïve Text Classification  – Supervised Algorithms – Decision Tree – k-NN Classifier – SVM Classifier – Feature Selection or Dimensionality Reduction – Evaluation metrics – Accuracy and Error – Organizing the classes – Indexing and Searching – Inverted Indexes – Sequential Searching – Multi-dimensional Indexing. | | | |
| **PART-A** | | | |
| **Q. No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Integrate** the problems of k-means method. | BTL 6 | Create |
| **2** | **Define** the characterization of text classification. | BTL 1 | Remember |
| **3** | **Summarize** Evaluation metrics with example. | BTL 2 | Understand |
| **4** | **What** are the types of data in clustering analysis? | BTL 1 | Remember |
| **5** | **Point out the** advantages and disadvantages of Decision Tree algorithm. | BTL 4 | Analyze |
| **6** | **Show** the applications SVM Classifier | BTL 2 | Understand |
| **7** | **Illustrate** the advantages of Naive Bayes. | BTL 3 | Apply |
| **8** | **Assess** how to measure distance of clusters? | BTL 5 | Evaluate |
| **9** | **Distinguish** Supervised learning and Unsupervised Learning. | BTL 2 | Understand |

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| **10** | **Summarize** the good clustering approaches. | BTL 3 | Apply |
| **11** | **Define** Supervised and Unsupervised algorithm | BTL 1 | Remember |
| **12** | **What** is Hash-based Dictionary in Indexing? | BTL 1 | Remember |
| **13** | **Describe** two types of index in detail. | BTL 5 | Evaluate |
| **14** | **Explain** Sequential search in detail | BTL 1 | Remember |
| **15** | **Describe** Brute Force in Sequential Search. | BTL 3 | Apply |
| **16** | **Distinguish** Suffix Trees and Suffix arrays | BTL 4 | Analyze |
| **17** | **What** is Range queries and Nearest-Neighbour Queries? | BTL 1 | Remember |
| **18** | **Differentiate** two types of multi-dimensional indexing. | BTL 4 | Analyze |
| **19** | **Classify** Dimension reduction in detail. | BTL 4 | Analyze |
| **20** | **Discuss** between clustering and classification. | BTL 6 | Create |
| **PART-B** | | | |
| **1** | 1. **Define** Topic detection and tracking, Clustering in TDT. (4) 2. **Examine** in detail about Cluster Analysis in Text Clustering.(9) | BTL 1 | Remember |
| **2** | **Define** Clustering in Metric space with application to Information  Retrieval (13) | BTL 1 | Remember |
| **3** | 1. **Evaluate** the Agglomerative Clustering and HAC in detail. (7) 2. Discuss the Types of data and evaluate it using any one clustering techniques. (6) | BTL 5 | Evaluate |
| **4** | 1. **Summarize** on Clustering Algorithms. (6) 2. **Evaluate** on the various classification methods of Text. (7) | BTL 6 | Create |
| **5** | 1. **Analyze** the working of Nearest Neighbor algorithm along with one representation. (7) 2. **Analyze** the K-Means Clustering method and the problems in it**.** (6) | BTL 4 | Analyze |
| **6** | **Analyze** about Decision Tree Algorithm with illustration**. (**13**)** | BTL 4 | Analyze |
| **7** | **Examine** Inverted index and Forward index (13) | BTL 1 | Remember |
| **8** | 1. **Discuss** in detail about Text Classification. (7) 2. **Explain** B Tree Index in detail (6) | BTL 2 | Understand |
| **9** | 1. **Apply** Naïve Bayes Algorithm for an example. (7) 2. **Demonstrate** its working in detail. (6) | BTL 3 | Apply |
| **10** | **Analyse** single Dimension Index in detail (13) | BTL 4 | Analyze |
| **11** | **Define** Knuth Morris Pratt algorithm in detail (13) | BTL 1 | Remember |
| **12** | 1. **Construct** B+ Tree Index in detail (6) 2. **Summarize** the significance of SVM classifier in detail**.** (7) | BTL 3 | Apply |
| **13** | **Examine** Single dimensional and multi-dimensional index. (13) | BTL 2 | Understand |
| **14** | **Explain** Sequential search in detail (13) | BTL 2 | Understand |
| **PART-C** | | | |
| **Q. No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Rank** the impacts of Categorization and clustering of text in the mining with the suitable examples. (8)  **Detailed** about KNN Classifier (7) | BTL 5 | Create |
| **2** | **Design** a Plan to overcome the gap in decision theoretic approach for evaluation in text mining. (15) | BTL 6 | Create |
| **3** | **Compare** two types of Dimensional Index in detail with example (15) | BTL 5 | Evaluate |
| **4** | **Estimate** R Tree index and R+ Tree index (15) | BTL 5 | Evaluate |

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| **UNIT IV WEB RETRIEVAL AND WEB CRAWLING** | | | |
| The Web – Search Engine Architectures – Cluster based Architecture – Distributed Architectures – Search Engine Ranking – Link based Ranking – Simple Ranking Functions – Learning to Rank – Evaluations -- Search Engine Ranking – Search Engine User Interaction – Browsing – Applications of a Web Crawler – Taxonomy  – Architecture and Implementation – Scheduling Algorithms – Evaluation. | | | |
| **PART-A** | | | |
| **Q. No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Express** the basics of web search with a neat diagram. | BTL 2 | Understand |
| **2** | **Explain** Pay for Placement. | BTL 2 | Understand |
| **3** | **What** is meant by Search Engine Optimization? | BTL 1 | Remember |
| **4** | **List** the need of web search engine. | BTL 1 | Remember |
| **5** | **Demonstrate** the architecture of search engine. | BTL 2 | Understand |
| **6** | **Compare** parallel crawler and meta crawler. | BTL 2 | Understand |
| **7** | **Lis**t the SPAM Techniques. | BTL 1 | Remember |
| **8** | **Evaluate** use of inversion in indexing process. | BTL 5 | Evaluate |
| **9** | **State** the issues in search engines. | BTL 1 | Remember |
| **10** | **Design** the Politeness policies used in web crawler. | BTL 6 | Create |
| **11** | **Classify** the ways to identify duplication. | BTL 4 | Analyze |
| **12** | **How** to Apply duplicate Deduction to web pages? | BTL 3 | Apply |
| **13** | **Assess** the need for keyword stuffing. | BTL 5 | Evaluate |
| **14** | **What** are the challenges in data traversing by search engines? | BTL 1 | Remember |
| **15** | **Identify** the applications of web crawlers. | BTL 3 | Apply |
| **16** | **Classify** the use of Web indexing and inversion of indexing process. | BTL 4 | Analyze |
| **17** | **What** is focused crawler? | BTL 1 | Remember |
| **18** | **Illustrate** the hashing technique with example. | BTL 3 | Apply |
| **19** | **Classify** the types of search engines. | BTL 4 | Analyze |
| **20** | **Generalize** on XML Retrieval. | BTL 6 | Create |
| **PART-B** | | | |
| **1** | **Demonstrate the** Search Engine Optimization/SPAM in detail.(13) | BTL 2 | Understand |
| **2** | i) **Describe** in detail about Vector space model for XML Retrieval. (9) ii)**What** is Structured and Unstructured Retrieval.(4) | BTL 1 | Remember |
| **3** | 1. **List** the types of Search Engine and explain them. (7) 2. **Distinguish** visual vs programmatic crawler. (6) | BTL 1 | Remember |
| **4** | **Design** and develop a Web search Architecture and the components of  search engine and its issues.(13) | BTL 6 | Create |
| **5** | 1. **What** is P4P? Elaborate on Paid Placement. (7) 2. **Describe** the structure of WEB and its characteristics (6) | BTL 1 | Remember |
| **6** | 1. **Summarize** on the working of WEB CRAWLER with its diagram. (8) 2. **Explain** the working of Search Engine. (5) | BTL 2 | Understand |
| **7** | 1. **Differentiate** meta crawler and focused crawler. (8) 2. **Analyze** on URL normalization.(5) | BTL 4 | Analyze |
| **8** | **Recommend** the need for Near-Duplication Detection by the way of finger print algorithm. (13) | BTL 5 | Evaluate |
| **9** | i) **Examine** the behavior of web crawler and the outcome of crawling policies. (5) | BTL 3 | Apply |

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|  | 1. **Illustrate** the following (8)    1. Focused Crawling    2. Deep web    3. Distributed crawling    4. Site map |  |  |
| **10** | 1. **Explain** the overview of Web search. (8) 2. **What** is the purpose of Web indexing? (5) | BTL 4 | Analyze |
| **11** | **Summarize** the process of index compression in detail.(13) | BTL 2 | Understand |
| **12** | 1. **Examine** the need for Web Search Engine. (6) 2. **List** the challenges in data traversing by search engine and how will you overcome it.(7) | BTL 4 | Analyze |
| **13** | **Describe** the following with example.   1. Bag of Words and Shingling (7) 2. Hashing, Min Hash and Sim Hash (6) | BTL 1 | Remember |
| **14** | 1. Based on the Application of Search Engines, **How** will you categorize them and what are the issues faced by them? (9) 2. **Demonstrate** about Search Engine Optimization. (4) | BTL 3 | Apply |
|  | **PART-C** |  |  |
| **Q. No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Develop** a web search structure for searching a newly hosted web domain by the naïve user with step by step procedure. (15) | BTL 6 | Create |
| **2** | 1. **Grade** the optimization techniques available for search engine and rank them by your justification. (9) 2. **Explain** Web Crawler Taxonomy in detail (6) | BTL 5 | Evaluate |
| **3** | **Estimate** the web crawling methods and illustrate how do the various nodes of a distributed crawler communicate and share URLs? (15) | BTL 5 | Evaluate |
| **4** | **Formulate** the application of Near Duplicate Document Detection  techniques and also Generalize the advantages in Plagiarism checking. (15) | BTL 6 | Create |
| **UNIT V RECOMMENDER SYSTEM** | | | |
| Recommender Systems Functions – Data and Knowledge Sources – Recommendation Techniques – Basics of Content-based Recommender Systems – High Level Architecture – Advantages and Drawbacks of Content- based Filtering – Collaborative Filtering – Matrix factorization models – Neighborhood models. | | | |
| **PART-A** | | | |
| **Q. No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Examine** the broad classification of Recommendation systems? | BTL4 | Analyze |
| **2** | **Justify** Content Based recommendation system | BTL 5 | Evaluate |
| **3** | **Classify** collaborative filtering system | BTL4 | Analyze |
| **4** | **Define** knowledge based Recommendation | BTL2 | Understand |
| **5** | **Give the** definition Hybrid recommendation | BTL2 | Understand |
| **6** | **Define** Meta level and Cascade Recommendation system | BTL1 | Remember |
| **7** | **Examine** Knowledge based configuration in detail | BTL4 | Analyze |

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| **8** | **Explain** the types of Recommendation System | BTL 5 | Evaluate |
| **9** | **Point out** some advantages of Mobile Recommendation system | BTL3 | Apply |
| **10** | **Demonstrate** Used based and Model based Collaborative filtering | BTL 2 | Understand |
| **11** | **Describe** Recommendation Techniques in detail | BTL 1 | Remember |
| **12** | **Examine** the advantages of Content Based recommendation system | BTL3 | Apply |
| **13** | **What** are the types of Hybrid recommendation system | BTL 1 | Remember |
| **14** | **Define** web recommendation in detail | BTL1 | Remember |
| **15** | **Describe** Hybrid recommendation system. | BTL 2 | Understand |
| **16** | **List** the advantages of Collaborative Recommendation System | BTL 1 | Remember |
| **17** | **Construct** Collaborative and Content based recommendation system | BTL 6 | Create |
| **18** | **Estimate** some example for content based recommendation system | BTL 6 | Create |
| **19** | **Examine** disadvantages of content based recommendation system | BTL3 | Apply |
| **20** | **Describe** Weighted Recommenders | BTL 1 | Remember |
| **PART-B** | | | |
| **1** | **Define** Recommendation based on User Ratings using appropriate example. (13) | BTL1 | Remember |
| **2** | 1. **Explain** Recommender system. (4) 2. **Explain** the techniques of Matrix Factorization (9) | BTL2 | Understand |
| **3** | **Explain** the different types of recommendation system.   1. Hybrid Recommendation System (3) 2. Content Based Recommendation System (3) 3. Collaborative Recommendation System (3) 4. Knowledge Based Recommendation System (4) | BTL 4 | Analyze |
| **4** | **Estimate** the Content based recommendation system (13) | BTL 5 | Evaluate |
| **5** | **Differentiate** collaborative filtering and content based systems. (13) | BTL3 | Apply |
| **6** | 1. **Explain** about High Level Architecture (6) 2. **Explain** the significance of Collaborative Filtering in detail. (7) |  |  |
| **7** | **Illustrate** the advantages and disadvantages of Content based and collaborative filtering recommendation system (13) | BTL2 | Understand |
| **8** | **Describe** Knowledge based recommendation system in detail (13) | BTL3 | Apply |
| **9** | 1. **Detailed** the rules of HLA (7) 2. **Difference** between Hybrid and Collaborative Recommendation (6) | BTL 4 | Analyze |
| **10** | 1. **Describe** common HLA terminologies. (3) 2. **Define** the steps involved in Collaborative Filtering (10) | BTL1 | Remember |
| **11** | 1. **Describe** web based recommendation system (7) 2. **When** can Collaborative Filtering be used? (6) | BTL1 | Remember |
| **12** | **Define** in detail about Matrix factorization models (13) | BTL1 | Remember |
| **13** | **Discuss** Neighbouring model in detail (13) | BTL6 | Create |
| **14** | 1. **Explain** is Matrix Factorization? (4) 2. **Discuss** the approaches of recommender system. (9) | BTL2 | Understand |
|  | **PART-C** |  |  |
| **Q. No** | **Questions** | **BT**  **Level** | **Competence** |
| **1** | **Narrate** in detail about a model for Recommendation system. (15) | BTL 5 | Evaluate |

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| **2** | **Discuss** in detail about High Level Architecture and also common Terminologies in HLA. (15) | BTL 6 | Create |
| **3** | **Classify** Recommendation techniques with examples (15) | BTL 5 | Evaluate |
| **4** | 1. **Design** Matrix factorization model (8) 2. **Detail** about Neighbouring models in detail (7) | BTL 6 | Create |