BCA(I) — COM / I /
                                          6 / X / H

2010

Time : 3 hours

Full Marks : 80

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

Answer from both the Groups as directed.

Group – A

(Objective Type Questions)

Answer **all** questions.

1. Choose the correct answer of the following :

                               2×10 = 20

   (a) The example of non-preemptive scheduling is :

   (i) First – Come – First – Serve

   (ii) Round Robin

(iii) Last – In – First – Out

(iv) Shortest – Job – First

(b) The fit policy of a memory manager to place a process in the largest-block of unallocated memory is :

(i) First Fit

(ii) Best Fit

(iii) Worst Fit

(iv) Bad Fit

(c) A process is _____ .

(i) Program in main memory

(ii) Program in cache memory

(iii) Program in Secondary storage

(iv) Program in execution

(d) _____ approach simplifies debugging and system verification.

(i) Kernel

(ii) Layered

(iii) Extended

(iv) Virtual machine

(e) A process may create a new process by executing _____ system call.

   (i) Init

   (ii) Fork

   (iii) Create

   (iv) New

(f) _____ refers to the technology in which some space in hard disk is used as an extension of main memory :

   (i) Cache Memory

   (ii) Paging

   (iii) Virtual Memory

   (iv) Associative Memory

(g) When resources have multiple instances _____ is used for deadlock avoidance.

   (i) Banker's Algorithm

   (ii) Resource Allocation Graph

   (iii) Semaphores

   (iv) All of these

(h) BSD stands for _____ .

   (i) Basic Software Division

   (ii) Berkeley Software Distribution

(iii) British Software Distribution

(iv) Berkeley Software Data

(i) _____ approach can place the data directly into the memory or take the data directly from the memory without direct intervention from the processor.

(i) DMA

(ii) Daisy Chain Arbitration

(iii) Both (i) and (ii)

(iv) None of these

(j) SRM stands for _____ .

(i) Security Resource Manager

(ii) Secret Resource Manager

(iii) Security Reference Monitor

(iv) Security Reference Manual

Group – B

(Long-answer Type Questions)

Answer any **four** questions :

2. (a) Explain the various types of operating system.

(b) Define process. Diagrammatically, explain the life cycle of a process.

(c) Discuss the various types of interfaces in the operating system. $5 \times 3 = 15$

3. (a) Define Turnaround Time, Response Time and Waiting Time.

(b) What are the main advantages of the layered approach and microkernel approach to operating system design ?

(c) Five processes arrive at time given, in the order, with the length of the CPU-burst time given in milliseconds : $5 \times 3 = 15$

Process	Arrival Time	Burst Time
P1	0.0	7
P2	2.0	4
P3	4.0	1
P4	5.0	4

Consider the FCFS, SJF (Non-Preemptive) and SJF (Preemptive) scheduling algorithms for this set of processes. Which algorithm gives the least average waiting time ?

4. (a) With the help of a diagram, explain the hardware used for segmentation. How are protection and sharing inherently supported by segmentation scheme ?

(b) What is context switch ? Why is it considered to be an overhead ?

(c) Differentiate between Network Operating System and Distributed Operating System.

$5 \times 3 = 15$

5. (a) What is the difference between a physical address and virtual address ?

(b) What is meant by device independent I/O software ?

(c) Explain short-term, Medium-term and Long-term scheduling. $5 \times 3 = 15$

6. (a) List two salient features of each of the following types of systems :

(i) Multiprogramming

(ii) Multiprocessing

(iii) Time Sharing

(iv) Real Time Systems

(v) Batch Processing

(b) What is the difference between multiprocessing and multiprogramming ?

(c) State the advantages of segmentation over paging. $5 \times 3 = 15$

7. (a) Briefly describe the four major resource managers in a typical operating system.

(b) Differentiate between interrupts and exceptions.

(c) When do page fault occurs ? Describe the actions taken by the operating system when a page fault occurs. $5 \times 3 = 15$

8. (a) What is deadlock ? How can deadlock be prevented by not allowing "Hold and Wait" ? Is it a feasible policy ?

(b) How can synchronization be achieved when two processes communicate by message passing ?

(c) Most Round-Robin schedulers use a fixed size quantum. Give an argument in favour of and against a small quantum.   5×3 = 15

9. (a) What do you understand by reentrant code ? How does it support sharing ?

(b) Distinguih between internal fragmentation and external fragmentation ? Which of the two is prevalent in paging space system ?

(c) What is a cause of thrashing ? How can the OS reduce the effects of thrashing and improve overall performance ?   5×3 = 15

10. (a) How an access matrix is used for implementing protection policies ?

(b) Is mode switching the same as context switching ? Give reasons for your answer.

(c) OS is also called Resource Manager. Why ? How are interrupts handled by the OS ?

5×3 = 15

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