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**B.E / B.Tech (Full-time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2011
COMPUTER SCIENCE AND ENGINEERING BRANCH**

27

**FIFTH SEMESTER
CS9303 System Software Internals**

REGULATIONS 2008

Time : 3 hrs

Max Mark : 100

Answer ALL Questions

Part – A (10x2 = 20 Marks)

1. Give an example machine instruction and describe the different parts.
2. What is the main task of the first pass of a two pass assembler.
3. Describe the work done by an absolute loader.
4. Explain the main features of Dynamic Linking and Loading.
5. Show how keyword macro parameters can be implemented.
6. List different techniques for syntactic analysis.
7. What are object oriented VMs? Give an example.
8. What is the difference between copying and compacting Garbage Collection techniques.
9. Explain what is involved in handling control flow instructions in an emulator.
10. List some real world implementations of system software.

Part – B (5x 16 = 80 Marks)

11. Attempt to design a generic assembler that is highly configurable. That is, it should be possible to easily change it to work on completely different input assembly languages and output instruction sets. This should be possible preferably with no recompilation at all (that is, all the assembly language and instruction set specific information is kept in configuration files), or worst case by only modifying arrays/tables in header files / initial sections of program files.

(i) List the issues or difficulties involved in making it highly configurable. Decide on the main aspects/features that will make it highly configurable and briefly list them. (4)

(ii) Attempt to describe specific techniques that will be involved in implementing these aspects/features. (6)

(iii) Briefly present the overall design of the assembler. (2)

(iv) Present in detail the design (data structures and algorithm/pseudocode) for the specific techniques in (ii). (4)

12. a (i) Discuss issues regarding storage allocation in loaders and linkers. (8)
(ii) Describe what is involved in Relocation. (8)

(OR)

- b (i) Discuss issues regarding libraries in loaders and linkers. (8)
(ii) Describe what is involved in Overlays. (8)

13. a (i) Discuss basic macro processor functions. (8)
(ii) What are grammars? Show through an example how they are used in compilers (8)

(OR)

- b.(i) Discuss machine independent macro processor features. (8)
(ii) What is code generation? Show through an example how it is done in compilers (8)

14. a (i) Describe the Pascal P-Code VM with an appropriate diagram. (8)
(ii) Discuss the issues and techniques for Dynamic Class Loading in VMs. (8)

(OR)

- b. (i) Describe the Common Language Infrastructure with an appropriate diagram. (8)
(ii) Discuss the issues and techniques for optimization in VMs. (8)

15. a. Write short notes on

- (i) Interpretation in Emulators (8)
(ii) Profiling (8)

(OR)

b. Write short notes on

- (i) Binary Translation in Emulators (8)
(ii) Grids (8)
