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PRINCIPLES OF ARTIFICIAL INTELLIGENCE.

Part - B

Q.1] a] Dempster-Shafer Theory:-
                    This theory is
an evidence theory. It combines all
possible outcomes of the problem. Hence
it is used to solve problems where there
may be a chance that a different
evidence will lead to some different
result.
     This considers a set of propositions
and assigns to each of them an interval.
   i.e.   [Belief, Plausibility].

* **Belief** : The Belief measures the strength
   of the evidence in favour of the set of
   propositions. It ranges from 0 [no evidence]
        to 1 [certainity].

* **Plausibility**:- It is a measure of the
extent   to which evidence in favour
of -X leaves room for belief in X. It
ranges from 0 to 1 and is defined as:-

$$Pl(x) = 1 - Bel(x)$$

Q.1b) Given: m_1

$$\{covid\ 19,\ Bronchitis,\ Tuberculosis\} = 0.6$$
$$\{\theta\} = 0.4$$

m_2

$$\{Asthama,\ covid\ 19,\ Bronchitis\} = 0.8$$
$$\{\theta\} = 0.2$$

— For simplification lets denote as:

covid-19 —→ Cov ; Asthma —→ Ast
Bronchitis —→ Bro ; Tuberculosis —→ TB

—→ Table for m_1 & m_2 :—

$m_1 \downarrow$ $\quad \xrightarrow{m_2}$	$\{Ast, Cov, Bro\}$ (0.8)	$\{\theta\}$ (0.2)
$\{Cov, Bro, TB\}$ (0.6)	$\{Cov, Bro\}$ (0.48)	$\{Cov, Bro, TB\}$ (0.12)
$\{\theta\}$ (0.4)	$\{Ast, Cov, Bro\}$ (0.32)	$\{\theta\}$ (0.08)

Hence, from the table we obtain m_3 :—

$$\{covid,\ Bronchitis\} \qquad (0.48)$$

$$\{covid,\ Bronchitis,\ Tuberculosis\} \qquad (0.12)$$

$$\{Asthma,\ covid,\ Bronchitis\} \qquad (0.32)$$

$$\qquad\qquad (0.08)$$

$$\xi \qquad \theta$$