1. In how many ways can the 26 letters of the alphabet be permuted so that none of the patterns man, log or site occurs. **(10 marks)**

2. Define the following with an example each: Euler Trail, Hamilton Path, Isomorphic graphs. **(10 marks)**

3. State and prove the absorption law using truth tables. **(10 marks)**

4. Consider the following argument. If the argument is valid, identify the rule of inference that establishes its validity. If not, indicate what is the logical error: "If Raj's computer program is correct, then he'll be able to complete his computer science assignment in at most two hours. It takes Raj over two hours to complete his computer science assignment. Therefore Raj's computer program is incorrect". **(10 marks)**

5. Show that the Peterson's graph is non-planar. Prove every single statement without assuming anything. **(20 marks)**

6. Find the number of ways to arrange the letters in LAPTOP so that none of the letters L, A, T, O is in its original position and the letter P is not in the third or sixth position. **(20 marks)**