

Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
SIXTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), MAY 2019

**Course Code: EC366**

**Course Name: Real Time Operating Systems**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks*

Marks

- 1 a) Describe the virtual machine structure of operating system design. (8)
- b) Compare FCFS and Round Robin Scheduling algorithms. (4)
- c) Discuss the problems associated with multiprocessor scheduling. How they can be solved? (3)
- 2 a) Describe the function of operating system as an abstract machine. (5)
- b) Schedule the given list of processes using SJF and Priority algorithms. Compare their performances. (10)

Process	Burst Time	Priority
P1	8	3
P2	5	1
P3	2	4
P4	4	2
P5	3	3

- 3 a) Explain the monolithic and layered architecture of operating systems. (12)
- b) Differentiate Pre-emptive and Non Pre-emptive Scheduling schemes. Give examples. (3)

**PART B**

*Answer any two full questions, each carries 15 marks*

- 4 a) Discuss the different methods of preventing deadlock. (8)
- b) Explain the basic concepts of demand paging. (7)
- 5 a) What is meant by critical section problem? Why it is atomic in nature? (5)
- b) Consider the following page-reference string: (10)

7, 0, 1, 2, 0, 3, 1, 6, 4, 0, 1, 0, 3, 1, 2, 1

Compute and compare the Page Fault Rate for the following replacement algorithms, assuming frame size to be 3. Also assume that the frames are initially empty.

- i) LRU replacement

ii) Optimal replacement

- 6 a) Give the structure of a page table entry used with virtual memory. (4)  
b) State and explain the Dining Philosopher problem. Give a suitable solution(with code) to the problem using semaphore. (11)

**PART C**

*Answer any two full questions, each carries 20 marks*

- 7 a) Explain the various inter-process communication techniques supported by VxWorks and MicroC/OS. (12)  
b) Explain the techniques for performing I/O functions (8)
- 8 a) Write in detail about any three disk scheduling algorithms. (12)  
b) Explain how  $\mu\text{C}/\text{OS}$  -II handles the critical section of code. (8)
- 9 a) Give a detailed description about the different I/O buffering schemes. (10)  
b) Using a block diagram explain how a real time system is implemented. Describe a real life example of an RTOS control system. (10)

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**SCMS**  
School of Engineering & Technology

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**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY**  
SIXTH SEMESTER B.TECH DEGREE EXAMINATION, APRIL 2018

**Course Code: EC366**

**Course Name: REAL TIME OPERATING SYSTEMS**

Max. Marks: 100

Duration: 3 Hours

**PART A**

*Answer any two full questions, each carries 15 marks.*

Marks

- 1 a) What is the significance of a virtual computer? (2)
- b) Compare Parallel Operating systems and Distributed operating systems. (5)
- c) Explain Round Robin algorithm for scheduling. (8)
- Draw the Gantt chart for the list of processes using round robin algorithm.  
Assume time quantum=2 ms.

Process	Burst Time (ms)
P1	10
P2	5
P3	2

- 2 a) List the functions of an operating system as resource manager. (2)
- b) Differentiate Pre-emptive and Non Pre-emptive Scheduling schemes. (6)
- c) Describe the criteria to be taken care of while designing a scheduling scheme. (7)
- 3 a) Describe the features of Multilevel feedback queue scheduling. (2)
- b) Differentiate Kernel Mode and User mode of operations. (3)
- c) Explain the monolithic and microkernel architectures of OS kernel. Which one is better? Give reasons. (10)

**PART B**

*Answer any two full questions, each carries 15 marks.*

- 4 a) Describe the principles of deadlock. (3)
- b) Consider the following page-reference string: (12)
- 0,2,1,6,4,0,1,0,3,1,2,1
- Compute and compare the Page Fault Rate for the following replacement algorithms, assuming frame size to be 4? Assume that the frames are initially empty.

- (i) FIFO replacement.
  - (ii) Optimal replacement.
- 5 a) Using a suitable example, illustrate dynamic partitioning. (5)
- b) With proper code write in detail about producer-consumer problem and suggest a suitable solution. (10)
- 6 a) Using suitable examples, illustrate the idea behind resource allocation graphs. (5)
- b) Explain the concept of Demand Paging. (5)
- c) State and explain the Dining Philosopher problem. Illustrate a solution using fork function. (5)

### PART C

*Answer any two full questions, each carries 20 marks.*

- 7 a) Explain the various I/O buffering schemes. (10)
- b) Write in detail about the evolution of I/O function. (10)
- 8 a) Prepare suitable requirements table for an RTOS control system used in adaptive cruise control. (10)
- b) Using a sample case study explain how real time system is implemented. Draw necessary diagrams to depict the hardware and software implementation. (10)
- 9 a) Explain the various disk scheduling techniques. (10)
- b) Compare the characteristics of Vxworks and  $\mu$ COS. (10)

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