

***Department of Computer Science and Engineering***

**Subject Name: Artificial Intelligence and Machine Learning Subject Code: MR22-1CS0105**

**Year & Semester: III-I**

**Unit-Wise Question Bank**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Qno** | **Question** | | **Marks** | **Section** | **UNIT** |
| 1 | What is AI? Explain the AI techniques? | 8 | | Section-I | 1 |
| 2 | Explain briefly about the goals of AI, its advantages and disadvantages. | 8 | | Section-I | 1 |
| 3 | Explain briefly about State Space Search with an example. | 8 | | Section-I | 1 |
| 4 | Explain in detail about Production Systems and its applications. | 8 | | Section-I | 1 |
| 5 | Explain the issues in the design of search programs. | 8 | | Section-I | 1 |
| 6 | Explain in detail about Un-Informed Search, BFS, and DFS with an example. | 8 | | Section-I | 1 |
| 7 | Explain in detail about A\* Algorithm with an example. | 8 | | Section-I | 1 |
| 8 | Explain in detail about AO\* Algorithm with an example. | 8 | | Section-I | 1 |
| 9 | Explain in detail about Best-First Search with an example. | 8 | | Section-I | 1 |
| 10 | Explain in detail about Hill Climbing with an example. | 8 | | Section-I | 1 |
| 11 | What is Knowledge? Explain its types? | 8 | | Section-II | 2 |
| 12 | Explain Inference rules in proposition logic and First order predicate logic. | 8 | | Section-II | 2 |
| 13 | Explain types of quantifiers. | 8 | | Section-II | 2 |
| 14 | Write difference between proposition logic & predicate logic. | 8 | | Section-II | 2 |
| 15 | Explain FOL inference rules for quantifier. | 8 | | Section-II | 2 |
| 16 | Explain resolution in First Order Logic. | 8 | | Section-II | 2 |
| 17 | Consider the following set of well-formed formulas in predicate logic:  Man(Marcus)  Pompeian(Marcus)  ∀x : Pomeian(x) → Roman(x)  Ruler(caeser)  ∀x : Roman(x) → loyalto(x,caeser) V hate(x,caeser)  ∀x: y loyalto(x,y)  ∀x:∀ y Man(x) ∧ tryassassinate(x,y) → loyalto(x,y)  Tryassassinate(Marcus,caeser)  Convert these into clause form and prove that hate(Marcus,Caeser) using resolution proof | 8 | | Section-II | 2 |
| 18 | Use the inference rules to derive the soundness of the argument, derivation the reason for the murder  P: Robbery was the reason for the murder.  Q: Something was taken.  R: Politics was the reason for the murder.  S: A woman was the reason for the murder.  T: The murderer left immediately.  U: The murderer left tracks all over the room. | 8 | | Section-II | 2 |
| 19 | Define Bayes theorem with an example. | 8 | | Section-II | 2 |
| 20 | Explain Bayesian belief network with an example | 8 | | Section-II | 2 |
| 21 | Define machine learning and what are the important objectives of machine learning? | 8 | | Section-III | 3 |
| 22 | Briefly explain about Components of learning Process. | 8 | | Section-III | 3 |
| 23 | What is supervised and unsupervised learning? Explain with the examples. | 8 | | Section-III | 3 |
| 24 | Define ordering of hypothesis and illustrate it with an example. | 8 | | Section-III | 3 |
| 25 | Illustrate finite and infinite hypothesis spaces with an example. | 8 | | Section- III | 3 |
| 26 | Define Version space and illustrate it with an example. | 8 | | Section- III | 3 |
| 27 | Explain steps of candidate elimination algorithm. Apply the algorithm to obtain the final version space for the given training set | 8 | | Section- III | 3 |
| 28 | Explain about linear and non-linear classification. | 8 | | Section- III | 3 |
| 29 | Define Multiclass and Multi-label Classification with a neat diagram? | 8 | | Section- III | 3 |
| 30 | Differentiate Traditional programming approach vs Machine learning approach and discuss different perspectives of Machine Learning. | 8 | | Section-III | 3 |
| 31 | Discuss in detail about decision tree ID3. | 8 | | Section-IV | 4 |
| 32 | Explain Linear Regression with its cost function. | 8 | | Section-IV | 4 |
| 33 | Briefly explain about Multiple Linear Regression with an example | 8 | | Section-IV | 4 |
| 34 | Explain Logistic Regression with an example | 8 | | Section-IV | 4 |
| 35 | Differentiate Classification and Regression with an example. | 8 | | Section-IV | 4 |
| 36 | Explain Support vector machines and its types. | 8 | | Section-IV | 4 |
| 37 | Explain K-Nearest Neighbors and its working in detail | 8 | | Section-IV | 4 |
| 38 | Explain working of Neural Network | 8 | | Section- IV | 4 |
| 39 | Discuss briefly about CART in decision trees. | 8 | | Section- IV | 4 |
| 40 | Explain multi-layer perceptron architecture. | 8 | | Section- IV | 4 |
| 41 | What is unsupervised learning, and how does it differ from supervised learning? Provide examples of applications of unsupervised learning in real-world scenarios. | 8 | | Section-V | 5 |
| 42 | Define clustering. What are the different types of clustering techniques? Explain hierarchical and partitional clustering in detail. | 8 | | Section-V | 5 |
| 43 | What is AGNES in hierarchical clustering? Describe its working process with an example. | 8 | | Section-V | 5 |
| 44 | Explain DIANA in hierarchical clustering. How does it differ from AGNES? Discuss with an example. | 8 | | Section-V | 5 |
| 45 | How does the K-means clustering algorithm work? Illustrate its steps with an example. | 8 | | Section-V | 5 |
| 46 | What is K-Mode clustering, and why is it used for clustering categorical data? Compare it to K-means clustering in terms of their applications and performance | 8 | | Section-V | 5 |
| 47 | What is a Self-Organizing Map (SOM)? Describe its learning process and its role in clustering. | 8 | | Section-V | 5 |
| 48 | Explain the Expectation Maximization algorithm. How is it applied in clustering? Discuss the advantages of EM over simpler algorithms like K-means. | 8 | | Section-V | 5 |
| 49 | What are Gaussian Mixture Models (GMM)? How do they use the Expectation Maximization algorithm for clustering? | 8 | | Section-V | 5 |
| 50 | What is Principal Component Analysis (PCA)? How does it work, and how is it used in unsupervised learning? Explain with an example. | 8 | | Section-V | 5 |