Q1: What is the main problem in trying to assemble a program in one pass? Briefly describe how to solve the problem.
(15%)

Q2: In addition to *linking loader*, *linkage editor* and *dynamic linking* schemes are also typical schemes found on most computing systems.
(a) Briefly state the differences among these three schemes.
(b) What are the advantages in using the latter two schemes (*linkage editor* and *dynamic linking* schemes)?
(20%)

Q3: Compare the advantages and disadvantages of *macro* and *subroutine*.
(10%)

Q4: Assuming the array declaration
    C : ARRAY[-10..10,2..12] OF INTEGER
Generate quadruples for the statement
    D[I,J] := 0
(15%)

Q5: Consider the following grammar:
    <asg> ::= id := <term>;
    <exp> ::= id * <exp> | id * <term>
    <term> ::= id + <term> | (<exp>) | id
Assume that the scanner will report token type *id* when it sees a valid Pascal identifier. Which of the following strings is a valid sentence in the language generated by this grammar?
(a) ALPHA := B + C;
(b) D := B * C;
(c) Y := B + (C * D + E);
(d) A := B + (C * D);
(12%)

Q6: (a) What methods might a programmer use to improve the locality of reference of a program?
(b) What programming techniques and data structures would probably lead to poor locality of reference?
(14%)

Q7: Is it possible for a job to have a shorter turnaround time under a multiprogramming operating system than under a single-job system for the same machine? Briefly state the reason.