2 PAZ¬(9Ax) V (P→9). 30 m: PA - 1(9,18) V (P->9) ED PAT (QA8) V (TPVQ), POIL DTPM 2 > pr (19 v 78) v (7pvg) demograis (PATQ) V (PATO) V TPVQ dietable which is the Sum of produch. and in the frequired DNF. A) Find the conjunctive normal forms for the following: ( (PA ¬(9AT)) V (P→9). Som: (PA-1(qAr)) V (P→9) (PA T(gAT)) V (TPV9), PAG ENTPY (PA (19 VT8)) V (-1P V9) demorganis (P1-19) V (P1-18) V (-1PV9) (PV(PN-TR)) N ((-19V(PN-TR)) V ( Tprq) distrib (PVP) N(PV TR) N (TgVP) N(TgVTR) V (TPVg) dish (PVP) A (PV-IR) A (-19VP) A (-19V7R V TPV9)

APRIPUTE) 11-19UP) 1(-19UQU DA (PVTR) A (TQVP) A (TV/TR DA (PVTR) A (TAVP) AT DU DU (PUTR) U (TOVA). which is the required EVF. 2. (9 V(PA91) A - (PV8) 19) (qv(PAq)) 1 -1 ((PV8) 19) => 9n - ((PVr) 19) Absorption law € 9 1 7 (prr) v79 Demoganis = 9 1 (TPATIS) V 79 demorganis = 9 1 (TPV79) 1 (TVV79)

dichabuba

Principal Disjunctive and Principal
Conjunctive Normal Forms (PDNF) & IKM
Definitions

is the required enf.

the products in which each of its variable, the products in which each of its variable. Variable or its negation, but not both, occurs only once are called the minterms:

DA (PVTR)  $\Lambda$  (TQVP)  $\Lambda$  (TQVQV)

TRVTP)

DA (PVTR)  $\Lambda$  (TQVP)  $\Lambda$  (TV (TRV

PVTR)

PA (PVTR)  $\Lambda$  (TQVP)

PAT:

PAT:

PAT:

Which is the required OVF.

2. (QV(PAQ))  $\Lambda$  — (PVX)  $\Lambda$ Q

Solon:

(QV(PAQ))  $\Lambda$  — (PVX)  $\Lambda$ Q

Absorption law

Solm:

(qv(PAq)) A — ((PV)) Aq)

Absorption law

QA (PV) V 79 Demorganis

PAN — (PV) V 79 Demorganis

Principal Disjunctive and Principal
Conjunctive Normal Forms (PDNF) & PM
Definitions

Griven a number of variables, the products in which each of its variable or its negation, but not both, occurs only once are called the minterms:

For 2 variables p and q, the possible minterms are PAQ, TPAQ,

pATQ, TPATQ.

For 3 variables p, q and &, the possible minterms are.

PAQAY, TPAQAY, PATQAY, PATQATA,

TPATQAY, TPAQAY, PATQAY, PATQATA,

TPATQATA.

Definitiven a number of variables, the sums in which eacht of its variable or its negation, but not both occurs only once are called the maxterns.

For 2 variables p and q, the possible max terms are prq,

Tprq, pr 79, -1pr 79.

For 3 variables p, q and r,
the possible max terms are
pravo, Tpravo, pragro,
pravo, Tpravo,
pravolo, Tpravo,
Pravolo, Tpravo,
Pravolo, Tpravolo,
Pravolo, Tpravolo,
Pravolo, Tpravolo,

Detros:
A formula consisting of Sum of minterms in the Variables only is known as PDNF. (Sum of Products Comonical form).

of maxterms in the variables only is known as PCNF. (Product of Sums canonical form)

Working Procedure:

To find the PDNF, fixt find the DNF.

- @ Introduce 1T in missing tomu.
- 3 Apply 7 = PV7P.
  - @ Apply Distributive law.
  - 5 Identical terms are deleted leg: PVP => P)

## Problems:

Obtain the PDNF and PCNF of. The following statements using touth tables.

1. (PV 79) -> (P4> 79).

2. PV (¬P → (qv (¬q→8))).

	<u> </u>							
1.	P .	9	. Пр !	79	7p'V7q	P⇔ 79	a →b	
	T	T	F	F	; F .	F	TV	
	T	F	F	T	T	T	TV	
	F	丁	T	F	T	T	TV	
	F	F	丁.	T	T .	F	F	
-						# + Q (ve., 2*)		
	PDN	PDNF: (PAQ) V (PATQ) V (TPAQ)						
					.,	4		
	Nou	o p	DWF	of -	$-i(a \rightarrow b)$	is T	P1-9.	
	Let s: gn. formula.							
2	P 9.	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	P7079 -	79->8	91(79 >8	) -1P+(9V	(79→1) s	
1	TF	T 1	FF	丁	T	T	T	
-		FF	F	F	. T	T		
	IF	T. F		T	Tible	T	1	
,	T F	FF		F	·F	F	T	
F	-   T	TT	F  -	T	T	T	T	
F	-   -	FT	F	r I	+ + 1	T	· T	
F	F	TIT	T -	Til	7	IT.	Т	
F	F	FT	1	=	F	F	F	
1								
-	-	OF (budue) A (budue) A (buddue)						
,	v (Þ	1-	1917	8) V (	TP Ag Ar	-) V (TP)	19178)	
			79 18			1.1		

PDNF of -1(8) = T(1P179178)

· · PCNF = PV9V8.

Without constructing the fruth tables, find the PDNF of the following statements.

1. (PAQ) V. (-1PAQ) V. (9A8).

Som:

Gin. statement is the DNF, but not

PONF.

To find PDNF:

(PAQ) V (-1PAQ) V (QAr).

⇒ (PAQ AT) V (¬PAQA T) V (QA8AT)

(PΛ9ΛΥ) V (PΛ9Λ ¬Τ8) V (¬ΡΛ9ΛΥ)
V(¬РЛ9Л¬8) V (9ЛΥЛР) V (9Л8Л¬Р)

(PAQAT) V (PAQA-10) V(-1PAQAT)

( which is the requised

PDNF.

2. PN -1(2 N8) V (P→9) Som: PA-1(918)~ (P->9) ⇒ Pn (¬qv¬r) v(¬pvq) (P1-19) V(P1-18) V (-1PV9). (PA-19) V (PA-18) V [(IP AT) V (9AT) (Pˬq) V (PΛ¬σ) V (¬PΛ(QV¬q) V ga(PVTP) € (P1-19) V (P1-10) V (-1P1-19) V (1P179) N(91P) N (917P) € (P179) V (P178) V (¬P179) V(PA9) V(917P) (PATQAT) V (PATSAT) V (TPATGAT) V (PAGAT) V(GATPAT) (P1-19) 1 (8 N-18) ] N [(P1-18) 1 (9 N-18) V(MPN-19 N(XX-18)) V (PN9 N(XX-18) V ((9/17P)/(8V78)) ] (PA-1948) V (PA-19 1-18) V (PA-7819) ( by 22 y dd) N ( db 1 2 d 12) N ( dby 20 4 4 20) V (PAGAS) V(PAGATS) V(QATPAS) V(QATPATA

(PATGAT) V (PATGATT) V (PAGATT) ( -1 b v d v s) A ( -1 b v d v -1 s) A (-1 b v d d v) V ( TPATQATS) V (PAQAS).

Note:

Since all the minterns are present in the above problem, it is a tautology

\*) Without constructing the truth tables, find the penf of the following statements.

1. (PVg) 1 (8V7P) 1 (9V78) Som:

Let S (Prg) 1(8V7P)1(qvis) Since it is a ENF, we directly

find PCNF:

SE (PV9) VF) 1 [GV-IP) VF] 1 [GV-TA) VF

(Prq) v(81-18)] V (81-18) [(41-14) N(61-16)]

(brdrs) V (brdr. 12) V (Lr Lbrd)

1 (8VTPVT9) X (QV TOVP) 1 (9V-18V-1P)

(Prara) V(brar 12) V(2brara) V (TPV TQ, VV) A (TPVQV TV) is the 2. PE (PA9) V (-IPA9A8) Sohn: Let S (PAQ) V (-IPAQA8) ⇒ (PAQAT) V (-1PAQA8) => [(P 19) 1 (TV-18)] V (-1P19 18) (PA9 18) V(PA9 A-18) V(-1PA9N8) is the required PDNF. To find PCNF: -18 0 - 10 (PA-7918) V (-1PA-7918) V (-1PAQA-18) V (PA-1QA-18) Y ( TPA-1911-18) TTS (TPVQVT8) 1 (PVQVT8) V(PV-gvr) 1 (-prqvr) 1 (prq vr) which is the required PCNF.

Harman T. Radion Control . Late