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 noteson 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 < P1, P3, P4, P2, P0 > 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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