**RCSE–002**

# Ph. D. (COURSE WORK)
# COMPUTER SCIENCE (PHDCS)
## Term-End Examination
## June, 2025

### RCSE–002 : MACHINE LEARNING

*Time : 3 Hours*          *Maximum Marks : 100*

*Weightage : 50%*

*Note* : (i)  *Question No. **1** is compulsory.*

(ii)  *Attempt any **three** questions from the rest.*

1. (a)  What is Machine Learning ? What are areas of applications and research of Machine Learning ? Explain in detail.

     10

   (b)  What is the role of data in research ? What is need of Hypothesis Testing ? Does sample size have any effect on Hypothesis Testing ? Justify your answer.          10

(c) What is version space ? Discuss the List-Then-Eliminate algorithm with the help of an example. 10

(d) What is clustering ? Write and explain *K-means* algorithm. 10

2. (a) Explain the process of designing a learning system with the help of an example. 10

(b) Write is Z-score ? Explain p-value, level of significance and level of confidence in hypothesis testing with the help of a suitable example. 10

3. (a) What is computational learning ? Explain its significance. 7

(b) What are PAC and PAC learnables ? Explain. 7

(c) Explain supervised and unsupervised learning with an example for each. 6

4. (a) Explain the Gini Index method to measure the node impurity for continuous attributes with the help of an example. 10

(b) What is decision tree ? Explain ID3-algorithm used for creating a decision tree. 10

5. Write short notes on the following : 4×5=20

(a) Entropy to measure node impurity

(b) Gain ratio

(c) Difference between C4.5 and CART algorithm

(d) Overfitting and Underfitting

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