

SNS COLLEGE OF TECHNOLOGY



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DEPARTMENT OF MATHEMATICS

Contra possifive and Inverse puopossition: Conveise, Dett: : IS P > Q, then Q > P B called Us converse its contraposeteve TR->TP & called 7p->7a & called Us Invotee. conditional proposition and its contrapositive Remarks: loggically equivalent. ie, $(P \rightarrow a) \Leftrightarrow (7a \rightarrow 7P)$ ij. The The conditional proposition and its convoise are $\log^{9} \operatorname{cally} = \operatorname{equivalen}_{\pm}$, i.e., $(P \rightarrow a) \Leftrightarrow (a \rightarrow P)$ ii]. not Example: tor the J. Obtain convoise, contraposettive and inverse statement " Team Inclea 109ns whenever Dhone B a captain " P: Dhoni B a captain NOW, Q: Team Indla WPng $P \rightarrow Q$: If Dhong is a captain, then Team India wing. (unditional) Q-> P: If toam India wins then dhorn is a captain. TQ-> TP: II the woops doos team India does not wins then albong is not a captain. (contra possitive) TP>7Q: If Dhora is not a captain then team 1 notes do es not 2]. Obtalls "If the raises then the crops coll geow. P: It lains A: THE COOPS WALL GALOW. . ATOS WITH 99000 p→Q: If growing then the works Q→P: IZ the cups will glow then it lains (A→P: IT the coops will bot glow then it does TQ->7P: Ib the cops well bot gloco then bot sains TP-> TQ: If it does not lating then the clops will

Discrete Mathematics



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Other connectives: (i) NAND -> a combanation of NOT & AND P. depend by T
(ii) NOR $\rightarrow a$ combroat ton of NOT & OR
α in β α β α β
$P \uparrow Q = T(P \land Q)$ and $P \lor Q = T(P \lor Q)$ Normal forms:
Normal forms: The statement wscltter 9n the standard forms. Finterno 96 V, A and T then 92 is called the normal forms. Note: (i) conjunction (A) is denoted as preduct. (ii) Stisjunction (V) is denoted as burn.
Elementary product: A pdt. of the variables and there hegations if 910 a formula is called an elementary product. Eg: P, TPAB, TRAP, PATP, RATP
Elementary sum: A sum of the variables and thely negations The a formula is called an elementary sum.
E9: P, TPVQ, TEVP, THUS Disjunctive Normal form (DNF) A statement formula which is equivalent to a given formula and which consists of a serm of elementary products is called a Disjunctive normal torm of the given formula.
DNF = (Elementary) V (Elementary) VV (product)
Confunctive Normal form: A statement formula which is equivalent to a given formula and which consists of a preduct of elementary sum is called a confunctive normal form. eNF = (file mentary) (file mentary) (file mentary) Sum) (file mentary) (file mentary).



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phain the DNF and CNF of the formula P> [(P>Q) A 7 [TQV7P] DNF : $P \rightarrow [(P \rightarrow Q) \land 7 (T Q \lor T P)]$ materpal ⇒ TP V [(P→a) AT (TQVTP)] Materia material > TP V [(TPVQ) A T (TQVTP)] Implacation laws = TP V [(TPV Q) A (QAP)] Demarganis law > TP V [(TP A (QAP)) V (QA (QAP))] PRSTOP but Pre law ← TP V [TP ∧ (Q ∧ P)] V [(Q ∧ Q) ∧ P] A&SO Gatfive laws ↔ JP V [JPA (QAPS] V [QAP] Idempotent law material implication law J CNF: $P \rightarrow [(P \rightarrow Q) \land T (TQVTP)]$ Demolgan's law > TP V [(TPVQ) A T (T(QAP))] Double Negation Jaco ⇒ TPV [(TPVQ) ∧ (QAP)] pastorbutive law ⇔ FIPV (JPVQ)] ∧ [JPV(QAP)] Idempotent law ⇒ [TPVQ] ∧ [TPV (QAP)] Distributive law (TPVQ) ∧ [(TPVQ) ∧ (TPVP)] (TPVQ) A (TPVQ) A (TPVP) 今 (IPVQ) A (TPVP) 2]. Obtain a DNF OB PA (P>Q) <>>(PATP) V (PAQ) Distogbutieve $P_{\Lambda}(P \rightarrow Q) \Leftrightarrow P_{\Lambda}(TPVQ)$ NOW Slince the grover statement for mula is would then goterms of sum of elementary products.



