

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

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

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

**Course Code: IT305**

**Course Name: OPERATING SYSTEMS (IT)**

Max. Marks: 100

Duration: 3 Hours

**PART A**

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

Marks

- 1 a) What is real time OS? How they are classified? Give examples for each. (5)
- b) Write about three types of schedulers in OS. Which scheduler will decide the degree of multiprogramming in a system? Justify your answer. (5)
- c) What is the role of dispatcher? Illustrate the reason for thread being called as a light weight process? Draw the diagram showing transitions of states of a process. (5)
- 2 a) What is SPOOL ing? Write any two salient features of Batch Operating System. Write any three differences between monolithic and micro kernels (5)
- b) How do we calculate the length of a job in SJF? Draw Gantt Chart and find the Average waiting time and average Turn Around Time for the following processes using pre-emptive priority scheduling. (5)

Process	CPU Burst	Priority	Arrival Time
P1	3	2	0
P2	1	1	1
P3	5	7	4
P4	3	3	6

- c) Write any two characteristics of Distributed OS. Why do we say that a single program can give rise to many processes? How the RR scheduling will give a better response time in short term scheduling? (5)
- 3 a) Write a note on APIs. Illustrate how APIs help in developing applications. Give any two examples for APIs. (5)
- b) What are the fields in a process control block? What is the use of PCB in context switching? Write note on fork () system call in UNIX. (5)
- c) Explain the layered approach in system design. What are the advantages of the layered approach to system design? What are the disadvantages of using the layered approach? (5)

**PART B**

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

- 4 a) How pipes are used in IPC? Illustrate the race condition with an example. (5)
- b) Illustrate external and internal fragmentation of Memory. (5)  
 Given five memory wholes of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (ill order), how would the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory?
- c) Write any two message passing mechanisms? Write short note on the following: (5)  
 i) Cooperating processes      ii) Concurrent processes.
- 5 a) How semaphore could be used as a solution for Critical section problem? (5)
- b) Consider the following page reference string: (5)

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6.

How many page faults would occur for the following replacement algorithms, assuming five frames? Assume that all frames are initially empty.

- i) LRU replacement      ii) FIFO replacement      iii) Optimal replacement
- c) How does paging ensure Protection and Sharing? (5)  
What causes thrashing situation in Operating System?
- 6 a) What are the steps in handling page fault? Consider a logical address space of 32 pages with 1,024 words per page, mapped onto a physical memory of 16 frames. Calculate: (5)
- i) How many bits are required in the logical address?  
ii) How many bits are required in the physical address?
- b) Give the Dining Philosophers problem. Explain monitor as a solution for it. (5)
- c) Write short notes on the following: (5)
- i) JAVA monitors      ii) Event Counters

### PART C

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

- 7 a) How would you select a Disk Scheduling algorithm? What do you mean by device Driver? (7)
- b) Explain the significance of reference count in Acyclic Graph Directory structure (7)
- c) How to distinguish deadlock from starvation? How to eliminate circular wait situation to prevent deadlock? (6)
- 8 a) Consider a system with 5 processes numbered from P0 to P4 with only three types of resources A, B, C each with instances 10, 5, 7 respectively. At time  $t_0$ , the snapshot of the demand and allocation of resources is as shown below. Using Bankers' Safety Algorithm, check whether  $\langle P1, P3, P4, P2, P0 \rangle$  is a safe sequence. Write the contents of Work and finish data structures at every pass. (8)

Process	Allocation			Max			Available		
P0	0	1	0	7	5	3	3	3	2
P1	2	0	0	3	2	2			
P2	3	0	2	9	0	2			
P3	2	1	1	2	2	2			
P4	0	0	2	4	3	3			

- b) Write about basic file system structure. (5)
- c) How the policy differs in UNIX and MS DOS to delete a directory in a tree structured directory structure? Discuss the merit and demerits of each policy. (7)
- 9 a) Draw the diagram of Virtual File System Concept in LINUX. Write about the two basic functions of the VFS. (7)
- b) What are the approaches for recovery from deadlock? Write merits and demerits of each. (7)
- c) Write about the six basic operations on files. (6)

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