1. (a) Compute $(14-8)_{10}$ by translating from ten notation into two's complement notation using four bits length register and perform the addition as a machine does (5%)

   (b) Express $(3)_{10}$ as an excess three notation system using three bits length register (5%)

2. (a) What are the stages within the development phase of the software life cycle? (5%)

   (b) What is called the entity-relationship diagram design methodology? (5%)

3. (a) What are the two parts of a machine instruction? (6%)

   (b) Describe the control steps for a machine cycle (6%)

   (c) Explain how a machine's throughput can be increased with pipelining technique (8%)

4. (a) Summarize the distinction between batch processing and interactive processing (6%)

   (b) What is the difference between application software and utility software? (6%)

   (c) How to prevent deadlock during resource allocation? (8%)

5. (a) Define each of the following: router, bridge, browser (6%)

   (b) What is the difference between an open network and a closed network (6%)

   (c) What are the key technology ingredients that determine the nature of a local area network? (8%)

6. (a) Describe the complete tasks of preparing a high-level language program for execution (6%)

   (b) What is the difference between an object and a class? (6%)

   (c) Draw the parse tree for the following expression:
   x+y*z, (x+y)*z (8%)