**Akhbar Alyoum Academy**

**Computer Science Department**

### Artificial Intelligence

**Fourth Year**

# Time: 1 hour November 2010

**Answer All Questions**

* 1. For propositional expressions P, Q and R prove that:

1. (P  Q)  (P → Q).
2. (P → Q)  (Q → P).
3.  (P  Q) (P → Q).
4. P  (Q ^ R)  (P  Q) ^ (P  R)
5. The logical operator "↔" is read "if and only if." P ↔ Q is defined as being equivalent to (P → Q) ^ (Q → P). Based on this definition, show that P ↔ Q is logically equivalent to (P v Q) → (P ^ Q) By using truth tables.
6. Prove that implication is transitive in the propositional calculus, that is, that ((P → Q) ^ (Q → R)) → (P →R).
7. Represent the following English sentences in predicate calculus:
8. If it doesn’t rain on Friday we will go to the park.
9. Emma is a Doberman pinscher and a good dog
10. All basketball players are tall.
11. Nobody likes taxes.
12. Given the following
13. if it is sunny and it is warm, then Samy is happy.
14. if there is blue sky then it is sunny.
15. there is blue sky.
16. it is warm.
17. is Samy happy?

Use resolution to show Samy is happy

**Good Luck**