

**M.Sc. 3rd Semester Examination, 2023**

**COMPUTER SCIENCE**

**PAPER – COS-302(M1 & M1)**

*Full Marks : 50*

*Time : 2 hour*

*The figures in the right hand margin indicate marks*

*Candidates are required to give their answers in their own words as far as practicable*

**PAPER – COS-302(M1)**

*( Machine Learning )*

**GROUP – A**

Answer any two questions : 2 × 2

1. Define F1-score and recall.

2. What do you mean by overfitting and underfitting ?
3. What is entropy ?
4. What is the difference between regression and classification ?

GROUP – B

Answer any two questions : 4 × 2

5. Differentiate between logistic regression and linear regression. 4
6. Explain the k-fold and leave p-out cross validation training. 2 + 2
7. What do you mean by data pre-processing ?  
What is bias and variance ? 2 + 2
8. Explain the K-nearest neighbor classifier algorithm. 4

## GROUP – C

Answer any one question :

8 × 1

9. Given the following table S and find the entropy(S), entropy(S, Temperature) and information gain(S, Humidity) from it.

Outlook	Temperature	Humidity	Wind	Play Tennis
Sunny	Hot	High	Weak	No
Sunny	Hot	High	Strong	No
Overcast	Hot	High	Weak	Yes
Rain	Mild	High	Weak	Yes
Rain	Cool	Normal	Weak	Yes
Rain	Cool	Normal	Strong	No
Overcast	Cool	Normal	Strong	Yes
Sunny	Mild	High	Weak	No
Sunny	Cool	Normal	Weak	Yes
Rain	Mild	Normal	Weak	Yes
Sunny	Mild	Normal	Strong	Yes
Overcast	Mild	High	Strong	Yes
Overcast	Hot	Normal	Weak	Yes
Rain	Mild	High	Strong	No

10. Explain the support vector machine classifier algorithm. What is confusion matrix ? 6+2

**PAPER – COS-302(M2)**

( *Deep Learning* )

**GROUP – A**

Answer any **two** questions : 2×2

1. What is deep learning ?
2. What do you mean by dimensionality reduction ?
3. What is vanishing gradients ?
4. If the image input shape is  $32 \times 32 \times 3$  with the  $3 \times 3$  filters, then find the output shape of CNN.

GROUP – B

Answer any two questions :  $4 \times 2$

5. Explain the k-means clustering algorithm.
6. Write a short note on PCA.
7. Explain the recurrent neural network architecture.
8. What is the difference between supervised and unsupervised learning ?

GROUP – C

Answer any one question :  $8 \times 1$

9. Explain the convolutional neural network (CNN) architecture in details with proper diagram.

( 6 )

10. Explain the long-short term memory network.

Why this network was introduced ?      6 + 2

[ *Internal Assessment – 10 Marks* ]

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