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Paper Code : BCAC402 Operating System

UPID : 4000103

Time Allotted : 3 Hours   *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following :   [1 x 10 = 10]
   (I)   What is the main function of a CPU?
   (II)   What is the most common type of storage used in modern laptops?
   (III)   What is the kernel in an OS?
   (IV)   What is the purpose of a Layered Operating System?
   (V)   What is a process in an operating system?
   (VI)   What is a thread in an operating system?
   (VII) What is a monitor in process synchronization?
   (VIII) What is continuous memory allocation?
   (IX)   Which type of memory is non-volatile?
   (X)   What is an operating system?
   (XI)   Which OS is open-source and widely used in servers?
   (XII) What is a system call in an OS?

Group-B (Short Answer Type Question)

Answer *any three* of the following :   [5 x 3 = 15]

2. Explain three types of CPU schedulers and compare the execution frequency of these three types of schedulers.   [5]

3. Explain Monolithic, Layered and Microkernel architectures of an Operating System.   [5]

4. What are Processors, Memory, Devices, and I/O Bus in a computer system and draw a diagram showing interconnection and data flow direction among these components.   [5]

5. Explain: Batch, Time-sharing, Distributed and Real-time Operating System.   [5]

6. Explain: Multi-tasking, Multi-programming, Multi-processing OS.   [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following :   [15 x 3 = 45]

7. (a) What is Cryptography, and how is it used in OS Security? What is a Secure Operating System?   [5]
   (b) What is the difference between Security and Protection?   [2]
   (c) What are real-world examples of OS Security Measures?   [3]
   (d) What is a Dangling Pointer? Causes of Dangling Pointers   [5]

8. (a) What is preemptive scheduling? Give an example .   [7]
   (b) What is Non-Premptive scheduling ? GIve an Example.   [4]
   (c) Process Execution Time   [4]

Process	Execution Time
P0	6
P1	3
P2	4
P3	7

   Execute FCFS and SJF CPU scheduling algorithm to find out average waiting time and average turn around time.

9. (a) What are the information stored in the Process Control Block ?   [8]

   (b) How many Types of I/O Buses are used in Operating System?   [7]

10. (a) Define Wait() and Signal() with respect to the semaphore in process synchronization?   [4]

(b) Implement Producer-Consumer problem using semaphore. [8]

(c) Taking an example, explain Race condition with respect to process synchronization. [3]

11. (a) What is Swapping in Operating Systems? Why is Swapping used? [4]

(b) Differentiate between internal and external fragmentation. [4]

(c) Suppose there are memory holes: 50 KB, 200 KB, 150 KB, 300 KB, 100 KB, and 70 KB (in that order). [6]
Now the following processes need the following memory spaces (in order): A = 190 KB, B =135 KB, C = 130 KB, D = 40 KB, E = 200 KB.
What is the amount of internal fragmentation using
(i) First-fit, (ii) Best-fit, and (iii) Worst-fit memory allocation algorithms.

(d) What is context switch? [1]

*** END OF PAPER ***