

(An Autonomous Institution) Coimbatore-641035.



#### **UNIT I-LOGICS AND PROOFS**

PDNF&PCNF

Minterms: [product constituting of all varilables] (9) PAG, TPAG, PATG, TPATG QUE MANTEUMS 9np. P TR (1) PARAR, PATRAR, TPARAR, PARATE MENTOUR TO THE PATRATE, TPAGATE, TPATRATE QUE MEDICOSIMS 90 Maxterns: [sum consisting of all voolables] P, Q and R. Q R PVQ, TPVQ, PV7Q, TPVTQ and maxterms 9n P, Q, DYEVE, DYTEVE, TPVEVE, PVEVTE, TPVTEVE, PTOR PUTENTR, TPVANTR, TPVTANTR are maxterns 90 TP & R P, Q, R. of PDNF poundpal Disjunctive normal form The PDNF of a given formula 95 an equivalent formula works consessing of diejunction of mentury only. il., PDNF = (Minterms) v (manterms) v....v (manterms) Principal conjunctive normal form (PCNF) The pent of a given formula pe an equivalent formula cossist consisting of conjunction of reasiteing only. a, PCNF=[maxitosims) / [maxitosims) / ... / (maxitosims) Enstoyment I to formulas which is in tou A. the PDNF of to o ii) (PAB) V (TPAR) V (QAR) VD. TPVQ +> (TPAT) V (QAT) ⟨TPA(QVTQ)) V (QA (PVTP)) ♦ (TPAQ) V (TPATQ) V (QAP) V (QATP) DASHABULA ⟨→ (¬PAQ) V (¬PA¬Q) V (PAQ) V (QA¬P) commutal ii). (PAG) V (TPAR) V (QAR) (PARAT) V (TPARAT) V (QARAT) (PARA (RVTR)) V (TPARA (QVTQ) V (QARA[PVTP))

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(PARAR) V (PARATR) V (TPARAR)
      V (TPARATA) V (QARAP) V (QARATP)
   ♦ (PARAR) V (PARATR) V (TPARAR)
      V (TPATRAR).V (T
  iii) Obtain the PDNF of P>((P>a) AT (TQVTP))
  P-> ((P-)Q) A7 (TQVTP))

⇒ TPV ((P→ Q) ∧ T (TQV TP))

→ TPV (FIPVA) AT(TAVTP))

   ⇒ TPV ((TPVQ) 1 (Q1P))
   A TPV (TPA (QAP)) V (QA (QAP))
   → TP V [(TPA(PAQ)) V ((QAQ)AP)]
   → TP V [(TPAP)AQ) V((QAQ)AP)]

→ TP V [GAQ) V (QAP)]

→ TP V [FV (PMQ)]

   OF TP V (PAQ)
  (¬PAT) V(PAQ)
  (¬PA (QV ¬Q)) V (PAQ)

⟨TPAQ) V(TPATQ) V(PAQ)

Obtalo the PCNF, Of 1). (TP->R) 1 (Q = P) and
      PCNP of 11). P-> (TPA (Q-> P))
i). (7P+R) A (Q产P)
PONF (PV.R) A [(a > p) A (p > a)]
  ⇔ (PVR) A [(TQVP) A (TPVQ)] ⇔ (PVRVF) A (TQVPVF) A (TPVQVF)
  (PVR V (anta)) A (TRVPV (RATR)) A (TPVQV (RATR))
  ⇔(PVRVA) A (PVRVTA) A (TAVPVR) A(TAVPVTR)
      A (TPVQVR) A (TPVQVTR)
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♦ (PVQVR) A (PYTQVR) A (PYTQVTR) A (TPVQVR) A (TPVQVTR)

PDNF:

75: conjunction of the Hernauning maxterins

75: (PVQVTR) A (TPVTQVR) A (TPVTQVTR)

7(75): 7 (PVQV7R) V7 (7PV7QVR) V7 (7PV7QY7R)

(¬PA¬BAR) V (PABA¬R) V (PABAR) which

is the granged PDNF.

11). P> (TPA (Q>P))

PCNF:

naterial implication Rule → TPV [TPA (Q→P)]

material implacation Rule (GVAF) A GT V YF +

# (TPVTP) A (TPV (TQVP)) DPSt89 but9ve law

→ TP Λ (¬P V(PYTQ))

Idempotent

Commulative law Associative

\$ TPA [GPVP) VTQ]

← TP x (T v TQ)

# TPAT

**分** TPVF

+ FIPV (an TQ)]

iii). (R+P) 1 (TP1R)

♦ (TAVP) A (TPAQ)

♦ (TAYP) \( (TPAQ) \( P) \) ((TPAQ) \( TP)

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今「TRVP)人(TPVP)人(RVP) 人(TPVTP)
人(RVTP)
HO (TOUP) AT A (OUP) A (TPV (OVTP))
 (PVTQ) A (PVQ) A (TPV (TPVQ)) man-contra
 ⟨> (PV7Q) ∧ (PVQ) ∧ ((TPVTP) VQ)

⟨PVTQ) ∧ (PVQ) ∧ (TPVQ)

Touth Table (PDNF 96 PCNF)
J. Obtala PDNF &PCNF too the followagng.
  using touth table
   i). PA (Q > R)
   ii). P+[(P+Q) / (TQVTP)]
 i) PA (G -> R)
                                      maxterms
                               Multeruz
                     PA (Q>R)
                               PARAR
                                      TPVTQVR
                               PATRAR
                               PATRATR
                                      PYTAYTR
                                      PYTRYR
                                      PVQVTR
                                      pravR
                       F *
  PDNF: Dectuoction q manteins
       = (PAGAR)V(PATGAR)V(PATGATR)
   Penf: conjunction of maxterns
        = (IPV-POVR) A (PV-TQ V-TR) A (PV-TQ VR) A (PV-QV-TR)
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