Machine Learning (CS3035)
Question Bank: Part-I

<u>Some fundamental questions up to ML (CS-3035) mid-semester exam. (but not limited to):</u>

1. What is learning in computer science?
2. Differentiate between weak-AI and Strong-AI.
3. Differentiate between Machine Learning and Deep Learning.
4. Explain different types of learning using suitable real-world examples.
5. Differentiate between supervised learning and unsupervised learning.
6. Explain different data types used in modern machine learning paradigm with examples.
7. What is true zero point for a numeric data type? Explain with example.
8. Differentiate between Univariate and Multivariate data analysis.
9. What do you mean by central tendency? Explain it with suitable example.
10. What is skewness? Explain at least one remedy for it.
11. What is kurtosis? Discuss at least one solution for it.
12. Explain the similarity and dissimilarity between Normal distribution and Students T-test.
13. Explain discriminative and generative learning models with suitable examples.
14. What are the different types of errors used in machine learning?
15. Differentiate between Type-I and Type-II errors.
16. Explain different evaluation metrics used in classification.
17. What are the properties of a distance metric?
18. Discuss different types of distance metrics using suitable expressions.
19. Explain the Minkowski Distance is a generalization of the Manhattan and Euclidean Distance metrics.
20. Explain any two bounded distance metrics with examples.
21. Explain the Voronoi diagram used in KNN?
22. What is KNN classification? Why is it called lazy learning?
23. Explain the KNN algorithm with a small hand crafted dataset and demonstrate its working principle.
24. Explain the advantages and disadvantages of KNN algorithm.
25. How many types of clustering are available in ML? Explain each type with example.
26. Explain the KMeans algorithm with a small hand crafted dataset and demonstrate its working principle.
27. Explain the advantages and disadvantages of KMeans clustering.
28. Differentiate between classification and regression.
29. Why do we call the Linear Regression a linear model?
30. Derive the cost function of Linear Regression using step by step explanation.
31. What are the assumptions in Linear Regression? Also mention the solutions for them.
32. What is Polynomial Regression?
33. Differentiate between Linear Regression and Logistic Regression.
34. Justify the name "Logistic Regression".
35. Why do we use a logistic function in Logistic Regression?
36. Derive the log-loss cost function of Logistic Regression using step by step explanation.
37. What are the drawbacks of the Linear Regression algorithm?
38. What are the merits and demerits of Logistic Regression model if any?
39. What is regularization?

40. Explain different types of regularization in ML using appropriate examples.
41. Differentiate between Lasso (L1) and Ridge (L2) regularization.
42. What is Elastic-Net regularization.
43. Explain the penalty term used in the Linear Regression for regularization of the model.
44. Explain how the penalty term influences the Logistic Regression for regularization of the model.
45. What is the Stochastic Gradient Descent Algorithm?
46. What is the Least Square Method?
47. Explain the OLS and Gauss-Markov Theorem.
48. Find the equation of linear regression line using following data points: (0,72),(5,66), (10,70), (15,64), (20,60)
49. Using K-mean Clustering Algorithm, Cluster the following data points: (5,7), (11,45),(10, 6), (18,29), (10,25), (4,3); where K=2 and Euclidean distance.
50. Using KNN algorithm and the given data set, predict the label of the test data point (3,7), where K=3 and Euclidean distance.

X	Y	Label
7	7	1
7	4	1
3	4	2
1	4	2