ASSIGNMENT # 1(MTH202)

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Q1:Which of the following are the propositions? Write Truth value of each proposition.

1.Ali is an intelligent boy.	(F)	PREPOOSITION
2.She cooks well.		NOT A PREPOSITION
3.5 + 6 = 12	(F)	PREPOOSITION
4.x + 5 >		NOT A PREPOOSITION
5.The sun sets in the west.	(T)	PREPOOSITION
6.Complete your homework.		NOT A PREPOOSITION
7.Respect your elders.		NOT A PREPOOSITION
8.The set of natural numbers begins with 1.	(T)	PREPOOSITION
9.The square root of 2 is irrational.	(F)	PREPOOSITION
10.The sky is blue at night.	(F)	PREPOOSITION
11.Honesty is the best policy.	(T)	PREPOOSITION

Q2: Let p = "I am a student of Computer Science."
q = "I work hard."
Then translate the following logical expressions into English sentences.

- $p \rightarrow q$

If i am a student of Computer Science then I must work hard.

- $q \rightarrow p$

If I work hard then I must be Computer Science Student.

- $p \leftrightarrow q$

If I am a student of Computer Science if and only if I work hard.

- $\sim p \rightarrow \sim q$

If I am not a student of Computer Science then I must not work hard.

- $\sim q \rightarrow \sim p$

if I m not working hard then I must not be a Student of Computer Science.

- $\sim (p \rightarrow q)$ Use the result: $\sim (p \rightarrow q) = p \vee \sim q$

I m a student of Computer Science and I don't work hard.

Q3: let h = "Asad is happy."
S = "Asad is sad."
t = "Asad watch television."
Then translate the following logical expressions into English sentences

- $h \rightarrow t \vee \sim s$

if Asad is happy then he watch TV and he is not sad.

- $s \leftrightarrow \sim t$

Asad is sad if and only if he is not watch TV.

- $\sim t \rightarrow \sim h$

If Asad is not watch TV then he is not happy.

- $\sim t \rightarrow h \wedge s$

Asad is not watch TV then he is happy or he is sad.

- $t \wedge h \leftrightarrow \sim s$

Asad watch TV or he is happy if and only if he is not sad.

Q4: Write converse, inverse, contra-positive of the following conditional sentences:

a: If Ali plays soccer, then Bilal plays hockey.

Converse:	If Bilal plays hockey, then Ali plays soccer.
Inverse:	If Ali not plays soccer, then Bilal is not plays hockey
contra-positive	If Bilal not plays hockey, then Ali is not plays soccer.

b: If it is spring season, then trees are green.

Converse:	If trees are green, then its spring season.
Inverse:	If it is not a spring season, then the trees are not green.
contra-positive	If trees are not green, then its not spring season.

c: if x is a natural number, then 2x is an even number.

Converse:	If 2x is an even number, then the x is a natural number.
Inverse:	If x is not a natural number, then 2x is not an even number.
contra-positive:	If 2x is not an even number, then the x is not a natural number.

Q5: Construct the truth table for $\sim (p \rightarrow q)$

(Hint: Use the result : $\sim (p \rightarrow q) = (p \wedge \sim q)$

p	**q**	**~ q**	**p → q**	**~ (p → q)**	**(p ∧ ~ q)**
T	T	F	T	F	F
T	F	T	F	T	T
F	T	F	T	F	F
F	F	T	T	F	F

Q6: What is the truth value of each of the following logical expressions ?

Given : p = True, q = False

(For example : $p \vee q$ = True ∨ False = True)

P	**Q**	**~p**	**~q**	**p ∧ q**	**p q**	**~ (p ∧ q)**	**~ q → ~ p**	**p → q**	**~ q → p**	**~ p ∨ ~ q**	**p ↔ q**
T	F	F	T	F	T	T	T	F	T	T	F