

SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution) Coimbatore-641035.

UNIT I-LOGICS AND PROOFS

CONVERSE, CONTRAPOSITIVE, INVERSE & NORMAL FORMS

Converse, Contra possifive and Inverse purpossition: If P > Q, Hen a -> P is called its converse TR->TP B called "HS contra possettive 7P->78 & called les Invoyse.

Remarks:

ij. The conditional poloposition and its contrapositive are legiscally equivalent. ie, (P+a) (70,77P) ii]. The conditional proposition and its convoise one not log-scally equivalent. ie, $(P+a) \Leftrightarrow (a \rightarrow P)$

J. Obtain convaise, contraposettive and inverse for the statement "Team Inclea wans whenever Doons

is a captain"

P: Dhors & a captain

Q: Team Indla wins

P-R: If Dhong is a captain, then Team Incla wins. (unditional)

Q-7 P: It toam India wins then dhori is a captain.

TR-TP: If the wwps don team India does not wins then albord B not a captain. (contra possitive)

TP>72. If Dhom is not a captain then team

India does not 10905.

a). Obtain " If the "it mains then the crops con gloco.

P: It lains a: The coops will grow.

P>Q: If It 91 class then the wops will golow P+Q: If the cups will grow then it lains of does

TA->TP: It the cops well but glow then not rains

TP>79: If it does not lains then the coops will

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(i) NAND -> a comparation of NOT & AND Other Connectives: denoted by 1 (ii) NOR -> a combination of NOT & OR denoted by which is defined as $P \uparrow Q = 7(P \land Q)$ and $P \lor Q = 7(P \lor Q)$ The Statement woulten In the Standard tolm Normal forms: Porterno of V, 1 and 7 then It is called the normal forms Note: (i) conjunction (1) % denoted as preduct. (ii) sisjunction (v) is denoted as bum. A pate of the variables and those higher cons Elementary product: In a formula is called an elementary product. Eg: P, TPAQ, TRAP, PATP, QATP A sum of the variables and theel negations In a formula is called an elementary sum. Eg: P, TPVQ, TAVP, PVTP, QVTP. Disjunctive Normal form (DNF) A Statement formula which B equivalent to a given formula and which consider of a sum of elementary products le called a Drajunctive normal form of the given formula. DNF = (Elementary) V (Elementary) V.... V (Elementary) product ? conjunctive Normal form: A statement formula which is equivalent to a green formula and which consists of a preduct of elementary sum 90 called a conjunctive normal form.

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obtain the DNF and CNF of the formula P+[(P+Q) 17 [7QV7P)] P > [(P+Q) AT (TQVTP)] → TP V [(P+Q) AT (TQVTP)] Montained
Tempine cate Bon law (TPVQ) A T(TQVTP)] material implication law → TP V [(TPVQ) A (QAP)] Demagan's law ⇒ TP V [(TP N(Q AP))) V (Q N(Q AP))] +95t8166449ve law → TPV [TPN(QAP)] V [(QAQ)AP] ASSOCRATIVE law ⇒ TP V[TPA (QAP)] V[QAP] Idempotent law muterial implication law I CNF: P>[(P>Q) AT (TQVTP)] Demorgan's law → 7P V [(7.PVQ) 17 (7(Q1P))] pouble regation are ↔ TPV [(TPVQ) A (QAP)] pastophutore law ⇒ [TPV (TPVQ)] ∧ [TPV(QAP)] Idempotent law ♦ [TPV Q] 1 [TPV (Q1P)] ⟨¬PVQ) ∧ [(¬PVQ) ∧ (¬PVP)] (TPVR) A (TPVA) 1 (TPVP) \$ (TPVA) A (TPVP)]. Obtain a DNF Ob PA (P>Q) (PATP) Y (PAQ) Destrabutive PA(P→Q) ⇔ PA (7PVQ) Same the given statement for mula 9s woutten anteins of som of elementagy products.

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