

Subject: OPERATING SYSTEMS AND SYSTEMS SOFTWARE

Time: 3 Hours

Max. Marks: 100

DECEMBER 2010

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 half an hour 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.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. The optimum CPU scheduling algorithm is

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|-----------------------------|--------------------------|
| (A) FIFO. | (B) SJF with preemption. |
| (C) SJF without preemption. | (D) Round Robin. |

b. The command line interpreter program is also called as

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|---------------|--------------|
| (A) Kernel. | (B) Process. |
| (C) Protocol. | (D) Shell. |

c. Presence of Loops / cycles in a Resource Allocation Graph indicates

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|---------------------|-----------------|
| (A) Deadlock state. | (B) Safe state. |
| (C) Unsafe state. | (D) Wait state. |

d. The memory management system that supports user's view of memory is

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|---------------------|------------------------|
| (A) Segmentation. | (B) Paging. |
| (C) Virtual memory. | (D) Contiguous memory. |

e. Distributed systems provide

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|-----------------------|-------------------|
| (A) Resource sharing. | (B) Speed. |
| (C) Reliability. | (D) All of these. |

f. The following are properties of IR

- (A) ease of use, memory efficiency
- (B) high level code, memory efficiency
- (C) low level code, processing efficiency
- (D) None of these

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- g. The following are used in scanning
- (A) DFA, FSA (B) Parsing table
(C) Stack, queues (D) DFA, Queues
- h. The object module of a program P has
- (A) Header, RELOCTAB (B) Header, RELOCTAB, LINKTAB
(C) Header, Scanner (D) LINKTAB, Header
- i. Expansion of nested macro call follows
- (A) FIFO (B) Linked List
(C) LIFO (D) Random
- j. Frequency reduction and strength reduction correspond to
- (A) Control structures (B) Assembler optimization
(C) Compilation of expressions (D) Code optimization
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PART A

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

- Q.2** a. What are the typical operating system services? Explain multiprogramming and real time systems. (8)
- b. With the help of transition diagram, explain the process states in operating system. Give features of PCB. (8)
- Q.3** a. Compare preemptive and non-preemptive scheduling. Define throughput and mean turnaround time parameters in scheduling. (8)
- b. Explain various deadlock handling techniques. (4)
- c. Write deadlock detection algorithm. (4)
- Q.4** a. Explain Readers and Writers problem. In what way this problem is different from the producer-consumer problem? (8)
- b. Explain various types of disk space allocation techniques. (4)
- c. Explain any two features for each of the following file sharing modes:-
(i) Sequential sharing (ii) concurrent sharing (4)
- Q.5** a. State and explain Belady's anomaly. (6)
- b. Explain the differences between logical and physical address. Give an example for illustration. (6)
- c. Discuss the conceptual differences between Paging and Segmentation. (4)

PART B

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

- Q.6** a. Explain briefly the importance of binding. Differentiate static and dynamic binding. (4)
- b. Explain any two features from each of the following:-
(i) Search data structures
(ii) Allocation data structures (8)
- c. Give the features of language processor development tools. (4)
- Q.7** a. Give an example to illustrate top down parsing and bottom up parsing. (4)
- b. What is macro expansion? Explain two kinds of expansion. (4)
- c. Define function of linker. Explain the following:-
(i) Non-relocatable programs
(ii) Relocatable programs
(iii) Self-relocatable programs. (8)
- Q.8** a. Explain Pass-I and Pass-II performed by two-pass assembler and give algorithm of Pass-I or Pass-II assembler. (8)
- b. Explain elements of assembly language program. Define the following with respect to assembly program:- (8)
(i) Label
(ii) Assembler directives
(iii) Any two assembly instructions
(iv) Constants
- Q.9** a. Explain any two compiler code optimization techniques. Give an example for illustration. (8)
- b. Explain compilation of control structures. Give any two examples for illustration. (8)