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| **Q.No** | **Question** | | **Marks** | **Section** | **UNIT** |
| 1 | What are recommender systems, and how do they function in various applications? | 8 | | Section-I | 1 |
| 2 | Summarize the prerequisites for building recommender systems? | 8 | | Section-I | 1 |
| 3 | What are the different types of recommender systems, and how do they differ from one another? | 8 | | Section-I | 1 |
| 4 | Explain Content-Based Filtering in detail with examples. | 8 | | Section-I | 1 |
| 5 | Explain Collaborative Filtering in detail with examples. | 8 | | Section-I | 1 |
| 6 | Outline about hybrid filtering, and how does it improve recommendation accuracy? | 8 | | Section-I | 1 |
| 7 | Explain how recommender systems integrate knowledge from different disciplines. | 8 | | Section-I | 1 |
| 8 | Discuss the role of deep learning in modern recommender systems. | 8 | | Section-I | 1 |
| 9 | Demonstrate major challenges faced by recommender systems? | 8 | | Section-I | 1 |
| 10 | Illustrate the cold-start problem in recommender systems, and how can it be solved? | 8 | | Section-I | 1 |
| 11 | Discuss the key components of a Content-Based Recommender System? | 8 | | Section-II | 2 |
| 12 | Implement a basic Content-Based Recommender System using TF-IDF and cosine similarity for movie recommendations. | 8 | | Section-II | 2 |
| 13 | Explain the role of Preprocessing in Content-Based Systems. | 8 | | Section-II | 2 |
| 14 | Summarize the different methods of feature extraction in content-based filtering? | 8 | | Section-II | 2 |
| 15 | Discuss how text-based feature extraction methods like TF-IDF improve recommendations? | 8 | | Section-II | 2 |
| 16 | Discuss Gini Index, Entropy, Chi-Square Statistic, and Normalized Deviation as feature selection and weighting techniques. | 8 | | Section-II | 2 |
| 17 | Discuss how user profiles built in content-based recommender systems? Explain using explicit ratings and implicit feedback. | 8 | | Section-II | 2 |
| 18 | Outline why filtering is important in content-based recommendation systems? | 8 | | Section-II | 2 |
| 19 | Explain Nearest Neighbour Classification, and how is it used in recommender systems? | 8 | | Section-II | 2 |
| 20 | Discuss the computational challenges in Nearest Neighbor Classification? | 8 | | Section-II | 2 |
| 21 | Explain the working principles of User-Based Collaborative Filtering. Discuss its advantages and challenges in recommendation systems. | 8 | | Section-III | 3 |
| 22 | Discuss the different similarity functions used in collaborative filtering. Compare cosine similarity, Pearson correlation, and adjusted cosine similarity in terms of effectiveness. | 8 | | Section-III | 3 |
| 23 | Discuss how User-Based Collaborative Filtering handle missing ratings in a user-item matrix? Discuss different approaches to filling in missing values and their impact on recommendation accuracy. | 8 | | Section-III | 3 |
| 24 | Discuss how mean-centering improve the prediction accuracy in neighborhood-based filtering methods? Explain with examples. | 8 | | Section-III | 3 |
| 25 | Discuss how a weighted average prediction function work in collaborative filtering? | 8 | | Section- III | 3 |
| 26 | Describe the concept of Item-Based Collaborative Filtering. | 8 | | Section- III | 3 |
| 27 | Explain the adjusted cosine similarity method used in Item-Based Collaborative Filtering. Why is it necessary to mean-center ratings before computing similarity? | 8 | | Section- III | 3 |
| 28 | Explore the difference between item-based collaborative filtering and user-based collaborative filtering. What is the most reliable approach, and why? | 8 | | Section- III | 3 |
| 29 | Summarize neighborhood-based collaborative filtering methods? | 8 | | Section- III | 3 |
| 30 | Discuss the key strengths and weaknesses of neighborhood-based collaborative filtering methods. How do they compare to model-based approaches? | 8 | | Section-III | 3 |
| 31 | Discuss rule-based collaborative filtering, and how does it work? | 8 | | Section-IV | 4 |
| 32 | Discuss rule-based filtering differ from traditional collaborative filtering methods? | 8 | | Section-IV | 4 |
| 33 | What is the significance of confidence and support in association rule mining for recommendation systems? | 8 | | Section-IV | 4 |
| 34 | Explain how Association Rule Mining can be used in Collaborative Filtering. Provide an example | 8 | | Section-IV | 4 |
| 35 | Explain Naïve Bayes collaborative filtering, and how does it work? | 8 | | Section-IV | 4 |
| 36 | How can Neural Networks be applied to Collaborative Filtering? Describe the role of deep learning in recommendation systems. | 8 | | Section-IV | 4 |
| 37 | Explain how Singular Value Decomposition (SVD) help in dimensionality reduction for collaborative filtering? | 8 | | Section-IV | 4 |
| 38 | What is matrix factorization, and how does it relate to Singular Value Decomposition (SVD) in recommendation models? | 8 | | Section- IV | 4 |
| 39 | What are the advantages of using Stochastic Gradient Descent (SGD) in training recommendation models? | 8 | | Section- IV | 4 |
| 40 | Discuss how regularization prevent overfitting in recommendation models? | 8 | | Section- IV | 4 |
| 41 | Discuss why evaluation important in recommender systems? | 8 | | Section-V | 5 |
| 42 | Outline the challenges exist in evaluating the performance of recommendation systems? | 8 | | Section-V | 5 |
| 43 | How do accuracy metrics measure the effectiveness of recommendations? | 8 | | Section-V | 5 |
| 44 | Outline some common accuracy-related challenges in recommender systems? | 8 | | Section-V | 5 |
| 45 | Discuss how can a system with high accuracy have poor coverage? | 8 | | Section-V | 5 |
| 46 | How can recommendation systems improve confidence in their suggestions? | 8 | | Section-V | 5 |
| 47 | How does serendipity differ from novelty in recommendations? | 8 | | Section-V | 5 |
| 48 | Explain how does increasing the number of users and items affect system scalability? | 8 | | Section-V | 5 |
| 49 | Why is it important to split data into training and testing sets in recommendation evaluation? | 8 | | Section-V | 5 |
| 50 | Outline the accuracy metrics in offline evaluation, and why are they used? | 8 | | Section-V | 5 |