NORMAL FORMS

as negation (n) or conjunction (1) or both is entled a basic conjunction.

NOTE: Basic conjunctions have the truth value time (T) only for a particular combination of truth values that can be assigned to the statement variables appearing in it.

example: (~prqnr) is a basic conjunction and it has the & dinth value true for the combination of dinth values FTT that can be assigned to the statement variables p, q, r subjectively and their Moreover, there is no other combination of dinth values for which (~prqnr) is true.

NOTE: Basic conjunctions are restricted statement demotes. forms.

Principle Conjunctive Normal Form (PCNF):

Every statement form which is not a tantology is logically equivalent to a restricted statement form, of the form (1 (V Rij)) where each Rij's as statement variables or negation of a statement variable. This form is called principle conjunctive normal forms. example: Principle conjunctive normal forms.

example: Principle conjunctive normal form of ((~pvq) -> r) is (~pvqvr) 1 (pvqvr) 1 (pvqvr).

THE RESERVE TO THE PERSON OF T

The same was the same of the

A 18 THE REAL PROPERTY.

Principle Disjunctive Normal Form (PDNF):

Every statement form which is not a contradiction is logically appropriately to a restricted statement form, of the form (M (A Qij)); where each Qij is a statement variable or negation of a statement variable. This form is called principle disjunctive normal form.

example: Principle disjunctive normal from of $(p \leftrightarrow q)$ is $(p \land q) \lor (\sim p \land \sim q)$.

Process of Finding PCNF:

Suppose R is a statement firm consisting of some statement variables and we need to find PCNF at R.

Stepl: Find the druth table for (CR).

11ep2: Find the combination of fruth values for which (~R) have the fruth value true (T).

step 3: Find all the basic conjunctions for each combination of truth values that obtained in step 2.

step4: Find the disjunctions of 8 au the basic conjunctions obtained in step3.

This is the PDNF which is legically equivalent to (~R).

steps of find the negation of the PONE that has been obtained in step 4 and apply Dimergan's laws. Then the resulting a statement form will be the PCNE which is begically equivalent to R.

Process of finding PONF:

Suppose R is a statement form consisting of statement variables and connectives. We need to find PONF of R.

Step1: Find the truth table for R.

Step 2; Find the combination of druth values for which R but the first value time (T).

each of the search of truth values that has been obtained in step 2.

tep4: Find disjunction of a AU the basic conjunctions that has been obtained in Alab 3.

The rewriting a statement form is the basic conjunction PDNF of R.

Problem: Find the principle & emjunctive normal from and principle disjunctive normal form of ((~pvq) ->p).

Volv. hed, R: (hpvq) -r).

9	r	(~p)	(~pv9)	R: (~pv9)	→r) (~R)
7	7	F	T	T	F
T	F	F	T	F	T
F	T	F	F	T	F
F	F	F	F	T	F
\mathcal{T}	\mathcal{T}	T	T	7	F
T	F	T	T	F	T
F	7	T	T	* T	F
F	F	T	T	F	T
֡֡֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜֜	T F F T F	T T F F T T F F T T F	T F T F F T F T T T T F T F T T F T T	T T F T F F F F T T T T T T F T T T T F T T T	T T F T T T F F T F F T F F T F F F T T T T T T F F T T T T

The combination of fruth values for which (~R) has the finth volve tim (T) are;

TTF, FTF, FFF.

Basic conjunctions corrusponding to above combination of tinthe value opposed ruspectively are:

Oper (pagnar), (apagnar), (apaagnar).

Then fore the PDNF which is Logically equivalent to (NR) is (P1911mr) V (Np191nr) V (Np1nq1nr).

i.e. $\sim (\sim R) \Leftrightarrow \sim ((p \land q \land \sim r) \lor (\sim p \land q \land \sim r)) \lor (\sim p \land \sim q \land \sim r))$.

in R => ((~pv~qvn) 1 (pv~qvn) 1 (pvqvr)).

Linu, ~(~p) ⇔ p.

Thus. (~pv~qvr) 1 (pv~qvr) 1 (pvqvr) is the PCNF
which is Logically equivalent to R.

PDNF

The combination of druth values for which has the truth value true (T) are:

TTT, TFT, TFF, FTT, FFT

Basic conjunctions corresponding to above combination of truth values respectively are:

(ÞIGIT), (ÞINGIT), (ÞINGINT), (NÞIGIT), (NÞINGIT).

Therefore, the PONF which is Logically equivalent to R is, (prqnr)V (pragnr)V (pragnr)V (pragnr)V (pragnr)V (pragnr)V (pragnr)V (pragnr)V (pragnr).

Problem: Find the PCNF and PONF which is hogically equivalent to following statement forms:

- 1. ((\$19) V (~9 00 m)).
- 2. (PAQAn) V (~PA~QAr).
- 3. ~ (p → ~ q → r).

Ungreen Rolling Control

fresh they were a specific garden