**Arab Academy For Science and Technology & Maritime Transport**

**College of Engineering & Technology**

**Computer Engineering Department**

**EXAMINATION PAPER**

Course Title: System Programming

Course Code: CC410

Date: Thurs. Jan, 22-2015 Lecturer: Dr. Manal Helal

Time allowed: 60 Minutes Start Time: 09:00 a.m.

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| Student's name: Reg.# : |

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| **Question #** | **Marks** |
| **Available** | **Actual** |
| Assemblers | 10 |  |
| Loaders & Linkers | 10 |  |
| Macroprocessors | 10 |  |
| Compilers & Formal Languages | 10 |  |
| **Total** | **40** |  |
| **Lecturer** | Name : Dr. Manal Helal |
| Signature : |
| Date: |

**MPC6/1-1**

**Assembler: [10 points]**

**1) Develop or trace a program in assembly language. Other variants might be asked like what is the difference between a fragment of code and another, or where is the error.**

**2) Describe the inputs and outputs from a two-pass assembler, and the functions performed in every pass.**

**3) Describe machine dependent assembler functions**

**4) Describe the following machine independent assembler features:**

**a) Symbols**

**b) Expressions**

 **c) Blocks**

 **d) Control sections**

**5) Describe how a one pass and multipass assemblers can work?**

**Loaders & Linkers: [10 points]**

**6) Describe the absolute loader and how it works, and why is it useful.**

**7) Define Program Relocation, and how it affects loading the program?**

**8) Describe two methods used in loading relocateable programs**

**9) Define:**

 **a) Automatic Library Search**

**b) Linkage editors**

 **c) Dynamic linking**

**Macroprocessors: [10 points]**

**10) Explain how to declare a macros, and why they are different from subroutines.**

**11) Explain how a one-pass macroprocessor handles a source code that contain macros, the functions and the data structures required, and the output produced.**

**12) Explain the difference between positional macro parameters and keyword macro parameters in declaration and invocation.**

**13) Explain the difference between nested macros and recursive macro expansion.**

**Compilers & Formal Languages: [10 points]**

**14) Define BNF, finite automaton, and how they are used in defining formal languages.**

**15) Trace a Finite Automaton for a given string, and find out if it accepts or rejects the string.**

**16) Trace the lexical Analyser functionality given a source code, and using finite automaton, tabular forms, or algorithmic forms.**

**17) What are the phases of compiling a source code, and what is the input and output of each phase.**

**18) Build a parse tree for a source code using a given language grammar:**

**a) using bottom up procedure such as operator precedence method and/or shift reduce method**

**b) or top down procedure such as recursive descend method.**

**19) Explain how code generation is processed from a given parse tree.**

**20) Explain what is a machine dependent code optimization and what is machine independent.**