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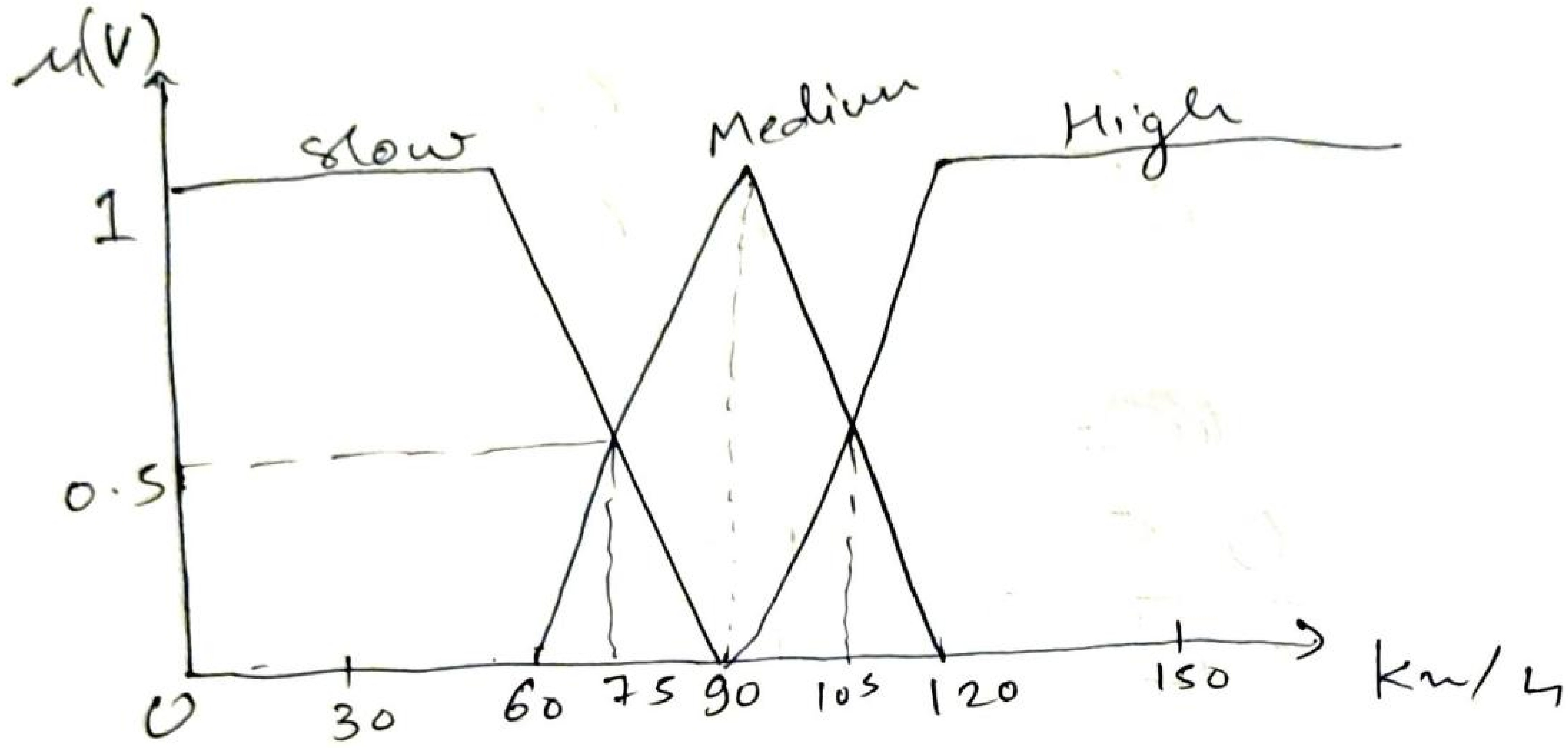
Ans2)

(a) (i) $V = 100 km/h$, (ii) $V = 70 Km/h$



(i) $V = 100 Km/h$

$$\frac{0.5}{c} = \frac{105-90}{100-90}$$

$$\frac{0.5}{c} = \frac{15}{10}$$

$$c = 5/15 = 0.333$$

$\mu(V)$ at $100 Km/h = 0.33$

(ii) $V = 70\ km/h$

$$\frac{0.5}{C'} = \frac{75-60}{70-60}$$

$$\frac{0.5}{C'} = \frac{15}{10}$$

$$C' = 5/15 = 0.33$$

$\mu(v)$ at $70\ km/h = 0.33$

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1(b)(i) Support : The support of a fuzzy set A is the set of all points x in X such that

$$\mu_A(x) > 0$$

$A = 0.1|-1 + 0.5|2 + 0.4|0 + 0.3|1$

↳ it is a fuzzy set

$Sup(A) = 0.5|2 + 0.3|1$

(ii) Core : The core of a fuzzy set A is the set of all the points x is X such that $\mu_A(x) = 1$.

$Core(A) = \{x \mid \mu_A(x) = 1\}$

(iii) Normality : A fuzzy set A is normal if its core is non-empty.

(iv) Convexity: for any x_1, x_2 belongs to $X \rightarrow x_1, x_2 \in X$ and any $\lambda \in [0,1]$, then

$$\mu_A(\lambda x_1 + (1-\lambda)x_2) \geq \min\{\mu_A(x_1), \mu_A(x_2)\}$$

A is a convex if all its α level sets are convex.

(c) $T_{dp}(a,b) \leq T_{bp}(a,b) \leq T_{ap}(a,b) < T_{min}(a,b)$

$T_{ap} \leq T_{min}$

$ab \leq \min(a,b)$

$1 \cdot 1 = \min(1,1)$; $a,b = 1$ (P)

$0 \cdot 0 = \min(0,0)$; $a,b = 0$ (P)

$a \times b < a$, $a, b < 1$

and

$a \times b < b$

So,

$a \times b < \min(a,b)$

$T_{bp} \leq T_{ap}$

$0 \vee (a+b-1) \leq ab$

$0 \leq ab \Rightarrow 0 = 0 \cdot 0 \quad ab = 0$

$1 = 1 \cdot 1 \quad ab = 1$

$0 < a \cdot b \quad ab < 1$

or

$(a+b-1) \leq ab$

$-1 < 0 \quad a, b = 0 (p)$

$1 = 1 \cdot 1 \quad a, b = 1 (p)$

$a, b < 1$

again, $a + b > 1$

$a + b > a \cdot b$

but,

$a + b - 1 < ab (p)$

and $a + b - 1 < ab (p)$

if $a, b < 1$

and $a + b < 1$

$a+b > a.b \Leftarrow (a+b) > a.b$ (c)

also $a+b-1 < a.b$ (P)

$T_{dp} \leq T_{bp}$

$O \vee (a + \cancel{1} - \cancel{1})$

$= O \vee a = a$

$O \vee (a+b-1)$ if $b=1$

(P)

$O \vee (\cancel{1+} b \cancel{-1})$ if $(a=1)$

$= b$ (P)

if $a, b < 1$

and $a+b > 1$.

$\approx \underset{max}{O}$ or positive value

$(0, +ive) \approx \underline{+ive > 0}$ (P)

if $a, b < 1$

and $a+b < 1$

0 or negative value

$\approx max(0, -ive)$

$\underline{\approx 0}$ (P)

$$\boxed{T_{dp}(a,b) \leq T_{bp}(a,b) \leq T_{ap}(a,b) \leq T_{min}(a,b)}$$

hence proved