Assignment 2
Total Marks 80
Deadline: 24.05.2018

Logic Puzzles [11*5=55 Marks]

1. Isaac and Albert were excitedly describing the result of the Third Annual International Science Fair Extravaganza in Sweden. There were three contestants, Louis, Rene, and Johannes. Isaac reported that Louis won the fair, while Rene came in second. Albert, on the other hand, reported that Johannes won the fair, while Louis came in second.
   In fact, neither Isaac nor Albert had given a correct report of the results of the science fair. Each of them had given one correct statement and one false statement. What was the actual placing of the three contestants?

2. At a family reunion were the following people: one grandfather, one grandmother, two fathers, two mothers, four children, three grandchildren, one brother, two sisters, two sons, two daughters, one father-in-law, one mother-in-law, and one daughter-in-law. But not as many people attended as it sounds. How many were there, and who were they?

3. **Four friends have been identified as suspects for an authorized access into a computer system. They have made statements to the investigating authorities. Alice said "Carlos did it." John said "I did not do it." Carlos said "Diana did it." Diana said "Carlos lied when he said I did it."**
   If the authorities know that exactly one of the four suspects is telling the truth, who did it? Explain your reasoning.

4. Suppose you are visiting an island with knights, who always tell the truth, and knaves, who always lie.

   Which statement is impossible for an islander to make?

   a) **I am either a knight or a knave.**
   b) **I am a knight.**
   c) **I am a knave.**

5. Stella has several essays to write this weekend. Her father asked how many essays she needed to write, and she made two statements:

   Statement 1: I have at least 3 essays to write.

   Statement 2: I have at most 3 essays to write.

   If her father knows that Stella never lies to him, can he determine exactly how many essays Stella needs to write on this weekend?

6. There are two men. One of them is wearing a red shirt, and the other is wearing a blue shirt. The two men are named Andrew and Bob, but we do not know which is Andrew and which is Bob.

   The guy in the blue shirt says, “I am Andrew.”

   The guy in the red shirt says, “I am Bob.”

   If we know that at least one of them lied, then what color shirt is Andrew wearing?

7. John tells the truth on Mondays, Thursdays, and Saturdays, but lies on all the other days of the week.

   One day he said, “I will tell the truth tomorrow.”

   On which day of the week did he make this statement?

8. Read the following passage **carefully** and answer the question(s) that follows:

   You are on your way to visit your Grandma, who lives at the end of the town. It's her birthday, and you want to give her the cakes you've baked.

   Between your house and her house, you have to cross a total of 7 (seven) bridges, However, before crossing each bridge you have to pay a **toll**. But the rule for paying toll is a bit different than the usual payment using coins. The rule is you have to pay **half of what you are carrying** as a toll in each bridge. For example, if you are carrying 8 (eight) cakes, you have give the first toll collector in the first bridge 4 (four) of them. However, you know that when the toll collectors will hear that it’s your grandma’s birthday, each of them will give 1 (one) cake back to you.

9. Read the following passage **carefully** and answer the question(s) that follows:

In Sahara desert, 3 men found a big **24 Litre** jar full of water. Since there is shortage of water so they decided to distribute the water among themselves such that they all have equal amounts of it. But they only have a **13 Litre**, a **5 Litre** and an **11 L** jar with them. But the problem is, the jar is not marked like the usual water jars, which means there is no way to half-fill it, quarter-fill it or to measure the amount of water in the jar. The only information you have is if the jar is full, then you have the whole amount of water. For example, if the jar is full, you know that you have 13 litres of water.

Can you distribute the water equally amongst the three men accurately?

10. Your sock drawer contains **ten pairs of white socks** and **ten pairs of black socks**. If you're only allowed to take one sock from the drawer at a time and you can't see what color sock you're taking until you've taken it, **how many socks do you have to take** before you're guaranteed to have at least one matching pair?

11. A farmer is taking **a fox, a chicken,** and **a bag of grain** home. To get there, he must cross a river, **but he's only allowed to take one item across the bridge with during each trip**. If the fox is left alone with the chicken, the fox will eat the chicken. If the chicken is left alone with the grain, the chicken will eat the grain. How can the farmer cross the river without any of his possessions being eaten? Please note that while making return trips he can also carry one animal/item back with him as well.