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CSE-B

AI Assignment

1) Which of the following sentences are statements?

- The moon is made of green (Yes)
- He is certainly a tall man (Yes)
- Next year interest rates will fall (No)
- $x - 4 = 0$ (No)

2) What's the truth value of following:-

- 8 is even or 6 is odd (True)
- 8 is even and 6 is odd (False)
- If 8 is odd, then 6 is odd (False)
- If 8 is even, then 6 is even (True)

3) Negation:

(i) If food is good, then service is excellent.

→ The food is good and the service is not excellent.

(ii) Either the food is good or service is excellent.

→ Neither the food is good nor the service is excellent.

(iii) Neither the food is good, nor service is excellent.

→ Either the food is good or service is excellent

4) Well formed formulas:

(i) either A or B → $A \vee B$

(ii) neither A nor B → $\neg A \wedge \neg B$

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5) Truth table:

(i) $A \vee A' \rightarrow B \wedge B'$

A	B	A'	B'	$A \vee A'$ (a)	$B \wedge B'$ (b)	$a \rightarrow b$
T	T	F	F	T	F	F
T	F	F	T	T	F	F
F	T	T	F	T	F	F
F	F	T	T	T	F	F

(unsatisfiable)

(ii) $(A \rightarrow B) \rightarrow B' \wedge C$

A	B	C	B'	$A \rightarrow B$ (a)	$B' \wedge C$ (b)	$a \rightarrow b$
T	T	T	F	T	F	F
T	T	F	F	T	F	F
T	F	T	T	F	T	T
T	F	F	T	F	F	T
F	T	T	F	T	F	F
F	T	F	F	F	F	F
F	F	T	T	T	T	T
F	F	F	T	T	F	F

(satisfiable)

6) Negation of :-

(i) The answer is either 2 or 3.

⇒ The answer is neither 2 nor 3.

(ii) Cucumbers are green and ready.

→ Cucumbers are not green or not ready.

(iii) Either the food is good or the service is excellent.

⇒ Neither the food is good nor the service is excellent.

(iv) If the price is high, ~~and either~~ then food is good and service is excellent.

⇒ The price is high and either the food is not good or the service is not excellent.

(v) The processor is fast but the printer is slow.

⇒ The processor is slow but the printer is fast.

7) Tautology:

→ $(A \wedge B')' \vee B \Leftrightarrow A' \vee B$

LHS $\equiv (A \wedge B')' \vee B$

$\equiv (A' \vee B)'' \vee B$ (Demorgan's law)

$\equiv A' \vee (B \vee B)$ (Associative law)

$\equiv A' \vee B$ (Idempotent law)

$\equiv$ RHS //