Register Number: _____

Date: _____

ST. JOSEPH'S COLLEGE(AUTONOMOUS), BENGALURU-27
MSc(DATA ANALYTICS) —III SEMESTER
Continous Assesment Test:Ocotber 2022
BDA 3321: MACHINE LEARNING II

TIME: 1 hr **MAXIMUM MARKS: 25**

This paper has 2 printed pages and 2 parts.

Part A

Answer any FIVE questions. **($5 \times 3 = 15$)**

1. Explain a perceptron, with a diagram. (3)

> **Solution:** Diagram + weighted inputs, activation function, adder $(1 + .6 + .6 + .6)$

2. Show diagramatically an MLP. (3)

> **Solution:** Diagram + labeles of all components: input layer, hidden layer, bias input, output layer.(1+2)

3. Explain a DAG. (3)

> **Solution:** Definition + example. (1.5+1.5)

4. For the given transisition state matrices, give the state transisition diagrams.
$A_1 = \begin{bmatrix} 1-\alpha & \alpha \\ \beta & 1-\beta \end{bmatrix}$ $A_2 = \begin{bmatrix} A_{11} & A_{12} & 0 \\ 0 & A_{22} & A_{23} \\ 0 & 0 & 1 \end{bmatrix}$. (3)

> **Solution:** 1.5 + 1.5

5. (a) Define the chain rule. (1)
   (b) Define conditional probability. (1)
   (c) Show Naive Bayes model as a DAG. (1)

Solution: Definition + Definition + Diagram. (Definition means defining symbols used.)
(0.5+0.5+0.5+0.5+1)

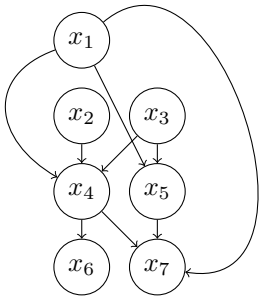
6. With respect to graphs; define:
   (a) Parent, child (1)
   (b) Root, leaf. (1)
   (c) Tree, forest. (1)

Solution: Definition (with symbols defined). (0.5/defition)

PART B

Answer ANY ONE question. **($1 \times 10 = 10$)**

1. (a) What is a ordered markov property, for a DAG. For the given diagram, write the joint probability distribution:



(4)

   (b) Explain modelling a language using Markov Models. (6)

Solution:

(a) Defition with explanation + Joint pdf (3+1)

(b) Modelling using markov chain: n-grams, MLE for n-grams, drawbacks, handling out of vocabullary words.
(1+2+1+2)

2. (a) Briefly explain all the different components of an MLP. (4)
   (b) Explain CNN. Also represent a CNN diagramatically. (6)

Solution:

(a) weighted inputs, bias input, hidden layer(s), activation function, output layer.

(b) Architechture of a CNN, explanation of different layers, convolution, stride, pooling, example of a use case, diagram.