

**Subject: OPERATING SYSTEMS & SYSTEMS SOFTWARE**

Time: 3 Hours

**JUNE 2011**

Max. Marks: 100

**NOTE: There are 9 Questions in all.**

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
  - **The answer sheet for the Q.1 will be collected by the invigilator after 45 Minutes of the commencement of the examination.**
  - **Out of the remaining EIGHT Questions, answer any FIVE Questions, selecting at least TWO questions from each Part. Each question carries 16 marks.**
  - **Any required data not explicitly given, may be suitably assumed and stated.**
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**Q.1 Choose the correct or the best alternative in the following: (2×10)**

a. Time quantum is used in

- |                            |                            |
|----------------------------|----------------------------|
| (A) Priority scheduling    | (B) Round-Robin scheduling |
| (C) Multi-level scheduling | (D) Real time scheduling   |

b. Load address for the first word of the program is called

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|---------------------------|-------------------------|
| (A) Linker address origin | (B) Load address origin |
| (C) Virtual address       | (D) Absolute address    |

c. A program in execution is called

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|----------------|---------------|
| (A) Function   | (B) Procedure |
| (C) Subroutine | (D) Process   |

d. A static binding is a binding

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|--------------------------------------------------------|
| (A) Performed after the execution of a program begins  |
| (B) Performed before the execution of a program begins |
| (C) Performed during the execution of a program        |
| (D) None of these                                      |

e. The \_\_\_\_\_ loader is executed when the computer is turned on or restarted.

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|---------------------------|---------------------------|
| (A) Cross-Compiler loader | (B) Relating loader       |
| (C) Boot Strap loader     | (D) Compile and go loader |

f. The \_\_\_\_\_ of a program contains all information necessary to relocate and link the program with other programs

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|--------------------|-------------|
| (A) Source program | (B) Loader  |
| (C) Object modules | (D) Grammar |

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- g. SSTF stands for
- (A) Shortest-Seek-Time-First Scheduling
  - (B) Shortest-Simple-Time-First
  - (C) Seek-Simple-Time-First
  - (D) Small-Seek-Time-First
- h. A scheduler which selects processes from secondary storage device is called
- (A) Short term scheduler
  - (B) Long term scheduler
  - (C) Medium term scheduler
  - (D) Process scheduler
- i. The “blocking factor” of a file is
- (A) the number of blocks accessible to a file
  - (B) the number of blocks allocated to a file
  - (C) the number of logical records in one physical record
  - (D) none of the above
- j. A process that is spending most time in paging than execution is called
- (A) Scanning
  - (B) Thrashing
  - (C) Spooling
  - (D) Swapping

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**PART A**

**Answer at least TWO questions. Each question carries 16 marks.**

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- Q.2** a. What is an operating system? Discuss the various functions of operating system. (8)
- b. What is a Process? Discuss briefly, the various process states. (4)
- c. Discuss the differences between user level threads and kernel level threads. (4)
- Q.3** a. Explain Event Control Block (ECB). With the help of a suitable diagram, discuss the organization of the different modules of event handler. (8)
- b. Define Deadlock. Write an algorithm for deadlock detection. (8)
- Q.4** a. Define Semaphore. Give a solution for reader-writers problem using conditional critical regions. (8)
- b. Discuss the various attributes of a file. What are the methods that help in accessing the information stored in a file? Discuss them. (8)
- Q.5** a. Consider the following page reference string: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the following replacement algorithms, assuming four frames? All frames are initially empty.  
(i) LRU replacement (ii) FIFO replacement (4+4)

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- b. Write short note on:  
(i) Use of reference counts (ii) Garbage collection (4+4)
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**PART B**

**Answer at least TWO questions. Each question carries 16 marks.**

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- Q.6** a. Discuss various fundamental language processing activities. (5)  
b. What are the different criteria used to classify the data structures for Language Processors? (5)  
c. What is Binding and Binding Time? Specify the binding times for the various entities of the given program segment. (6)

**program** bindings (input, output);

**var**

i : integer;

a,b : real;

**procedure** proc (x : real; j : integer);

**var**

info : **array** [1..10, 1..5] **of** integer;

p : ↑integer;

**begin**

new(p);

**end;**

**begin**

proc(a,i);

**end.**

- Q.7** a. What are the problems that may arise during top-down parsing with backtracking? (4)  
b. Compare and contrast Non-relocatable program, Relocatable program and Self-relocatable program. (6)  
c. Explain the term Macro Definition and Macro Call. Explain the differences between macros and subroutines. (6)
- Q.8** a. What are different kind of statements used in Assembly Language Programs? Give suitable examples. (8)  
b. Discuss the different data structures used during Pass I of the Assembler. (8)
- Q.9** a. Discuss the issues involved that contribute to the semantics gap between a programming language domain and an execution domain. (8)  
b. What are the points that compiler must ensure while implementing a function call? (4)  
c. What is an interpreter? What are the different components of an interpreter? (4)