## Paper Name: Artificial Intelligence

## MSc 3rd Semester                                              FM=30

## PART-A

Q1. Answer any **five** questions                                         5 X 2 =10

i) Prove that height (F) =1 where F is normal fuzzy set

ii) Let us consider the fuzzy set M on the set U={a,b,c,d,e} described as

M=0.375/a +0.5/c + 1.0/d + 0.875/e;

Find out support(M), core(M)?

iii) Consider two fuzzy sets:

P=Beautiful flowers=0.3/jasmine + 0.9/rose + 1.0/lotus + 0.7/daffodil

Q=Fragrant flowers= 1.0/jasmine + 1.0/rose + 0.5/lotus + 0.2/daffodil

Compute fuzzy sets R

Where R=OR (P,Q)

iv) Define convex fuzzy set with the help of an example

v) Consider a dataset with five objects a=1, b=2, c=4, d=5, e=6; There are two clusters C1: {a,b} and C2: {c, d, e}; Compute the distances between C1 and C2 using single linkage, complete linkage and avg, linkage

vi) State the differences between partitioned clustering and hierarchical clustering algorithm

## PART-B

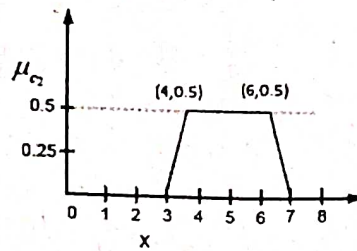Q2. Answer any **four** questions                                         4 X 5=20

a) Define the agents in artificial intelligence. State the differences between Uniform-cost Search Algorithm and Iterative deepening depth-first Search    (1+4)=4
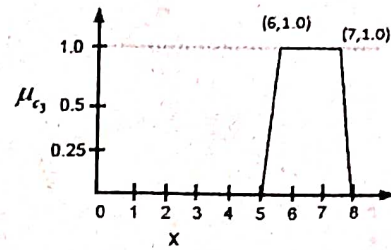
b) There are three fuzzy sets A1, A2, A3 in the following figure. Find out the defuzzified value of the aggregated fuzzy set (A1,A2,A3) using centre of gravity method.
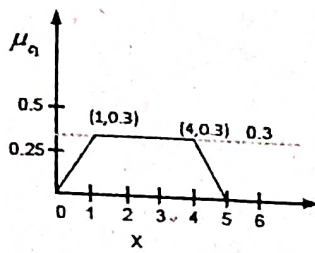
A1                                    A2                                    A3

c) Explain A* algorithm with the help of an example

d) Find the root of decision tree using CART algorithm. Please refer Table 1.

Table 1:

| Day | Outlook | Temperature | Humidity | Wind | Decision: ( Golf Play possible) |
|---|---|---|---|---|---|
| 1 | Sunny | Hot | High | Weak | No |
| 2 | Sunny | Hot | High | Strong | No |
| 3 | Overcast | Hot | High | Weak | Yes |
| 4 | Rain | Mild | High | Weak | Yes |
| 5 | Rain | Cool | Normal | Weak | Yes |
| 6 | Rain | Cool | Normal | Strong | No |
| 7 | Overcast | Cool | Normal | Strong | Yes |
| 8 | Sunny | Mild | High | Weak | No |
| 9 | Sunny | Cool | Normal | Weak | Yes |
| 10 | Rain | Mild | Normal | Weak | Yes |
| 11 | Sunny | Mild | Normal | Strong | Yes |
| 12 | Overcast | Mild | High | Strong | Yes |
| 13 | Overcast | Hot | Normal | Weak | Yes |
| 14 | Rain | Mild | High | Strong | No |

e) Find out the class label of the following sample (X) (refer Table 1) using Naïve Bayesian classifier
   X = {Outlook= Rain, Temperature=Hot, Humidity=High, Wind=Weak }

f) State the working principle of k-means algorithm with the help of a flowchart