

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

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

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

**Course Code: IT305**  
**Course Name: OPERATING SYSTEMS**

Max. Marks: 100

Duration: 3 Hours

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

Marks

- 1 a) What is meant by Real Time Systems? Explain the types of Real Time Systems with examples? (5)
- b) Explain the methods of passing parameters to a system call. (5)
- c) Draw and Explain the Queuing Diagram. (5)
- 2 a) Using the state-diagram, explain various process states. (7)
- b) Describe Layered Operating System Structure in detail. (5)
- c) Define the terms (3)
- a) Degree of Multiprogramming
- b) Dispatcher
- c) Throughput
- 3 a) What is meant by Multiprogrammed Batch Systems? How do they differ from Time Sharing Systems? (5)
- b) Consider the following set of processes with CPU burst given in milliseconds

Processes	Arrival time	Burst time
P0	0	4
P1	2	3
P2	4	1
P3	5	2

Assume quantum time for RR is 2

- i) Draw Gantt chart for FCFS, pre-emptive SJF and RR (6)
- ii) What is the Average Turn-around time for each of these scheduling algorithms? (2)
- iii) What is the Total Waiting time for each of these scheduling algorithms? (2)

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

- 4 a) Explain Critical Section Problem. What are the requirements for the solution of Critical Section Problem? (6)
- b) What is the purpose of Transition Look aside Buffer in paging? Explain how TLB is used in paging with the help of a suitable figure. (6)
- c) What are Semaphores? What are the usages of Semaphore? (3)

- 5 a) Explain how Strict Alternation achieves mutual exclusion. What is the problem with this solution? How can it be solved using Peterson's solution? (9)
- b) Differentiate between Internal Fragmentation and External Fragmentation. (6)
- Whether paging is an effective solution for these fragmentation problems? Justify.
- 6 a) Consider the following page reference string:  
6, 5, 2, 1, 5, 3, 5, 4, 1, 3, 5, 3, 1, 2, 1, 5, 2, 6, 5, 2  
All frames are initially assumed as empty.
- i) How many page faults would occur for the following replacement algorithms, (5)  
assuming three frames?
- (i) FIFO replacement.
- (ii) LRU replacement
- ii) How many page faults would occur for the above replacement algorithms, (5)  
when four frames are used?
- b) Discuss whether a monitor is superior to a semaphore. Justify your answer (5)

### PART C

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

- 7 a) Consider a disk containing 200 cylinders. At a certain point of time, the disk head is at cylinder 55 and the disk queue contains requests for I/O to blocks on cylinders 58, 39, 90, 160, 18, 150, 38, 184. Find out the total head movement with respect to FCFS, SSTF, SCAN, C-SCAN and LOOK scheduling (10)
- b) What is a File? List and explain the various File Attributes? (5)
- c) Describe the various file operations. (5)
- 8 a) Explain Bankers Algorithm for the deadlock avoidance in a system containing multiple resources of each type (8)
- b) Describe the various methods of recovery from deadlocks (6)
- c) Explain the various file access methods (6)
- 9 a) Describe any 4 schemes for defining the logical structure of directory (12)
- b) What are the necessary conditions for deadlocks? How to prevent deadlock? (8)

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