AI - Exam:

P. Kkrish Muthu Rathinam.
S5060913.

① Propositional Logic:

$A \Rightarrow$ Carla.
$B \Rightarrow$ Diana
$C \Rightarrow$ Marico.
$D \Rightarrow$ Bruno.

goes to the Party.

Formula:

$D \rightarrow \neg A \Rightarrow \varphi_1$

$(D \vee C) \vee (D \wedge C) \Rightarrow \varphi_2$

$C \rightarrow B \Rightarrow \varphi_3$

$A \rightarrow \neg B \Rightarrow \varphi_4$

$(A \vee B) \wedge (C \vee D) \Rightarrow \phi.$

Equation:

$\varphi = D \rightarrow \neg A \equiv (\neg D \vee \neg A).$

$\varphi_2 = (D \vee C) \vee (D \wedge C).$

$\varphi_3 = C \rightarrow B \equiv \neg C \vee B.$

$\varphi_4 = A \rightarrow \neg B \equiv \neg A \vee \neg B.$

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To find whether the Party will happen or Not The φ_1 φ_2, φ_3 and φ_4 should satisfy ϕ. where ϕ is $(A \vee B) \wedge (D \vee C)$.

$\left.\begin{array}{l} *)\ \neg D \\ *)\ \neg A \end{array}\right\} \Rightarrow \varphi_1$ $\left.\begin{array}{l} *)\ D, C \\ *)\ D, C \end{array}\right\} \Rightarrow \varphi_2$

$\left.\begin{array}{l} *)\ \neg C \\ *)\ B \end{array}\right\} \varphi_3$ $\left.\begin{array}{l} *)\ \bar{\neg} A \\ *)\ \neg B \end{array}\right\} \varphi_4.$

which means the Party is over when one-male and female are Going. the φ_1, φ_2, φ_3, φ_4 ~~Cont~~ consistent because if they are Not the Every formula of is a logical Con coquence of them.

$$(\varphi_1, \varphi_2, \varphi_3, \varphi_4 \models \phi).$$

The Party will be there only a satisfie there in allone one interpretation that can contende.

$$(\varphi \wedge \varphi_2 \wedge \varphi_3 \wedge \varphi_4 \wedge \varphi_5 \text{ is } T).$$

$(A \vee B) \vee (C \vee D) \Rightarrow$ *) AB
*) CD.

The Considering Velements Converaint in a following indeperation $A' = F$; $B' = T$. ; $C' = T$; $D' = T$.

logical is true.

So its satofiable. for the above interation $\psi_1 \wedge \psi_2 \wedge \psi_3 \wedge \psi_4 \wedge \psi_5 \Rightarrow T$ and is satisifiable.

Hence the party will be there.

Only as carla does Not goes to the

Party.

(5) (i) $\forall x\, P(x) \rightarrow \exists (y)\, P(y)$.

Formula : Relational Logic:

Showing the formula we are that "in a

Party it satisfiable.

$x = y$

$\forall = \exists$

The logical constraints, the party of bound

in (ii) $\forall x\, \exists y\ \varphi(x, y) \Rightarrow \exists x \forall y \varphi(x, y)$

$$\left.\begin{array}{l}\forall x = \forall y. \\ \exists y = \exists x\end{array}\right\} \Rightarrow \text{Equation is solved.}$$

(iii) $\exists y\ P(y) \Rightarrow \forall x\,.\, P(x)$.

$\exists y = \forall x \Rightarrow$ its possible.

(iv) $\forall x \forall y\, .\, \varphi\ (x, y) \rightarrow \exists x\, P(x)$.

$\Downarrow$

its. Not Possible.

(v) $(\forall x\ (P(x) \rightarrow \exists y\, \psi\ (x, y)) \wedge \exists z.\ P(y)) -$

$\exists x\ \exists y.\ \overline{\psi}\ (x, y)$.

$\Downarrow$

its Not Possible