CS & IT ENGINEERING

SATISH YADAV SIR

Discrete Mathematics

Mathematical Logic

DPP 02 Discussion notes

01 Question

02 Discussion

Q.1 Which of the following is/are logical equivalence? [MSQ]

I. $\sim(p \to q)$

II. $(p \to r) \wedge (q \to r)$

III. $p \wedge \sim q$

IV. $(p \vee q) \to r$

$\neg(p \to q)$

$\neg(\neg p \vee q)$

$p \wedge \neg q$

(b, c)

II. $(p \to R) \wedge (q \to R)$

$(p \vee q) \to R$

A. I and II

B. I and III ✓

C. II and IV ✓

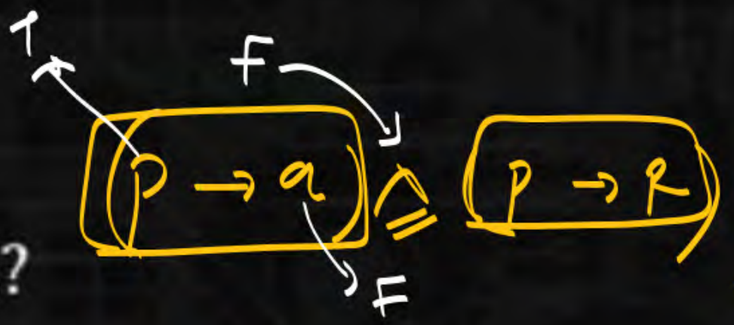
D. II and III

Q.2 Consider the following statement [MSQ]

S_1: $(p \to q) \wedge (p \to r)$

S_2: $p \to (q \wedge r)$

Which of the following is True?



A. S_1 is tautology ✗

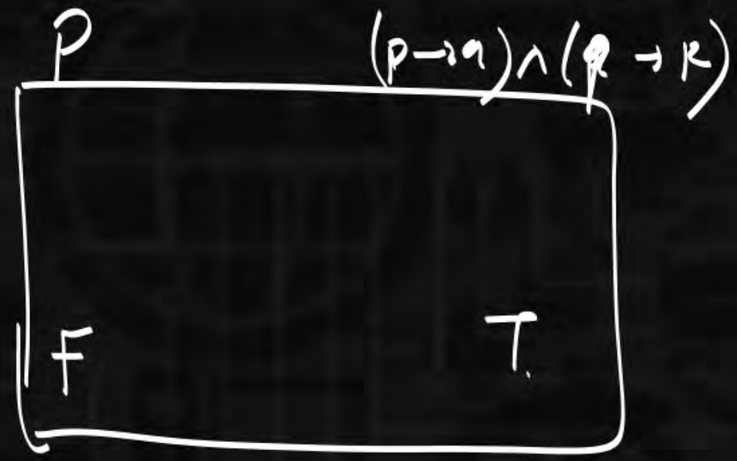
B. S_1 is contingency ✓

C. S_1 is logically equivalence to S_2 (True)

D. None of these

(b, c)

T
F
F
F



Q.3

Which of the following is logically equivalence?

[MSQ]

A. $(p \rightarrow r) \vee (q \rightarrow r)$

B. $(p \leftrightarrow q) \vee (q \rightarrow r)$

C. $(p \wedge q) \rightarrow r$

D. $(p \leftrightarrow r) \wedge (q \leftrightarrow r)$

(a, b)

Q.4 [MCQ]

Consider the following statement

S_1: $\sim (p \leftrightarrow q)$

S_2: $p \leftrightarrow \sim q$

Which of the following is correct?

A. S_1 is tautology

B. S_2 is contradiction

C. S_1 is equivalence to S2 ✓

D. None of these

$\neg((p \to q) \wedge (q \to p)) \equiv (p \wedge \neg q) \vee (q \wedge \neg p)$

$\neg(p \to q) \vee \neg(q \to p)$

$\neg(\neg p \vee q) \vee \neg(\neg q \vee p)$

$(p \wedge \neg q) \vee (q \wedge \neg p)$

Q.5

[MCQ]

Consider the following statement

S_1: $\sim (p \vee (\sim p \wedge q))$

S_2: $\sim p \wedge \sim q$

Which of the following is correct?

A. S_1 is tautology

B. S_2 is contradiction

C. S_1 is equivalence to S2 ✓

D. S_1 is not equivalence to S2

$\neg(p \vee (\neg p \wedge q))$

$\neg p \wedge \neg(\neg p \wedge q)$

$\neg p \wedge (p \vee \neg q)$

$(\neg p \wedge p) \vee (\neg p \wedge \neg q)$

$F \vee (\neg p \wedge \neg q)$


THANK YOU GW
SOLDIERS !